INDIA'S BEST PERFORMING PORT

JAWAHARLAL NEHRU PORT AUTHORITY
NAVI MUMBAI

DISASTER MANAGEMENT PLAN

SEPTEMBER-2024

FOREWORD

This study has been carried out by M/s Environmental Technical Services Private Limited, New Delhi, Work Order No. JNP/M/Safety/work order-DMP/2024/667, dated 07/08/2024 based on inputs received from Jawaharlal Nehru Port Authority, Navi Mumbai. M/s Environmental Technical Services Private Limited, would like to take this opportunity to extend their thanks to the Jawaharlal Nehru Port Authority, Navi Mumbai, management and officers who co-operated in supplying the data and information required, thus maximizing the effectiveness of the study. The study identified the hazards and analyzed the consequences of potential accident scenarios. The above study results, conclusions and recommendations were based on the information made available to ETS Private Limited at the time of study. ETS Private Limited exercised all reasonable skill, care and diligence in carrying out the study. However, this report should not be deemed as any undertaking, warranty or certificate and cannot be challenged in any court of law of the country.

Place: New Delhi
Date: 03.09.2024

Managing Director

JAWAHARLAL NEHRU PORT AUTHORITY

DISASTER MANAGEMENT PLAN

CONTENTS- PART I

LIST OF ABBREVIATIONS

ADWR	Airborne Doppler Weather Radar
ANM	Auxiliary Nurse Midwife
AWS	Automatic Weather Stations
CADA	Coastal Area Development Authority
CAPF	Central Armed Police Forces
CCM	Climate Change Mitigation
CCS	Cabinet Committee on Security
CDEF	Civil Defense
CDMM	Centre for Disaster Mitigation and Management, Vellore
CDRC	Central Drought Relief Commissioner
CEDMM	Centre of Excellence in Disaster Mitigation and Management/IIT-Roorkee
CFI	Construction Federation of India
CIDC	Construction Industry Development Council
CISF	Central Industrial Security Force
CMG	Crisis Management Group
CRPF	Central Reserve Police Force
CRZ	Coastal Regulation Zone
CSO	Central Statistics Office
CSS	Centrally Sponsored Schemes
DDMA	District Disaster Management Authority
DMD	Disaster Management Department
DMP	Disaster Management Plan
DOS	Department of Space
DOT	Department of Telecommunications
DRD	Department of Rural Development
DRDO	Defense Research and Development Organization
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSJE	Social Justice and Empowerment Department
EHRA	Earthquake Hazard and Risk Assessment
EOC	Emergency Operations Centre
EREC	Earthquake Risk Evaluation Centre
EWS	Early Warning System
GOI	Government of India
HAZCHEM	Hazardous Chemicals
HAZMAT	Hazardous Material
HRVCA	Hazard Risk, Vulnerability and Capacity Assessment
ICG	Indian Coast Guard
ICMBA	Important Coastal and Marine Biodiversity Areas
ICR-ER	Integrated Control Room for Emergency Response
ICT	Information Communication Technology
IDRN	Indian Disaster Resource Network
IMD	India Meteorological Department
INCOIS	Indian National Centre for Ocean Information Services
IRS	Incident Response System
IRT	Incident Response Team
MAFW	Ministry of Agriculture and Farmers Welfare

MCA	Ministry of Corporate Affairs
MCAFPD	Ministry of Consumer Affairs, Food and Public Distribution
MCF	Ministry of Chemicals and Fertilizers
MHA	Ministry of Home Affairs
MMSME	Ministry of Micro, Small and Medium Enterprises
MNCFC	Mahalanobis National Crop Forecast Centre
MNRE	Ministry of New and Renewable Energy
MOEFCC	Ministry of Environment, Forest and Climate Change
MOES	Ministry of Earth Sciences
MOSH	Ministry of Shipping
MSDE	Ministry of Skill Development and Entrepreneurship
MSIHC	Manufacture Storage and Import of Hazardous Chemicals
NSFT	Nhava Sheva Free Port Container Terminal
NAPCC	National Action Plan on Climate Change
NCDC	National Centre for Disease Control
NCMC	National Crisis Management Committee
NCMRWF	National Centre of Medium Range Weather Forecasting
NERC	National Emergency Response Centre
NGO	Non-Governmental Organizations
NHWIS	National Hazardous Waste Information System
NIDM	National Institute of Disaster Management
NIO	North Indian Ocean
NIRD	National Institute of Rural Development
NISA	National Institute of Security Academy
NPDM	National Policy on Disaster Management
NRSC	National Remote Sensing Centre
NSDA	National Skill Development Agency
NSDC	National Skill Development Corporation
NSG	National Security Guard
NSS	National Service Scheme
NSICT	Nhava Sheva International Container Terminal
O&M	Operation and Maintenance
OHSAS	Occupational Health and Safety Assessment Series
PED	Power/ Energy Department
RMI	Risk Management and Insurance
RTSMN	Real Time Seismic Monitoring Network
SDG	Sustainable Development Goals
SDMA	State Disaster Management Authority (or equivalent Nodal Agency)
SDMC	State Drought Monitoring Cell
SDRF	State Drought Monitoring Cell
SDRN	State Disaster Response Force
SIDM	State Institute of Disaster Management
SPCB	State Pollution Control Board
SPWD	State Public Works Department
T1	Short-Term, ending 2022
T2	Medium-Term, ending 2027
T3	Long-Term, ending 2030
VHF	Very High Frequency
WCTn	Wind Chill Effective Minimum Temperature

1. PRELIMINERIES

1.1 PROFILE

Jawaharlal Nehru Port Authority is a port at Navi Mumbai (formerly known as the Nhava Sheva Port) within the Mumbai harbour on the west coast of Maharashtra, India. The port was commissioned on 26th May 1989.The port lies on the main land opposite to the city of Mumbai across the Thane creek. It is well connected to the major highways and rail networks in India. The nearest airport to JNPA is Navi Mumbai (Loknate Diva Patil international) airport about 14 km away.

Location of the port

Latitude: 18°56'43'' N; Longitude: 72°56'24''E

The port encompasses an area of 3000+ hectares. The port handles 56% of India's container traffic.

The port has four container terminals, namely NSFT, BMCTPL, GTI / APMT, NSICT & NSIGT DPWORLD and two liquid cargo jetty (BPCL and NSDT). Also, one in no coastal berth for handling bulk cargo.

Nhava Sheva Free Port Container Terminal (NSFT)

Table 1: NSFT Terminal details

Quay length (m)	600
Maximum Draft (m)	15
Capacity (In million TEUs)	1.35
Reefer Points (Nos.)	576
RMQCs (Nos.)	09
RTGCs (Nos.)	27
RMGCs (Nos.)	05
Tractor Trailers	100
Backup Area in Hectares (Container Yard)	61.49 (Including NSDT area)
Reach Stackers	11 (Hired)
Railway Siding Tracks for ICD	04
Maximum Permissible LOA of The Vessel (m)	370

Gateway Terminal India (GTI- APM)

Gateway Terminals India (GTI) is a joint venture between APM Terminals and the Container Corporation of India Ltd (CONCOR). Incorporated in July 2004, GTI operates the third container terminal at Jawaharlal Nehru Port on a build, operate and transfer (BOT) basis for a period of 30 years. It commenced partial operations in March 2006 and became fully operational from October 2006.

Table 2: GTI-APM Terminal details

Quay length (m)	712
Maximum Draft (m)	15
Reefer Points (Nos.)	880
RMQCs (Nos.)	10
RTGCs (Nos.)	40
RMGCs (Nos.)	03
Yard Area (In Hectares)	47.24
Maximum Permissible LOA of The Vessel (m)	370
Empty Handlers	02
Twin Lift Spreaders (m) rated load	61

NSICT and NSIGT-DP WORLD TERMINAL

JN Port entered into a license agreement in July 1997 with M/s. Nhava Sheva International Container Terminal (NSICT) a consortium led by M/s. P & O Ports, Australia, for construction, operation and management of a new 2-berth container terminal on BOT basis for period of 30 years. The same was commissioned in April 1999. The project comprises construction of 600 meters quay length; reclamation of 25.84 hectares of area backup for container yards and requisite container handling equipment along with other related facilities. The present capacity of the terminal is currently assessed as 15.00 million tonnes per year.

Table 3: DP World Terminal details

	NSICT	**NSIGT**
Quay length (m)	600	330
Maximum Draft (m)	15	15
Reefer Points (Nos.)	772	320
RMQCs (Nos.)	08	04
RTGCs (Nos.)	29	16
RMGCs (Nos.)	03	03
Yard Area (In Hectares)	25.84	27
Maximum Permissible LOA of TheVessel (m)	370	370

Bharat Mumbai Container Terminal (BMCT) (Phase I – 3 berths)

BMCT - Fourth Container Terminal is developed on Design, Built, Fund, Operate and Transfer (DBFOT) basis for the concession period of 30 years. The work was awarded to M/s Bharat Mumbai Container Terminals Pvt. Ltd. (the subsidiary of Port of Singapore Authority) at the Revenue Share of 35.790%. The Concession Agreement was signed on 6th May 2014 and the Concession was awarded on 22nd December 2014.

The project is implemented in two Phases. i.e. Phase–I and Phase–II. The total capacity addition would be 4.8 Million TEUs, 2.4 Million TEUs in each phase.

Table 4: BMCT Terminal (Phase–I) details

Quay length (m)	1000
Maximum Draft (m)	16.5
Reefer Points (Nos.)	1620
RMQCs (Nos.)	04
RTGCs (Nos.)	36
RMGCs (Nos.)	04
Yard Area (In Hectares)	90
Maximum Permissible LOA of The Vessel (m)	370
Designed Capacity (million TEUs)	2.4

NSDT

NSDT commissioned 1st September 2002 of Total Length 445 meters. Vessels up to 183 meters LOA and up to 10 meters draught are being handled. Container Vessels, Cement, General Cargo and Liquid Cargo Vessels are being handled with a Capacity of about 0.15 Million TEUs Container & 0.9 Million Tons Other Cargo. Total 2.77 Million Tons.

Table 5: NSDT details

Quay Length (m)	445
Maximum draft (m)	10-Max(Tidal)
Design capacity (Million TEUs Year) (Million Tonnes/Year)	0.15 2.77
Max. Permissible LOA of The Vessel (m)	183
RMQCs (Nos.)	3

Liquid Cargo berth - BPCL Jetty (BPCL berth has extended and now Four parking berth)

BPCL's Liquid Cargo Berth (LCB) is situated at Jawaharlal Nehru (JN) Port, Navi Mumbai inside Jawaharlal Nehru Port Authority (JNPA), Sheva, Navi Mumbai. M/s Bharat Petroleum Corporation Limited (BPCL) is the owner and Jetty operator of the LCB. The Jetty handles various liquid cargos viz. petroleum (Class A, Class B and Class C), non-petroleum, chemicals, etc. from ship to shore and vice-versa through close conduit system of pipeline network, using marine loading arms for POL products and hoses for non-POL products. The Jetty has two parking berths, one on sea side and the other on shore side to facilitate various marine ships/vessels. LCB is developed with large network of pipelines, intermediate lines, pig launchers, marine loading arms and loading hoses.

The total quay length is 300 m. The vessels can be handled at creek side as well as shore side. Vessels with a capacity of 85,000 DWT tankers (Creek side) and 35,000 DWT tankers (Shore side) respectively have been handled at the Jetty. The berths are in operation since February 2002. Water depth in front of berth is maintained at 12.3m during Monsoon 13.0m during fair weather for Creek side and 10.2m for Shore Side with respect to chart data. Three ships can be unloaded simultaneously, one at the shore side and two at the creek side.

LPG unloading facility is also present at this jetty, which receives at BPCL, Uran LPG Plant. Products such as Crude Oil, Naphtha, Motor Spirit, High speed Diesel (HSD), Phosphoric Acid, Ammonia etc. are handled by private tank farm owners respectively through unloading arm, flexible hoses and transferred through dedicated cross-country pipelines.

There are unloading arms installed on each side of the jetty. BPCL handles the chemicals using SS braided hoses. The hoses are flanged to the unloading pump installed in the ship and then laid across the jetty up to the fixed pipeline.

Six numbers of Marine unloading arms are installed on Creek Side & Four numbers Marine unloading arms are installed on Shore Side. There is also a provision for future installation of a Marine unloading arm on shore side and a Marine unloading arm on sea side.

The jetty operations are carried out round the clock. There is a BPCL office on the Jetty which takes care of the day-to-day operations.

The details of the unloading arm and hoses given in table below:

Table 6: Marine unloading arm/Hose details

MLA/Hose details		Material	Pressurein bar (g)	Temperature(^{0}C)
Dia.	Company			
16”	ONGC	Crude oil	3	Atm.
12”	IOCL	Black oil	3	Atm.
12”	IOCL	White oil	3	Atm.
12”	RIL	White oil	7	Atm.
12”	IMC	White oil	7	Atm.
12”	BPCL	LPG	7	-4
12”	BPCL	Fuel Oil	3	Atm.
8”	BPCL	LDO	3	Atm.
16”	Dipak fertilizers	Ammonia	6	-18
10”	IMC	Chemicals	7	Atm.
8”	GBL	Chemicals	7	Atm.
12” & 8”	IMC/Suraj	Base oil	7	Atm.
12”	IMC/Suraj	Edible oil	7	Atm.
12”	GBL	Edible oil	7	Atm.
12”	GBL	Edible oil	7	Atm.

Shallow Water Berth (SWB)

The Shallow Water Berth (SWB) is a versatile facility designed to handle various types of cargo, including containers, cement, general cargo, and liquid cargo, for both coastal and international shipping. The berth spans 445 meters, with 125 meters developed as a Roll-on/Roll-off (Ro-Ro) terminal, and has a capacity of 4 million metric tonnes per annum (MMTA). It can accommodate vessels up to 30,000 Deadweight Tonnage (DWT), making it a preferred choice for diverse cargo operations.

In November 2022, JNPA entered into a 30-year concession agreement with JM Baxi Ports and Logistics Ltd. to upgrade, equip, operate, and maintain the SWB and the adjacent Coastal Berth through a Public-Private Partnership (PPP) model.

In terms of operational performance, during the financial year 2022-23, the SWB handled approximately 2.59 million tonnes of cargo, marking a 48.35% increase over the previous year. This includes significant volumes of dry bulk (cement) and liquid bulk cargo, underscoring the berth's role in supporting coastal shipping and decongesting rail and road networks by providing cost-effective and efficient multi-modal transportation solutions.

Pipelines within the Liquid Cargo Jetty includes

- Two numbers of 24" White Oil Pipeline connecting LCB and IOC Terminal
- 24" Black Oil Pipeline connecting LCB and IOC Terminal
- 12" & 8" Furnace Oil Pipelines connecting LCB and BPCL Bunk Depot
- Two numbers of 12" LPG Pipeline connecting LCB and Uran LPG Plant
- 24" White Oil Pipeline connecting LCB and IOT Navghar Terminal
- 24" Black Oil Pipeline connecting LCB and IOT Navghar Terminal
- 16" White Oil Pipeline connecting LCB and RIL Terminal
- 12" Base Oil Pipeline connecting LCB and Shell Terminal
- 16" Phosphoric Acid Pipeline connecting LCB and Deepak Terminal
- 16" Ammonia Pipeline connecting LCB and Deepak Terminal
- 16" Black Oil Pipeline connecting LCB and IMC Terminal
- 12" Edible Oil Pipeline connecting LCB and IMC Terminal
- 10" Chemicals Pipeline connecting LCB and IMC Terminal
- 8" Base Oil Pipeline connecting LCB and IMC Terminal
- 18" & 12" Edible Oil Pipelines connecting LCB and Suraj Agro Terminal
- 8" Base Oil Pipeline connecting LCB and Suraj Agro Terminal
- 18" Edible Oil/ Molasses Pipeline connecting LCB and GBL Terminal
- 12" Edible Oil Pipeline connecting LCB and GBL Terminal
- 8" Chemicals Pipeline connecting LCB and GBL Terminal
- 30" Crude Oil Pipeline connecting LCB and ONGC Uran

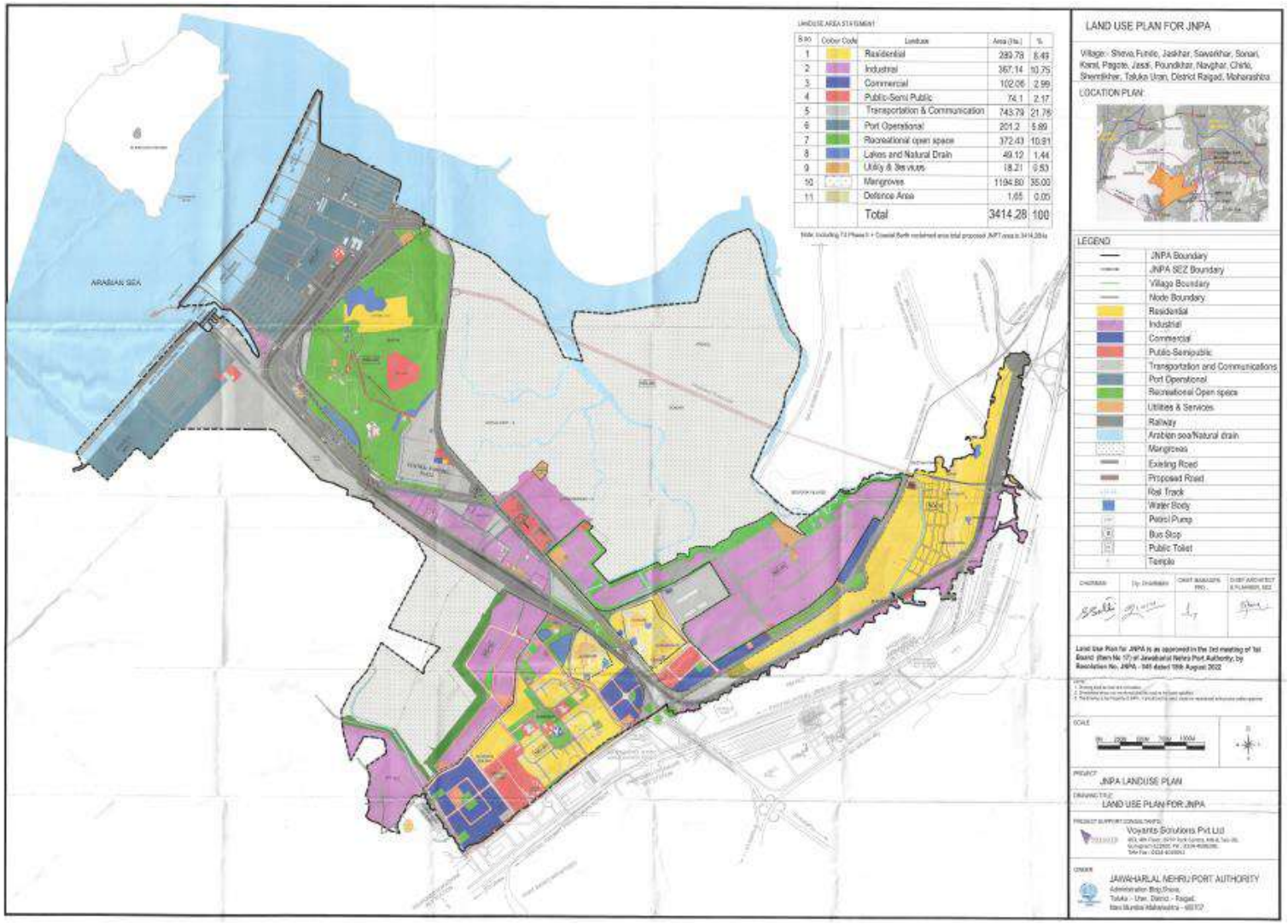
Anchorage area

- Bunkering of HSD for ONGC vessels.

Utility Services

JNPA receives electrical power from Maharashtra State Electricity Distribution Company Ltd. (MSEDCL) at 220KV level from two independent express feeders at Master Unit Sub Station (MUSS) of the Port. Two independent express feeders at 220 KV level ensures 100 percent reliability of power supply from MSEDCL. Three transformers at MUSS ensure 100% redundancy and uninterrupted power to all terminals of JNPA. As green port initiative, total 822.6 KW of rooftop solar panels are installed at various public buildings of JNPA with generation capacity of approximately 10,00,000 units per year.

Port Layout



S.no	Colour Code	Landuse	Area (Ha.)	%
1		Residential	289.78	8.49
2		Industrial	367.14	10.75
3		Commercial	102.06	2.99
4		Public-Semi Public	74.1	2.17
5		Transportation & Communication	743.79	21.78
6		Port Operational	201.2	5.89
7		Recreational open space	372.43	10.91
8		Lakes and Natural Drain	49.12	1.44
9		Utility & Services	18.21	0.53
10		Mangroves	1194.80	35.00
11		Defence Area	1.65	0.05
		Total	3414.28	100

Figure No. 1: Layout of JNPA

Berth Location Details

Figure No. 2: Berth Location Details

Port Area

Table 7: Port Area

Water Spread	50 sq. km
Land Area	3252 hectares including reclaimed area

Entrance Channel

Table 8: Entrance Channel

Length	:	22 km channel share with MbPT upto Jawahar Dweep + 7.2 km from Jawahar Dweep to JNPA.
Width	:	370 m at straight reach,460 m at the berths

Berth Particulars

Table 9: Berth Particulars

Sr.No	Berth	Type	Maximum permissible draft/mtr	Quay length (mtr)	Maximum size of the vessel that can be accommodated length (mtr)
1.	NSFT	Alongside	15	680	370
2.	NSICT	Alongside	15	600	370
3.	GTI-APM terminal	Alongside	15	712	370
4.	BMCT	Alongside	16.5	1000	370
5.	NSIGT	Alongside	15	330	370
6.	BPCL	Alongside	15	300	183
7.	NSDT – Shallow Water Berth	Alongside	10-Max (Tidal)	445	183
8.	NSDT – Coastal Berth	Alongside	9.2 (Tidal)	250	160

Establishments within the Port area

- Nhava Sheva Free Port Container Terminal (NSFT)
- DP world
  - Nhava Sheva International Container Terminal (NSICT)
  - Nhava Sheva (India) Gateway Terminal Pvt. Ltd. (NSIGT)
- Gateway Terminals India (GTI-APM terminal)
- Bharat Mumbai Container Terminal (BMCT)
- Bharat Petroleum Corporation Limited (BPCL terminal)
- Indian Oil Corporation Limited (IOCL) tank farm
- RIL tank farm
- IMC tank farm
- GBL tank farm
- Bharat Shell tank farm
- Suraj Agro tank farm
- Deepak Fertilizer tank farm
- Jawahar Customs House
- JNPA - CFS

Storage Facilities

Table 10: Storage facilities

Tank Farm	Product	Storage Tank (nos.)	Total capacity in KL
RIL	Naphtha, Motor Spirit (MS), Kerosene, N-Paraffin, Paraxylene, Mixed Xylene, HSD, Aviation Turbine Fuel (ATF), Light Diesel Oil (LDO), Aromatic Feed Stock (AFS), Aromatic Heavy Ends, Linear Alkyl Benzene	10	71,025
IMC	CBFS, CPO, CDSBO, BUTYL ACRYLATE, STYRENE, MDC, 2EH,ULTRA-6, EHC-110, HSD, MS,CSFO, CRUDE GLYCOL, 500 N, SN-600, 150N, SN150, AP/E CORE2500, PALMOLEIN, R600, J150	46	170,000
GBL	Acetic Acid, Acetone, Aniline, Butyl Acrylate, Butyl Acetate, CG, Chloroform, Crude Glycol, Cumene, EDC, IPA, LAB, MDC, MEG, MIBK, Mix Xylene, N Butanol, Phenol, Styrene Monomer,Tolune, VAM, Edible Oil, Base Oil,Bitumen	Phase I-41 Phase II-22	173819 --
IOCL	MS, BS-III HSD, BS-IV HSD, ATF,LSHF HSD	11	108,000
Deepak Fertilizer	Ammonia, Phosphoric Acid	03	29,000 14000 (KL Phos. acid) 15000 MT (Ammonia)
Bharat Shell	Base Oil	04	15,000
Suraj Agro	Edible Oil	15	65,100

Stakeholders

- Port Authority,
- Ship owners and operators,
- Container Terminal operators,
- Tank farm operators,
- Liquid Cargo operators,
- Stevedoring companies,
- Rail carriers/operators,
- Truck and Shipping companies,
- Contractors to support the day- to- day activities of the port.

Meteorological Parameters

Temperature and Rainfall

The temperature starts rising from March and May is generally the hottest month of the year with mean daily max temperature of 32.9^{0}C. With the onset of monsoon by about first week of June there is an appreciable drop in temperature. The month of January is the coolest month of the year with mean daily maximum and minimum temperatures of 29.1^{0}C and 19.3^{0}C.

The region is subject to a regular seasonal climatic variation determined by the occurrence of two annual monsoons. The South-West monsoon period extends from June to September. Most of the annual rainfall occurs during South-West monsoon, the average monthly rainfall being about 45 cm. Rain during the North-East monsoon is slight.

The average rainfall in the area is about 2422 mm and annual mean number of rainy days is about 77.8. The period between June to September receives nearly 95% of the seasonal rain. The monthly variation in temperature and rainfall is as per table 11.

Table 11: Temperature and Rainfall

Month	Temperature		Rainfall(mm)	No of rainy days average
	Maximum ^{0}C	Minimum ^{0}C		
January	30.6	16.4	0.6	0.3
February	31.3	17.3	1.5	0.1
March	32.7	20.6	0.1	0.1
April	33.1	23.7	0.6	0.3
May	33.3	26.1	13.2	1.2
June	31.9	25.8	514.1	15.4
July	29.8	24.8	868.3	23.5
August	29.3	24.5	553	19.1
September	30.1	24	306.4	12.8
October	32.9	23.1	62.9	3.7
November	33.4	20.5	14.9	1
December	32	18.2	5.6	0.3

Wind

General direction of wind is from the North to the West quarter, with seasonal variations are as per table 12.

Table 12: Wind directions and Speeds

Months	Directions	Speeds
February to May	Mainly from N.W	Max 8 to 10 Beaufort Substantial 4-6 Beaufort
June to September	Mainly from W.N.W	Max 8 to 10 Beaufort Substantial 6-8 Beaufort
October to January	Mainly from N.N.W	Max 6 to 8 Beaufort Substantial 2-6 Beaufort.

Winds are generally light to moderate with some increase in force in the summer and monsoon seasons. During January to May wind strengthens in the afternoon. In the southwest monsoon season winds are mainly from west or north east. During rest of the years, winds are north easterly to easterly in the mornings and blow from directions between south west and northwest in the afternoons. Summary is as per table 13.

Table 13: Wind speeds

Month	Wind Speed(knots/hr)
January	9.1
February	9.3
March	10.4
April	10.5
May	10
June	12.8
July	14.8
August	13.4
September	10
October	8.5
November	8.2
December	8.5
Total/average	10.5

Waves

The predominant waves are the swell waves generated by deep sea storms.

These mainly arise just before and during the South West monsoon. The statistical analysis indicates that most wave periods fall between 6 seconds and 10 seconds.

During the continuance of the North-East monsoon, North-Easterly winds known as "Elephantas" blow for short durations during the months of October-November. As the fetch and duration of these winds are limited, the "Significant height" of the resulting waves is not likely to exceed 1 meter with period ranging from 3 to 5 seconds.

The predominant wave direction during monsoon is from south west to west. During this period, waves of 4 to 5 m height normally occur, however, waves of 8.0 m height and period of 14 seconds have also been reported. October and November are transition periods during which the predominant wave direction changes to north and north east. During December and January the waves mainly occur from north to north east and from February to May waves predominantly come from the north-west quadrant. The summary of wave data is as per table 14.

Table 14: Wave height

Parameter	Value	
	1 year	100 years
Significant wave height (m)	0.6	1.6
Significant wave period (years)	10	10
Max. wave height (m)	1	3

Currents

The currents in Mumbai harbour and the near shore zone are tide induced with reversal at high and low waters. The current strength ranges from 1.5 to 3 knots.
Current speeds and directions within the Bay and associated tributaries are largely due to the tidal movements and show little variation from non-monsoon to monsoon. The maximum current speed in the outer Bay exceeds 1 m/s and the variation in the water column at any given time is not significant.

Lateral variations in the speed however occur with current in the eastern area being somewhat stronger. The maximum current speeds decrease in the inner creek and are typically around 0.8 m/s, decreasing markedly during neap tide.

As characterized for a tide dominated system, the alongshore components are fairly strong with the dominance of seaward component while cross-shore components are relatively weak. Their relative magnitude and directions are indicative of net seaward movement over a tidal cycle though shoreward drift can be significant around the change of tide.

Excursion lengths and average current speeds observed for the Bay based on the available drogue trajectories are as per table 15.

Table 15: Tide excursion at Mumbai Harbour

Tide	Excursion length (km)		Avg. Current speed (m/s)	
	Flood	Ebb	Flood	Ebb
Spring	11.5	11.5	0.5	0.55
Neap	5.5	6.0	0.25	0.3

Excursion lengths during flood and ebb are more or less of a similar magnitude as expected for tidal creeks devoid of large volumes of external water inputs. The overall circulation pattern suggests that the pollutants entering the creek upstream of the bridge at Vashi tend to oscillate within the creek system and flushing to the sea is a delayed process. These pollutants would however be considerably diluted under the influence of tide induced turbulence and advection.

During monsoon however, the creek receives voluminous land run-off and the discharge of near freshwater through the Ulhas estuary, which flushes the inner creek to a large extent.

Tides

The quality of water-spread area of the Bay is mainly influenced by tides which induce flushing and dispersion of pollutants entering the system. The tides in Mumbai harbour are characterized by occurrence of two high and two low waters with marked diurnal variation in the levels.

The monsoon freshwater flow, though important in flushing the inner zone, is not high enough to cause significant changes in the hydrography of the outer Bay. Tides (1.2 - 5 m) in the region are semi-diurnal type with an appreciable diurnal inequality. The flood tidal front advances in north-easterly direction and recedes to south-west.

The dominant tide in the Mumbai Harbour is the semi-diurnal tide with a period of 12 hours and 40 minutes. Table 16 gives the particulars of tidal levels related to Chart Datum.

Table 16: Tidal Levels

Tide	Above (+) or Below (-) datum
Highest High Water recorded	+5.39 m
Mean High Water Spring Tides	+4.42 m
Mean High Water Neap Tides	+3.30 m
Mean Sea Level	+2.5 m
Mean Low Water Neap Tides	+1.86 m
Mean Low Water Spring Tides	+0.76 m
Lowest Low Water recorded	-0.46 m
Highest Low Water	+2.74 m

Statistical studies indicate that all high tides exceed + 2.70 m. and about 5% of all high tides would be less than + 3.20 m.

Variations in tides in Mumbai estuary are as per table 17.

Table 17: Tide Variations

Location	Range (m)		Time lag from Apollo Bunder (min)
	Spring	Neap	
Apollo Bunder	5.0	1.6	-
Pir Pau	4.3	1.4	10-15
Vashi	4.2	1.2	10-30
Airoli	4.9	1.6	12-45
Thane	4.9	1.5	15-60

The tidal range decreases markedly up to Vashi as compared to that at the Apollo Bunder but increases in the inner creek, the range at Thane is only marginally lower than that at Apollo Bunder. This increase appears to be due to the funnel shape geometry of the Bay that is conducive for accumulation of seawater with the advance of tidal front in the lower creek. The tide at Thane lags by 30 to 45 min with respect to the tide at Apollo Bunder with the lag more pronounced for neap tide.

Spring tides are important for spill response as oil beached during this time is likely to remain stranded on the upper portion of the shoreline until the next spring tide (about 14 days) or storm event. If there is a storm surge during a spring tide, the oil can remain stranded for a much longer period.

Meteorological Station

Meteorological Station installed at 800 m away from the jetty at Port Control Station provides data on Air Quality, Pressure, Temperature, Humidity, Rainfall, Wind Speed and Direction and Tide level with the help of sensors as well as the forecast data and warning received from Regional Meteorological Centre (RMC) - Mumbai.

1.2 RATIONALE

Authority and relevant Regulations

- The Disaster Management Act, 2005;
- National Disaster Management Plan, 2019;
- Post 2015 – Global Framework;
- Prime Minister of India's Ten-Point Agenda for Disaster Risk Reduction.

The Disaster Management Act, 2005

The Disaster Management Act, 2005 (DM Act 2005) lays down institutional and coordination mechanism for effective Disaster Management (DM) at the national, state, district and local levels. As mandated by this Act, the GoI created a multi-tiered institutional system consisting of the National Disaster Management Authority (NDMA) headed by the Prime Minister, the State Disaster Management Authorities (SDMA) headed by the respective Chief Ministers and the District Disaster Management Authorities (DDMA) headed by the District Collectors/ District Magistrate and co-chaired by Chairpersons of the local bodies.

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 and mitigation of disasters, allocating sufficient funds and other resources to the National and State government agencies.

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, Updating and its approvals. Measures for financing the activities within the plan are also required to be spelled out in the plan.

Post 2015 – Global Framework

The Post-2015 goals and agenda are set forth in the three landmark global agreements reached in2015 – 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 three documents set the stage for future global actions on DRR, sustainable development and climate change.

1.3 SCOPE OF THE PLAN

Aim and Objective

This plan exhibits the organizations commitment to the safety of employees and increases the organizational safety awareness. It defines the roles and actions necessary to prepare for and respond to any disaster situation in a coordinated manner. Thus, minimize or avoid the potential losses from hazards and disasters caused due to human, technical or natural phenomena inside the Port and Port water limits, through the implementation of rapid, effective and appropriate response & recovery procedures.

DMP is intended to provide guidance to all concerned departments within the port with a general concept of potential emergency assignments before, during and following emergency situations in accordance with the priorities of SENDAI framework.

Disaster Management Cycle

Based on the culture of prevention and mitigation following a disaster or near disaster event, the capacity building measures are institutionalized.

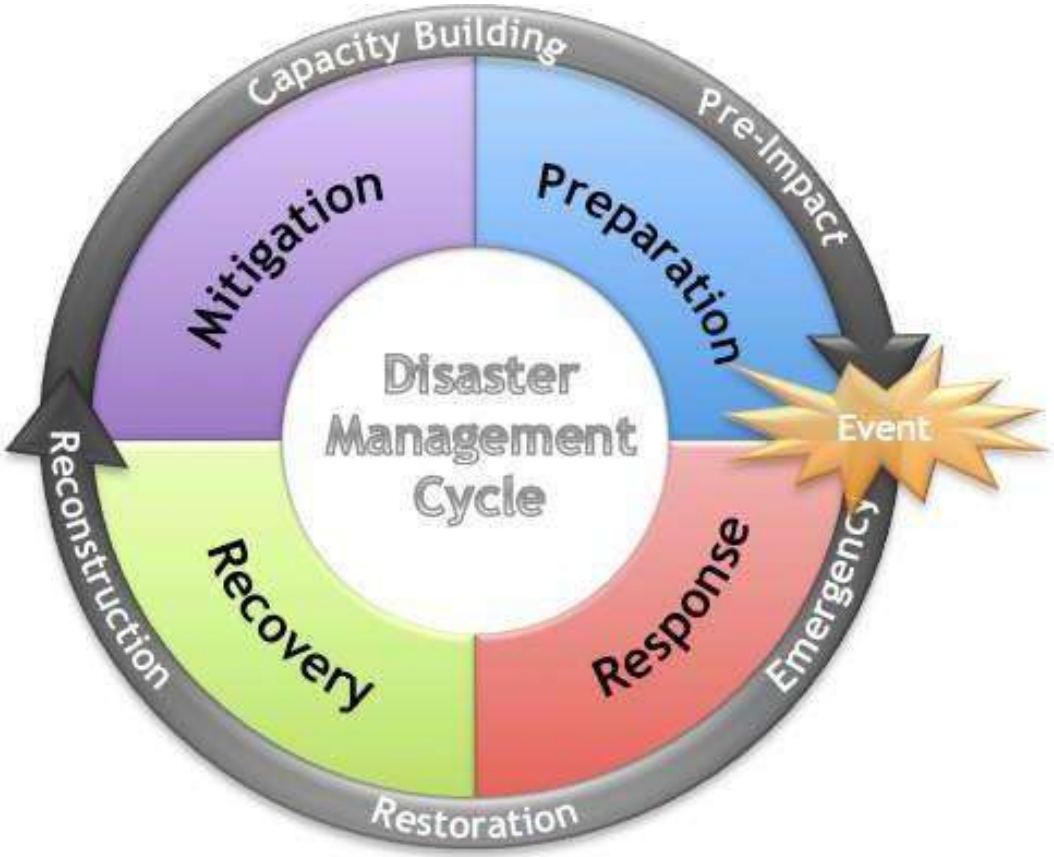


Figure No. 3: Disaster Management Cycle

The primary objectives of the DMP are to:

a) To contain and control the emergency incidents,
b) Proactively safeguard the lives of the JNPA 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) To ensure that the JNPA 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) To initiate off-site emergency plan in-case of necessity as and when required.

The scope covers –

- The existing preventive and mitigation measures besides those that are additionally required to reduce the risk in time bound manner;
- Identification of potential scenarios that are likely to occur considering risk profile of port;
- the preparedness to develop plans for actions when disaster or emergencies occur
- 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;
- 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;
- the post disaster recovery with aim to restore the affected area to its original conditions.

1.4 VISION

"To build, operate and maintain a safer and disaster resilient Port by a holistic, proactive, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation"

1.5 TIME FRAMES

EVENT SCENARIOS

Probability: Low-once in 10-50yrs; Moderate=once in 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat: 0=Very Low / 1=Low / 2= Moderate / 3 = High

Event/Scenario Spectrum	Early warning	Probability of occurrence	Duration Impact	Impact on property	Impact on People	Time to Restore Facilities	Risk Threat Probability
Cyclone	96-12 Hrs.	Very Low	0	0	0	12- 24 hrs.	Moderate
Floods	4-2 hrs.	Very Low	1	1	2	12-36 hrs.	Very Low
Earthquake	nil	Very Low	1	1	2	12-36 hrs.	Very Low
Tsunami	6-1 h	Very Low	1	1	2	12-24 hrs.	Very Low
Marine Accident							
Collision	< 1min	Low	<1hr	2	0	4 h	Moderate
Grounding	<1 min	Low	1-48h	2	0	1-48 hrs.	Moderate
Fire/Explosion	< 1min	Low	0.5-12 h	2	1	1-96 hrs.	Moderate
Oil Pollution	<5 mins	Low	1-72 h	1	1	1-30 d	Moderate
Transport Accident							
Road	< 1min	Low	< 5 min	0.1	0.1	< 2 h	Moderate
Rail	< 1min	Low	< 5 min	0.05	0.1	1-48 h	Low
Function Failure							
Elec sub station	< 1min	Mod	24 h	0	0	12-48 h	Low
Pipelines failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Fire station failure	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Water system	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Communications	< 1min	Mod	1-24 h	0	0	12-48 h	Low
Medical facilities	< 1min	Mod	1-24 h	0	0	12-48 h	Low

Event/Scenario Spectrum	Early warning	Probability of occurrence	Duration Impact	Impact on property	Impact on People	Time to Restore Facilities	Risk Threat Probability
Human related							
Labour Action/ Strike	24 h	Mod	< 24 h	0	0	12-48 h	Low
Civil disturbance	< 12 h	Mod	< 24 h	0	0	12-48 h	Low
Terrorism & War							
State of War	< 48 h	Low	1- 10 d	2	2	12-96 h	Mod
Bomb Threat	< 1 h	Mod	1-3 d	2	3	12-96 h	High
Hostage Threat	< 1 h	Mod	1 – 3 d	1	3	12-48 h	High
Terrorist attack	Nil	Mod	1- 3 d	1	3	> 48 h	High

1.6 INSTITUTIONAL FRAME WORK FOR DISASTER MANAGEMENT

National Level

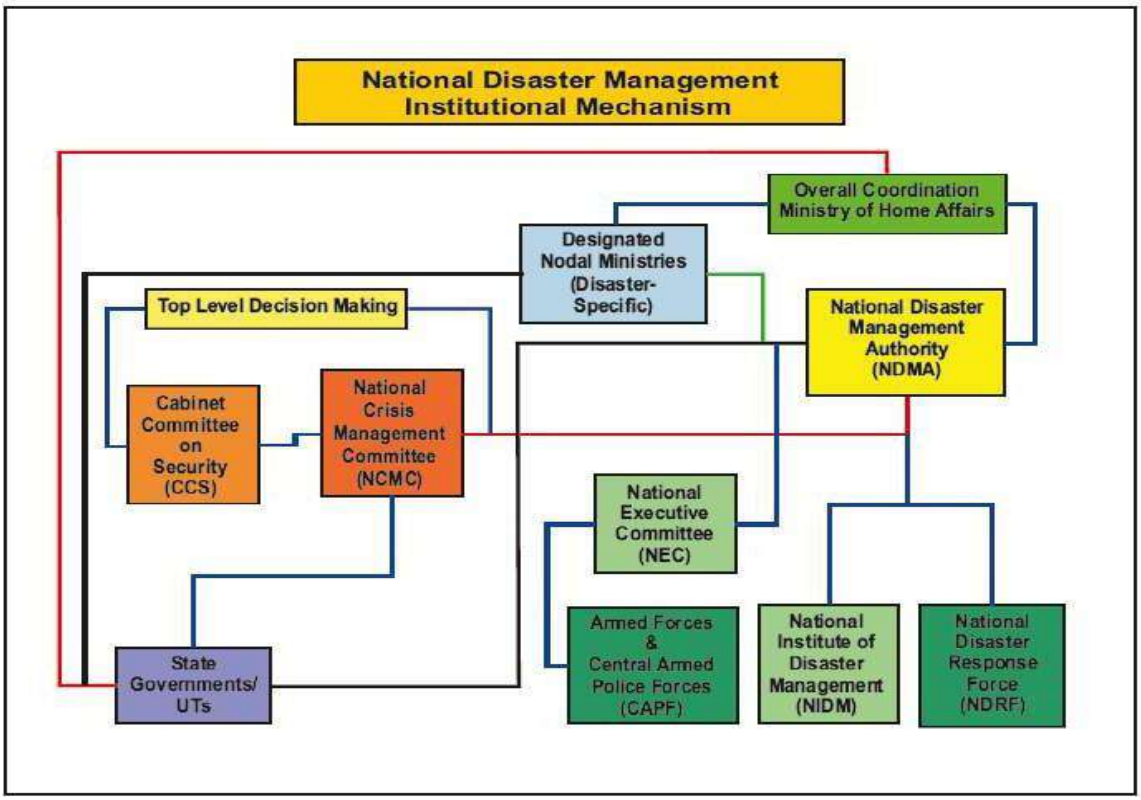


Figure No. 4: National – level disaster management – basic institutional framework

State level

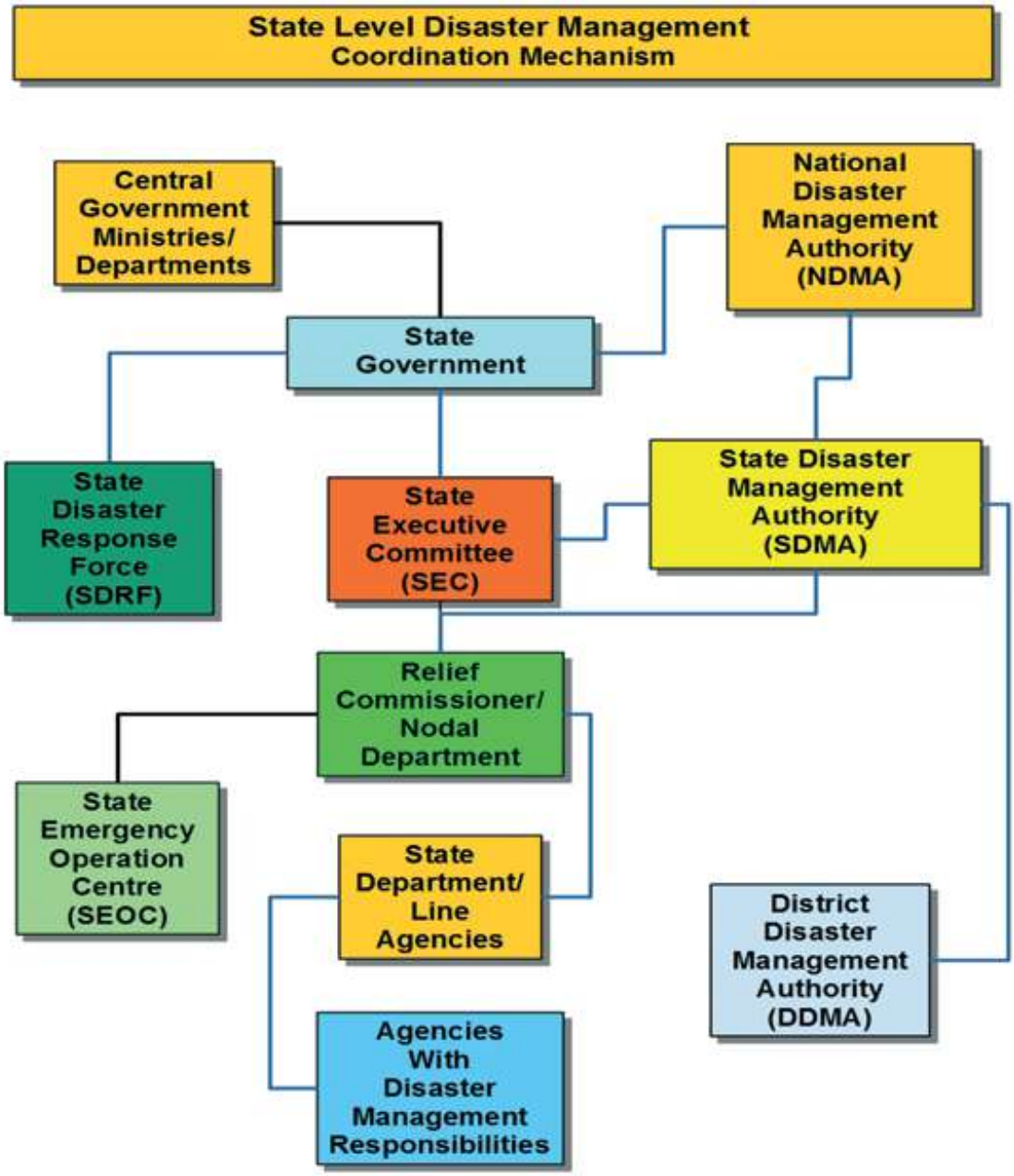


Figure No. 5: State – level disaster management – basic institutional framework

District Level

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

Incident Response Team at JNPA

IRT will be headed by the CIC with the elected representative of the Port department and various functional heads of stakeholders. Refer Figure 6.

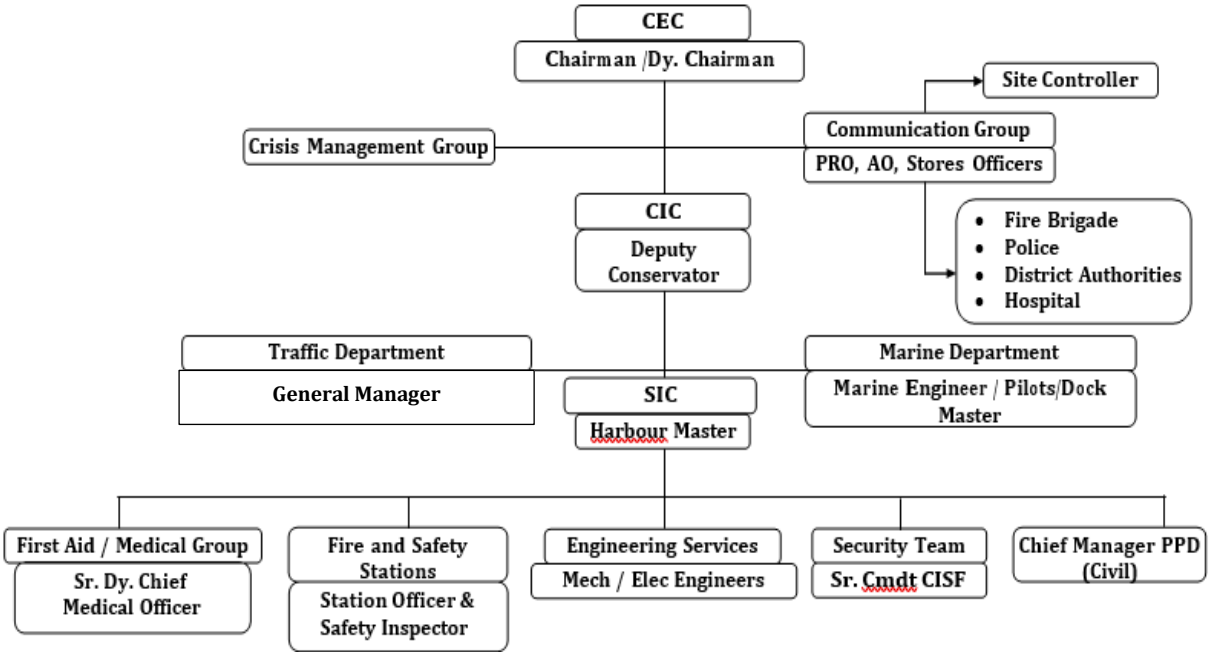


Figure No. 6: ONSITE EMERGENCY ORGANIZATION

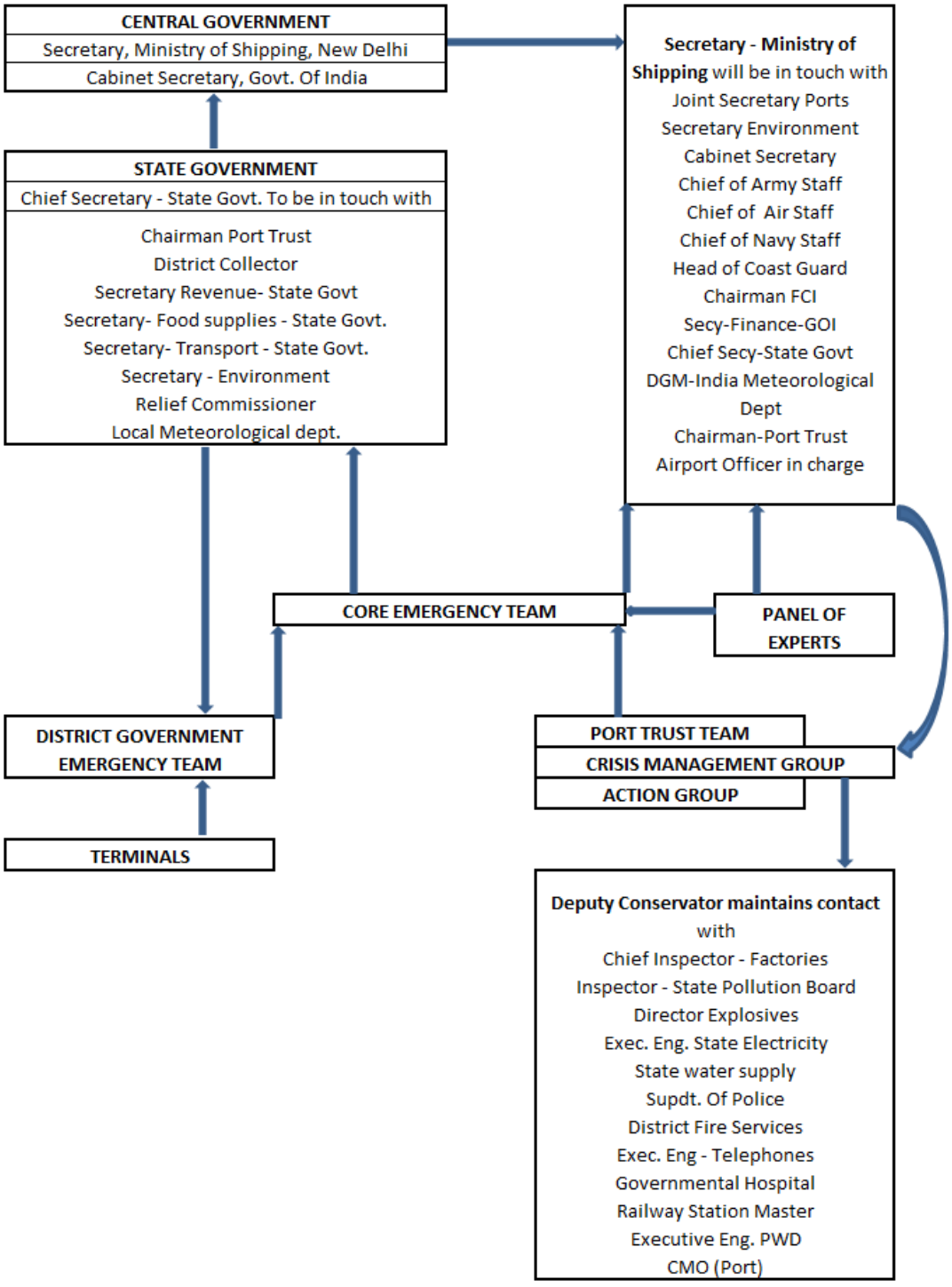


Figure No. 7: Off-Site Emergency Organization Chart – Level 2 and 3

2. HAZARD, RISK, VULNERABILITY & CAPACITY ANALYSIS

2.1 DISASTER RISKS, VULNERABILITIES AND CHALLENGES

DISASTERS IN MAHARASHTRA

Table 18: Natural Disaster in Maharashtra (Source: Maharashtra Disaster Management Plan – April 2016)

Natural Disasters	Past History	Vulnerable Areas
Floods	33 districts in 2005 31 districts in 2006	All districts of the State
Cyclones	No major history	Six coastal districts including Mumbai
Earthquake	1967 Koyna 1993 Latur	High Risk : Ratnagiri, Raigad, Satara, Thane, Latur

History of Chemical Disaster

Table 19: Chemical Disaster in Maharashtra (Source: Ministry of Environment and Forests (Disaster Management of India – Ministry of Home Affairs GOI)

Sr. No	Year	State & Area	No. of Incidents	Fatalities/ injuries
1.	2002	Gujarat, Kerala, Maharashtra	06	05 deaths 31 injured
2.	2004	Andhra Pradesh, Gujarat, Haryana,Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Uttarakhand, WestBengal, Delhi	18	47 deaths 91 injured
3.	2006	Andhra Pradesh, Gujarat, Maharashtra, Kerala, Rajasthan, Uttarakhand, Uttar Pradesh, West Bengal	16	32 deaths 24 injured
4.	2007	Assam, Gujarat, Kerala, Madhya Pradesh, Maharashtra, Punjab, Uttarakhand, West Bengal	18	37 deaths 14 injured
5.	2008	Andhra Pradesh, Gujarat, Jharkhand, Kerala, Maharashtra, Uttar Pradesh	23	50 deaths 148 injured

Disasters Classification (as per NDMA)

- Man-Made Disasters
  - Chemical

- Natural Disasters
  - Wind and Cyclone
  - Earthquake
  - Tsunami
  - Flood

Chemical Disaster

Chemical disasters may be traumatic in their impacts on human beings and may have casualties and also damages nature and property. The elements which are at highest risks due to chemical disaster primarily include the Port, its employees & staff, adjacent industries, hazardous chemicals vehicles, the residents of nearby settlements, adjacent buildings, occupants and surrounding community.

Chemical disasters may arise in number of ways, such as:

1. Process and safety systems failures
   - Human errors
   - Technical errors
   - Management errors
2. Induced effect of natural calamities
3. Accidents during the transportation (Loading/Unloading/Pipeline/Tank truck)
4. Hazardous waste processing/ disposal
5. Terrorist attack/ unrest leading to sabotage.

Wind and Cyclone

In accordance with national and regional hazard map available with BMTPC the Raigarh district falls under moderate cyclone damage risk zone (max. wind speed of 44 m/s).

Cyclones can cause damage to port infrastructures including damage to mangroves, trees and flooding of low line and poor drainage affected areas. In addition, ships in the harbor can also sustain serious damage and grounding.

Cyclones are classified by

- Strength of associated winds,
- Storm surges
- Exceptional rainfall occurrences.

Table 20: Wind speed Criterion for deep depression and cyclonic storm

Type of Disturbances	Wind Speed in km/h	Wind Speed in Knots
Depression	31-49	17-27
Deep Depression	49-61	27-33
Cyclonic Storm	61-88	33-47
Severe Cyclonic Storm	88-117	47-63
Super Cyclone	More than 221	More than 120
1 knot - 1.85 km per hour		

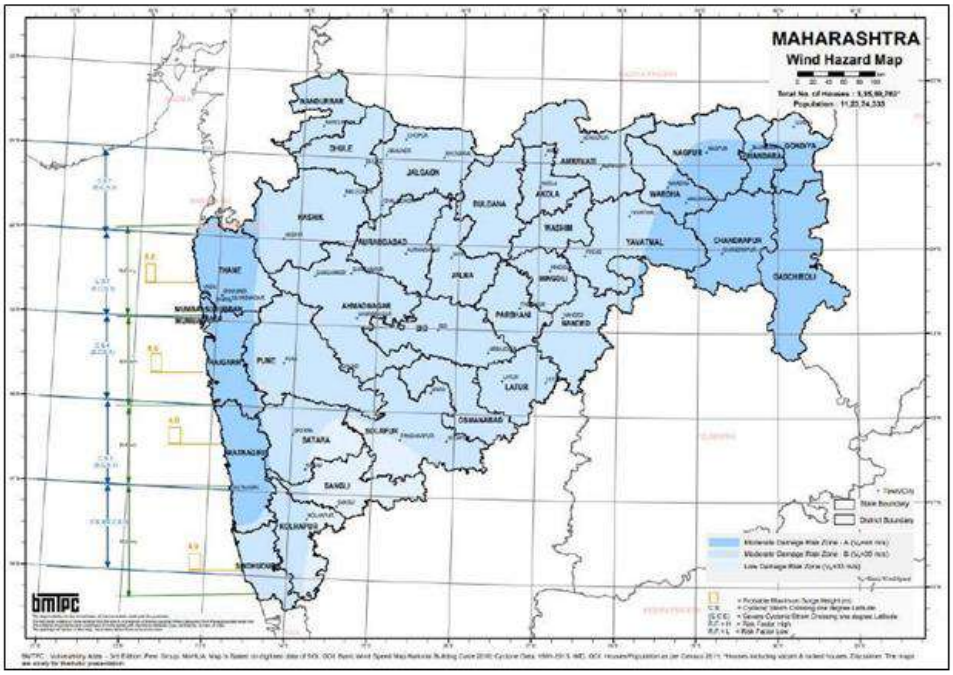


Figure No. 8: Wind Hazard Map (Source: Vulnerability Atlas of India)

Earthquake

Raigarh district which includes JNPA falls under Moderate earthquake damage Risk zone (zone category III).

Table 21: Classification of Earthquakes

Class	Scale
Great	8 or more
Major	7-7.9
Strong	6-6.9
Moderate	5-5.9
Light	4-4.9
Minor	3-3.9

The offices, utility buildings and berthing structures including cranes are required to be constructed for damage zone III. The relevant BIS standards are as follows:

a) For office and other utility buildings – 2016 (IS 1893)
b) For berthing structures -2002

Though the port is a newly developed port (about 30 years) some infrastructure has deteriorated with time due to wind weather effects and aging. A time bound strategy will be undertaken by the port to assess the condition and strengthening of the older buildings and quay side structures that might be affected. This also applies to quay cranes and RMGs. A strategy to counteract the effects of land settlement in the port industrial zone will be adopted to mitigate risk.

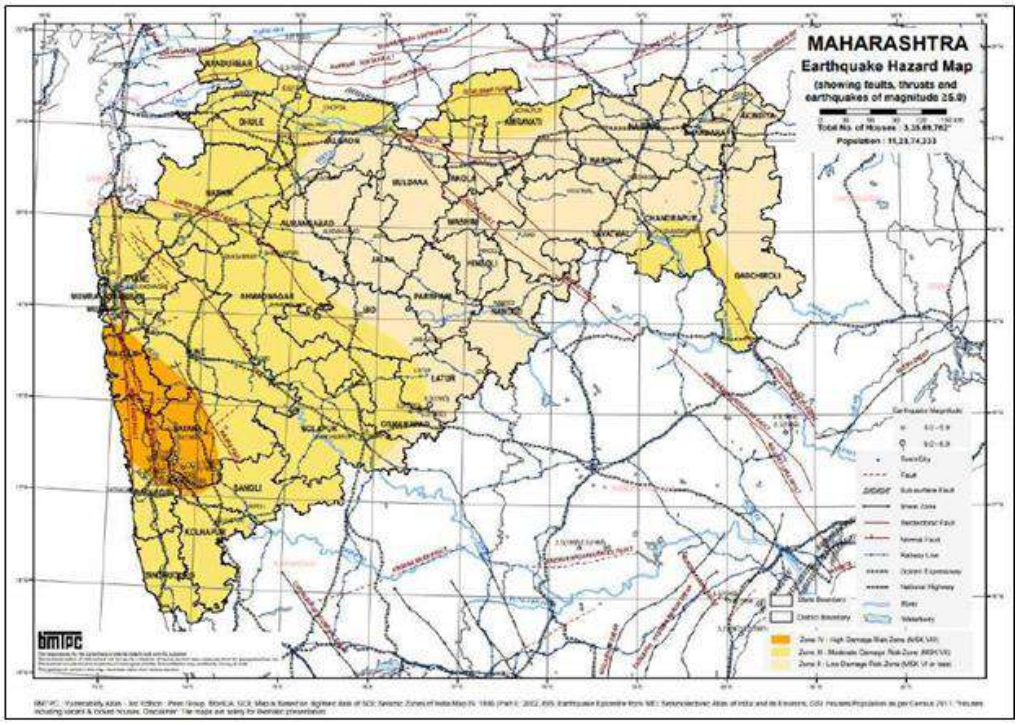
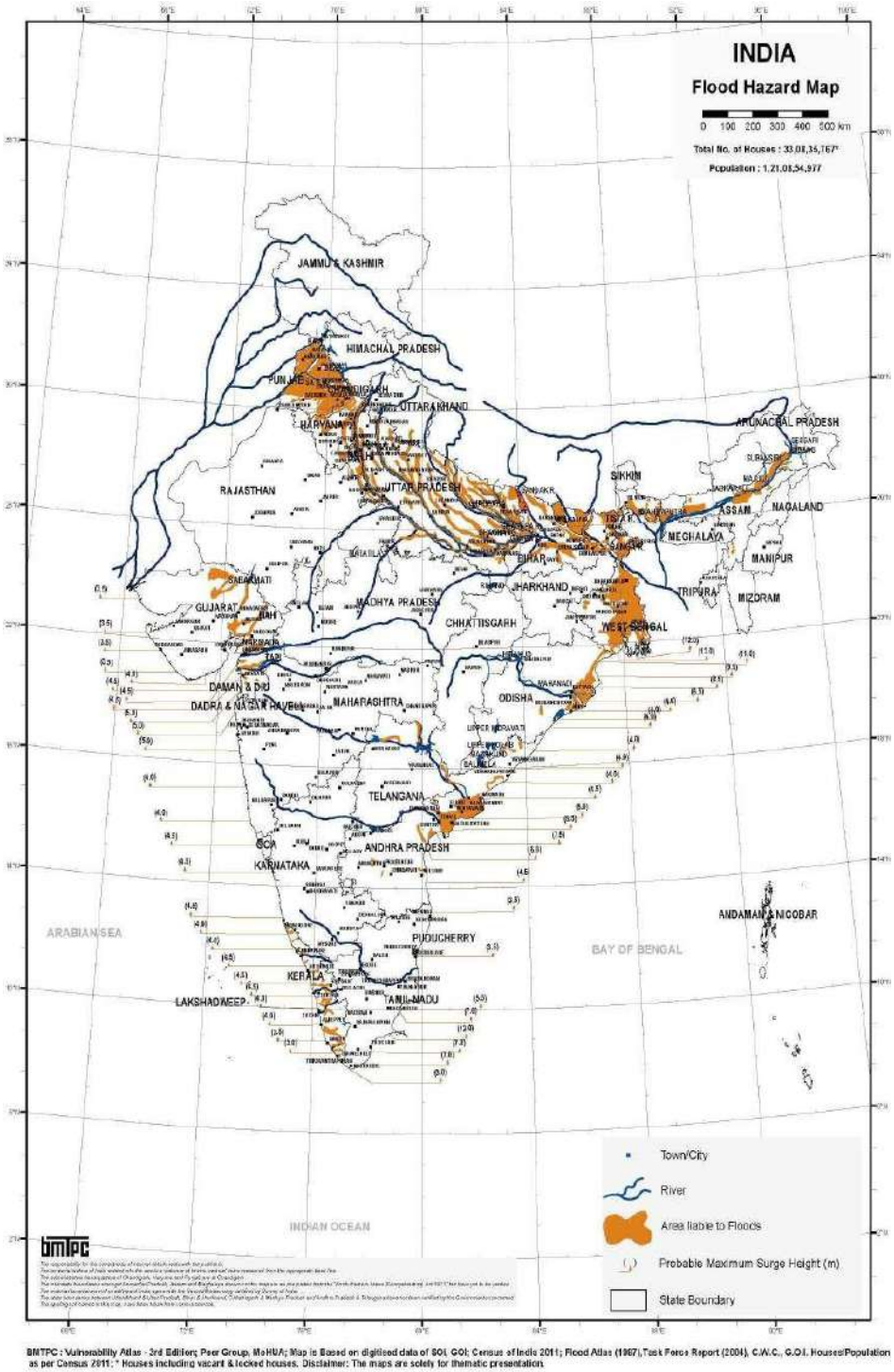


Figure No. 9: Earthquake Hazard Map (Source: Vulnerability Atlas of India)

Floods

JNPA being a coastal port in the Mumbai harbor region is bounded on the west by the waterfront, in the north and south by sea water quays. Therefore, has land boundary only on the eastern side. Flood prone areas are located in the latter zone. It comprises of villages where the drainage infrastructure is poor and instances of flooding have occurred in the past during heavy rainfall. The present port infrastructure as such does not face a flooding risk. A maximum surge height of 5 m has been recorded in the past for Raigad – Navi Mumbai coastal zone. The HTL & LTL has been demarcated by MCZMA in the published maps.

Port development plans for future expansion will take into account the strategy to take care of the HTL affected zones within the areas earmarked for expansion allowing sufficient and planned capacity of storm drainage and natural slopes including reservoirs if any that might come within the development zone.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987),Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Figure No. 10: Flood Hazard Map (Source: BMTPC, India)

Tsunami

An Early Warning System for information related to earthquakes and generation of tsunami has been created under the Ministry of Earth Science, GOI.

A network of tsunami coastal stations has been setup which relay information to the center via satellites.

INCOIS provides such data to JNPA on a regular basis. Hence, adequate early warning will be available to the port. Necessary evacuation measures and provision of tsunami shelters will be provided.

2.2 UNDERSTANDING DISASTER RISKS

In view of the complex nature of the navigational operations connected with pilotage of ships inside the narrow channel and their traffic regulation by VTMS, weather variations including tidal windows etc., berthing complexities, turning circles and usage of tugs; HAZID workshop with various stakeholders connected to marine department was carried out. As a result, a better understanding of navigational risk was achieved.

Chemical Disaster (Fire / Explosion/Toxicity) Risks

These can be caused due to loss of containment of hazardous cargo (LPG, Naphtha, Ammonia etc.) handled in the Port. Fire incidents can also occur in the admin building, Port users building, utility craft etc. This type of hazard can be due to both Man-Made and Natural Disasters.

Table 22: Potential Scenarios for liquid bulk cargoes

Sr. No.	Cargo handling activity	Location	Chemical leakage scenario
1	LPG unloading and transfer to Uran Plant	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of LPG from 12” marine unloading arm and 12” transfer pipeline.
2	Ammonia unloading and transfer to Dipak Fertilizer terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Ammonia from 16” unloading arm and 16” transfer pipeline.
3	Crude oil unloading and transfer pipeline	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Crude Oil from 16” unloading arm and 32” transfer pipeline.
4	Naphtha unloading and transfer to Tank farm terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Naphtha from 12” marine unloading arm and 24” transfer pipeline.

Sr. No.	Cargo handling activity	Location	Chemical leakage scenario
5	MS unloading and transfer to Tank farm terminal	BPCL - LCB	Small leak and Full Bore Rupture of unloading arm of Naphtha from 16" marine unloading arm and 16" transfer pipeline.
6	Flammable chemicals unloading and transfer to Tank farm terminal	BPCL - LCB / NSDT - SWB	Small leak and Full Bore Rupture of unloading flexible hose of chemicals from 8" flexible hose and 8" transfer pipeline.
7	Toxic chemicals unloading and transfer to Tank farm terminal	BPCL - LCB / NSDT - SWB	Small leak and Full Bore Rupture of unloading flexible hose of chemicals from 8" flexible hose and 8" transfer pipeline.
8	Flammable chemicals handled in tank containers	APMT / NSFT / NSICT / NSIGT/ BMCT	Major leakage, Medium Leakage and Small leakage of the tank container.
9	Toxic chemicals handled in tank containers	APMT / NSFT / NSICT / NSIGT/ BMCT	Major leakage, Medium Leakage and Small leakage of the tank container.

1. e.g. Acetone, Acrylonitrile, Alkyl alcohol, Benzene, Cyclo-hexane, Ethylene, MTBE, Propylene, Toluene,Xylene, VAM etc.
2. e.g. Acrylonitrile, Benzene, Toluene etc.
3. e.g. Acrylonitrile, Benzene, Carbon Disulphide, Ethylene oxide, Methylamine, Heptane, Hexane, PropyleneOxide Toluene, Xylene etc.
4. e.g. Acrylonitrile, Benzene, Carbon Disulphide, Ethylene oxide, Methylamine, Propylene Oxide etc.

Potential scenarios for containers:

1. Loss of containment – Major leakage, a puncture or major loss of containment through 2.5"or more dia.
2. Loss of containment – Medium leakage, a puncture or major loss of containment through 1.0"or more dia.
3. Loss of containment – Small leakage, a puncture or major loss of containment through 0.2"or lesser dia.
4. Full Bore Rupture – BLEVE effect

Oil Spill Disaster Risk

An Oil Spill Contingency Plan (OSCP) for the port emergency is prepared by the port and the same will be applicable in case of an oil and chemical spill disaster. This plan is prepared in accordance with the requirements of National Oil Spill Disaster Contingency Plan (NOS-DCP). A capability analysis has been carried out as per ICG requirements and is given in the plan.

Collision and Grounding of ships have the potential for causing oil spills of magnitude of Tier 1 (700 tonnes) and above.

Potential scenarios considered in this plan are as follows:

Scenario 1: Collision with small craft - Tanker / Container/ Bulk Carrier in harbour
Scenario 2: Collision between two vessels in channel (Regulated traffic)
Scenario 3: Tanker /Container/ Bulk Carrier tug assisted berthing - Contact with jetty
Scenario 4: Grounding- Tanker/Container/ Bulk Carrier transiting in channel Scenario
Scenario 5: Grounding- during pilotage of deep draft vessel
Scenario 6: Collision with dredger within navigational channel
Scenario 7: Collision – passing vessel in port waters (unregulated traffic)
Scenario 8: Dragging anchor
Scenario 9: Contact - during operations in turning circle (large vessels)
Scenario 10: Collision with channel marking buoys
Scenario 11: Fire on vessel in the Navigational channel/Anchorage

Natural Disasters Risk

In view of the historical records and HRVCA profile of the port the following natural disasters are considered for the preparation of the plans and their implementation.

1. Wind and Cyclone
2. Flood
3. Earth quake
4. Tsunami

The port is committed to update plans for the above mentioned geological and meteorological disasters on a periodical basis. Such updates include preparation/Updating of SOPs, structural assessments, project planning, environmental and utility management and provision of emergency equipment. These steps will highlight the strengths and weakness of the capabilities and thus creating resilience.

CBRN/ Terrorism risk

Considering the threats of nuclear / radiological risk due to concealment of cargoes and mis-declaration, the port will take actions as directed by MoS and equipment and capability provided within the ambit of such directives. The steps for mitigation of risk due to terrorism will be considered separately as part of Port Facility Security Plan (PFSP).

Handling of Class 7 Products

The International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Materials specify requirements for packages and freight containers for radioactive substances. No radioactive substances may be brought into a port area unless they conform to these requirements.

Hazard Assessment worksheet

The above identified hazards have been assessed considering the history of incidents, vulnerability and risk assessment and are placed in the following Hazard Assessment worksheet.

Table 23: 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
1,2,6	4	Leakage - Fire/Explosion	Fire /Explosion due to LPG/ POL/ Chemical leakage	Leakage at the connections of the hose/unloading arm to the manifold, damage to the pipeline, Static Electricity	Standard Operating Procedure, Ship-Shore checklist, Mobile/or fixed fire-fighting system	Minor Damage To vessel &/or other vessels/ Shore structures, injury to personnel	Major damage to shore structures e.g. loading arms etc., Major damage to vessel & pollution, Capsizing & port closure, fatality	3	3	2	2	2	4	4	3	3	3	Shipboard emergency procedure, Activation ofport DMP, POLREP, Activation of port OSCP
3,4	4	Toxic	Toxic gas (Ammonia & Acrylonitrile leak during operation – on Ship or Ashore	Leakage at the connections of the loading arm to the manifold, valves.	Standard Operating Procedure, Ship-Shore checklist, Mobile/or fixed fire-fighting system	Minor health issue to personnel, Minor environment damage	Serious health issue to personnel	3	1	2	3	2	4	2	3	4	3	Shipboard emergency procedure, Activation of port DMP
5	4	Corrosive	Corrosive acid (Phosphoric) leakage	Leakage at the connections of the hose to the manifold	Standard Operating Procedure, Ship-Shore checklist	Minor Damage to vessel, Shore structures, minor injury to personnel	Major damage to shore structures e.g. hoses, Major damage to vessel & pollution,	2	1	1	1	2	3	2	2	2	3	Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
							Serious injury to personnel											
7	5	Fire/Leakage	Fire/ leakage due to Crane Accidents (Container drop/ crane fall)	Human Error, Equipment failure	Emergency Shutdown system, Overload alarm, Standard Operating Procedure	Minor Damage to container and Jetty (Crane), Injury to personnel/ vessel	Major Damage to container and Jetty, Serious injury to personnel, Terminal closure	2	2	0	1	2	3	3	1	2	2	Activation of terminal DMP and port DMP
8	8	Fall	Container falling into water in Case of extreme weather, vessel collision or grounding	Latch Failure, Listing of vessels, Collision with other vessel, Bad weather conditions	Secured Arrangements of containers	Temporary passage block	Channel blockage, HAZMAT Pollution	1	1	0	1	3	2	3	1	3	4	Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP
9	1	Fire	Fire in engine room floating craft	Fire due to fuel leakage, Fire during assisting in extinguishing other fires.	Continuous Manning, Automatic Fire detection and fire extinguishing system	Minor Damage to the craft, Serious injury to the person	Major damage, Fatality	1	1	0	1	2	2	2	1	1	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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.1	2	Collision	Collision with small craft – Tanker/ Container/ BC in channel	Vessel equipment failure/ malfunction (navigational, propulsion, steering, auxiliary, tugs), Human error (pilot, master, tug), 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)	Exchange of information between Pilot & Master (Pilot exchange card), VTS, Training of personnel, Security boat, Navigational channel is buoyed & well marked, weather monitoring, suspension of operation on Increase of wind speed Beyond 30 knots.	Avoiding action fails resulting in glancing blow with moderate damage to one or both vessel, Delay to berthing	Penetration to oil tanker/ Container/B C, Oil pollution, serious damage to small craft, possible total loss and life of personnel	1	2	0	1	2	3	3	1	3	3	Incident report, Activate port DMP, SOPEP, POLREP, Activate 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.2	2	Collision	Collision between two vessels in Channel (Regulated)	Non-compliance with collision regulation, Human error, Lack of communication, Ship's equipment breakdown, Local congestion, difficulty in communication, maneuvering to (dis)embark pilot, absence of VTS control, Multiple vessel convergence especially in poor visibility, Incomplete passage plan	VTS, VHF, proper communication, Security boat, Pilot information exchange card, Designated anchorage area &designated boarding area & designated channel for port operation & pilot (Designated VHF frequency)	Moderate damage to one or both vessel, Delay to berthing	Serious damage to vessels and oil pollution, Vessel(s) stranded, Fire and Explosion, Blockage of the navigation al Channel	2	2	0	2	1	4	4	3	4	3	Incident report, Activation of port DMP, PLOREP, Activation of 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.3	1	Contact	Tanker/ Container/ BC tug assisted berthing – Contact with jetty	Mechanical failure (steering or main engine), Vessel blackout, Misjudgment by pilot/master/ tug master, Bad Weather (wind speed, poor visibility), Breakdown of tugs, Parting of tow line, Inadequate illumination at berth	Assistance of tugs and use of anchor, Use of electronic aids and proper Bridge team management, VTS, Pilot information card, Use of anchor and engines, Weather monitoring, tug assistance, Use of ships and tugs illumination for night berthing	Minor damage to side shell plating of vessel, No loss of cargo, Minor damage to quay or fendering system	Serious damage to side shell plating of vessel, Serious damage to quay/ fend er, Loss of cargo containment, pollution, fire/ explosion, personnel injury or loss of life	1	1	0	1	2	3	3	1	3	3	Incident report, remove vessel from damage areas and reberth, Activate port DMP, POLREP, Activate port OSCP.
10.4	3	Grounding	Grounding – Tanker/ Container/ BC transiting in channel	Vessel equipment failure, Misjudgment, Human failure, Adverse weather conditions, Fishing vessel Small craft impedes passage	Use of electronic aids and proper bridge team management, Weather monitoring VTS, Use of Anchor, Proper ship signal, Use of	Damage to shell plating – possible water ingress & increase in draught, No loss of cargo	Major hull damage, Vessel stranded, Oil pollution, Possible loss of Cargo if machinery disabled or extended stranding,	1	2	0	3	3	3	3	3	4	4	Incident report, Shipboard emergency procedure, Activate port DMP, POLREP, Activate 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
					security boat signals, Assistance of tugs		Blockage of Channel											
10.5	2	Grounding	Grounding – During pilotage of deep draft vessel	Engine Failure/Steering Failure, Incorrect assessment taken of vessel's draught & squat during under keel clearance calculations, Vessel transiting too fast, Incorrect chart datum assessed (hydrographic survey outdated), Bad weather condition, Improper maintenance of navigational aids.	Use of Anchor, Master-Pilot info exchange card, Vessel to transit in safe maneuvering speed, Updated navigational chart to be used at all times, Maximum 30 knots wind speed operational limit, Postpone movement, proper maintenance of navigational aids, exchange of information with MbPT.	Tugs require to pull vessel clear, Indentation Bottom hull plating	Breach of hull plating & oil pollution, fire/ explosion, Blockage of Channel	1	1	0	3	3	2	4	2	4	4	Incident report, Port/Local towage capability, Navigational aids, Pilotage communication, Shipboard emergency procedure, Activate port DMP, POLREP, Activate 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.6	2	Collision	Collision with dredger within the navigational channel	Vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), Human error, improper communication, Environmental conditions (poor visibility, high Current flows, unpredicted current eddies, channel size/ depth), results of avoiding action (eg. Small craft or vessel), navigation failure (markers, lights)	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, weather monitoring, port marine operation procedure, PMS	Temporary grounding without hull damage	Grounding or sinking of either vessel, Oil/chemical pollution, Fire and Explosion, Blockage of navigation all channel	0	1	0	1	3	4	4	2	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP, Port OSCP activation

Scenario No. *	Area #	Category	Hazard /Disaster Detail	Possible Causes	Hazard Reduction Barriers	MCS	WCS	Hazard/Disaster Assessed										Mitigation
								Most Credible					Worst Credible					
								Impact					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.7	2	Collision	Collision - passing vessel in navigation channel (unregulated traffic)	Non-compliance with COLREGS, vessel equipment failure, communication error or lack of communication causing misjudgment, result of avoiding action (eg. Small craft or vessel), Human error.	Shipboard navigational aids, VTS, PMS, shipboard emergency procedure, security patrolling boats, training, adequate work/hour, situational awareness.	Avoiding action fails resulting in glancing blow with moderate damage to one or both vessels, No loss of cargo, No serious injury	Severe damage to one or both vessel, Oil pollution and/ or loss of cargo, Fire / explosion, loss of life	1	2	0	1	2	3	3	2	4	3	Incident report, Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of port OSCP
10.8	3	Collision	Collision – Anchor dragging	Bad weather, Poor monitoring, Poor holding ground, Insufficient scope of anchor chain, Human error, vessel equipment failure	Met. warning through VTS, Use of all Navigational aids, Vessel to drop anchor in designated anchorage area, Vessel to ensure that sufficient chain is paid out, use of all navigational aids, PMS, shipboard	Minor Damage to vessels and/or other vessels	Grounding and oil pollution, Grounding and capsizing, Blockage of channel	1	1	0	1	3	3	4	3	4	4	Incident report, Shipboard emergency procedure, Port/Local towage capability, Activation of port DMP, POLREP, Activation of 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
					emergency procedure													
10.9	1	Contact	Contact – During operations in turning circle (large vessels)	Wind effect, Illumination inadequate at berth, Excessive load on tug rope, High rate of turn, Misjudgment, Human error (fatigue, lack of knowledge, etc.), Breakdown of tugs, vessel equipment failure, maneuvering constraint of vessel	Suspend operation at Max-30 knots wind speed, postpone movement, ensure proper illumination at berth, Use of support vessel illumination, Use of additional tugs, Use of electronic aid, proper bridge team management, use of all navigational aids, PMS, Shipboard emergency procedure	Minor Damage To vessel &/or other vessels/ Shore structures	Major damage to shore structures e.g. cranes, Major damage to vessel & pollution, Capsizing & port closure	0	1	0	1	2	3	4	3	4	4	Incident report, Shipboard emergency procedure, Activation of port DMP, POLREP, Activation of 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.10	2	Collision	Collision with channel marking buoys	Vessel equipment failure/ malfunction (navigational propulsion, steering, auxiliary), human error, improper communication, environmental conditions (poor visibility, high current flows, unpredicted current eddies, channel size/ depth), results of avoiding action (eg. small craft or vessel), navigational failure (markers, lights)	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, weather monitoring, port marine operation procedure, PMS	Minor Damage To vessel &/or buoy	Grounding or sinking of vessel, Oil pollution, Blockage of navigation all channel	0	1	0	1	2	3	4	3	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
10.11	2	Fire	Fire on Vessel in the navigational channel	Fire caused by faulty equipment, fire caused by human error, inadequate precautions during hot work, failure to take appropriate precautions with gas bottles and/or inflammable vapour, failure to take the appropriate precaution when handling specific cargoes.	Emergency shipboard procedure, VTS, training, adequate work/rest hour, situational awareness, SMS, PMS, Firefighting assistance from tugs.	Minor damage to vessel, Injury to personnel, Loss of power	Major damage to vessel, Multiple injury and/or fatality to personnel, Loss of cargo, Loss of vessel control.	2	1	0	2	2	4	4	3	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, POLREP and Port OSCP
11	2	Blockage of Navigational Channel	Blockage of due to Ground/ Sinking of vessel (Wreckage)	Collision, Bad Weather, Fire, Explosion	Shipboard emergency procedure, assistance from tugs, Port firefighting system	Temporary grounding, Limited flooding/listing	Sinking of vessel, Loss of life, Loss of cargo, Pollution	0	1	0	2	3	3	3	2	4	4	Incident report, Shipboard emergency procedure, Port DMP activation, 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
12	9	Fire/Explosion/Toxic	Emergency / Disaster in Tank farm	Leakage leading to fire/explosion due to short circuit, Hot work, smoking, absence of spark arrester in vehicles.	Emergency Shutdown system, Fire extinguishers, Fire tenders, Fire-fighting system.	Minor fire/ Toxicity incident, injury to the personnel.	Major fire/ explosion /Toxicity incident, Property damage, Environmental damage, Fatality	2	1	0	1	2	4	4	3	4	4	Activation of individual tank terminal DMP
13	7	Fire	Fire in CFS - Warehouse	Short Circuit, Hot Work, Smoking, leakage leading to fire/ explosion.	Fire extinguishers, Fire Tender, Fire-fighting system.	Minor fire incident, injury to the person present	Major fire/ explosion incident, Property damage, Fatality	1	1	0	1	2	3	3	1	2	3	Activation of CFS EAP and port DMP
14	6	Fire	Fire in the Admin building/ Port User building/ Custom House/ POC	Short circuit, Smoking	Fire extinguishers, Fire-fighting system	Minor fire incident, injury to the person present	Major fire incident, Property damage, Fatality	1	1	0	1	2	4	3	1	4	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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
15, 16	1 to 9	Civil Disturbance	Fire/ Explosion	War and Terrorism, Bomb Threat	Continuous Monitoring on News channel, Radio, Newspapers, mails	Damage to vessels, Shore structures	Major damage to shore structures e.g. cranes, Major damage to vessel & Oil pollution, Capsizing & port closure	3	3	3	4	4	4	4	4	4	5	Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP
17.1	1 to 9	Natural Disaster	Cyclone	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious Injury to personnel	3	2	1	3	2	4	4	2	4	4	Shipboard emergency procedure, 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
17.2	4 to 9	Natural Disaster	Flood	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures & port property, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious Injury to personnel	2	2	1	3	2	4	3	4	4	4	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP
17.3	1 to 9	Natural Disaster	Tsunami	Natural cause	Weather Monitoring and Public Warning system	Minor Damage to tugs, pilot boats, Shore structures & port property, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage to tugs, pilot boats & pollution, Capsizing & port closure, Serious Injury to	3	2	1	3	3	4	4	2	4	5	Shipboard emergency procedure, 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					Impact					
								People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency	
							personnel											
17.4	4 to 9	Natural Disaster	Earthquake	Natural cause	Weather Monitoring and Public Warning system	Minor damage to properties/ structures/ cranes, Injury to personnel	Major damage to shore structures e.g. loading arms etc, Major damage properties/ structures/ cranes, port closure, Serious Injury to personnel	2	1	0	3	3	4	4	4	4	5	Shipboard emergency procedure, Activation of port and terminal DMP, POLREP, Activation of port and terminal OSCP

Area 1: Inner harbour (inner basin)
Area 2: Navigational Channel
Area 3: Anchorage Area.
Area 4: Liquid Cargo Berths (BPCL jetty/SWB)
Area 5: Container Terminal
Area 6: Admin Building/Port User Building/Custom House/POC
Area 7: CFS Warehouse
Area 8: Entire Port limit
Area 9: Tank Farms

Risk Estimation

Table 24: Scale of Impact (I0 – I4)

Scale	People	Property	Environment	Port Business
I0	No injury	No damage	Negligible environmental impact	Negligible
I1	Minor (Single slight injury)	Minor damage	Minor Tier 1 oil spill, Minimal environmental harm	Minor
I2	Slight (multiple minor or single major injury)	Local damage	Moderate Tier 2 (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 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 than one fatality)	Total loss	Major 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	Major Port closes, navigation seriously disrupted for more than 1-2 days. Long term loss of trade

Table 25: Frequency scale (F1- F5)

Category	Descriptive term	Definition
F1	Frequent	An event occurring once a week to once an 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 100 operating years
F4	Unlikely	An event occurring once every 100 operating years to once in 1000 operating years
F5	Rare	Considered to occur once in more than 1000 operating years

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 Table 26 as below:

Table 26: 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 & 1 - Negligible Risk
2 & 3 - Low Risk
4, & 5 – Assessed to be in ALARP region
6 – Heightened Risk
7, 8 & 9 - Significant Risk
10- High Risk

Based on the values of frequency and impact as assessed, Risk Ranking have been done in Table 27.

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:

a) The average risk value of the four categories in the 'most likely' set.
b) The average risk value of the four categories in the 'worst credible' set.
c) The maximum risk value of the four categories in the 'most likely' set.
d) 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 27: Risk ranking for JNPA for identified hazards

Scenario No.	Rank No.	Area	Category	Hazard Detail	Assessed Risk							
					Most Credible				Worst Credible			
					People	Property	Environment	Business	People	Property	Environment	Business
10.2	1	2	Collision	Collision between two ships	8	8	0	8	7	7	6	7
1,2,6	2	4	Leakage-Fire/Explosion	Fire /Explosion due to LPG/POL/ Chemical leakage	7	7	6	6	7	7	6	6
3,4	3	4	Toxic	Ammonia/Acrylonitrile leak at liquid cargo jetty during operation – on Ship or Ashore	7	3	6	7	7	4	6	7
17.2	4	8	Natural Disaster	Flood	6	6	3	7	6	5	6	6
8	5	8	Fall	Containers falling into water in case of extreme weather, ship collision or grounding	2	2	0	2	3	5	2	5
17.1	6	8	Natural Disaster	Cyclone	7	6	3	7	6	6	3	6
7	7	5	Fire/Leak	Crane Accidents (Load drop/crane fall) at Container terminals	6	6	0	3	7	7	3	6
10.7	8	2	Collision	Collision – passing ship in port waters (unregulated traffic)	3	6	0	3	6	6	4	7
10.11	9	2	Fire	Fire on ship in navigational area	6	3	0	6	6	6	5	6
15,16	10	8	Civil Disturbance	Fire/Explosion (War and Terrorism, Bomb Threat)	5	5	5	6	5	5	5	5
12	11	9	Fire/Explosion/Leakage	Emergency/Disaster within the tank farm facility	6	3	0	3	6	6	5	6
10.4	12	2	Grounding	Grounding-Tanker/Container/BC transiting in area	2	4	0	6	5	5	5	6
5	13	4	Corrosion	Phosphoric acid leakage at BPCL Jetty	6	3	3	3	6	4	4	4

Scenario No.	Rank No.	Area	Category	Hazard Detail	Assessed Risk							
					Most Credible				Worst Credible			
					People	Property	Environment	Business	People	Property	Environment	Business
10.1	14	2	Collision	Collision with small craft-Tanker/Container/BC in area	3	6	0	3	6	6	2	6
17.3	15	8	Natural Disaster	Tsunami	6	4	2	6	5	5	3	5
10.5	16	2	Grounding	Grounding – During pilotage of deep draft Ship	2	2	0	6	3	6	3	6
17.4	17	8	Natural Disaster	Earthquake	4	2	0	6	5	5	5	5
14	18	6	Fire	Fire in the Admin building/PUB/ Custom House/POC	3	3	0	3	7	6	2	7
11	19	2	Blockage of Navigational area	Blockage of Navigational area due to Ground/Sinking of ship (Wreckage)	0	2	0	4	5	5	3	6
10.3	20	1	Contact	Tanker/Container/BC tug assisted berthing – Contact with jetty	3	3	0	3	6	6	2	6
10.9	21	1	Contact	Contact – During operations in turning circle	0	3	0	3	5	6	5	6
10.10	22	2	Collision	Collision with channel marking buoys	0	3	0	3	5	6	5	6
13	23	7	Fire	Fire in CFS Warehouse	3	3	0	3	6	6	2	4
10.8	24	3	Collision	Collision – Anchor dragging	2	2	0	2	5	6	5	6
10.6	25	2	Collision	Collision with dredger within navigational the area	0	2	0	2	6	6	3	6
9	26	1	Fire	Fire in Engine room of floating craft	3	3	0	3	4	4	2	2

3. HAZARD SPECIFIC PREVENTION AND MITIGATION MEASURES

3.1 BACKGROUND

The Disaster Management Act, 2005 and the National Policy, 2009 marks the institutionalization of paradigm shift in disaster management in India, from a relief-centric approach to one of proactive prevention, mitigation and preparedness. The Policy notes that while it is not possible to avoid natural hazards, adequate mitigation and disaster risk reduction measures can prevent the hazards becoming major disasters. Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities. The National Policy suggests a multi-pronged approach for disaster risk reduction and mitigation consisting of the following:

- Integrating risk reduction measures into all development projects
- Initiating mitigation projects in identified high priority areas
- Paying attention to indigenous knowledge on disaster and coping mechanisms
- Giving due weightage to the protection of heritage structures

The concept and practice of reducing disaster risks involve systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events. While both the terms -Disaster Reduction and -Disaster Risk Reduction are widely used, the latter provides a better recognition of the ongoing nature of disaster risks and the ongoing potential to reduce these risks.

Mitigation consists of various measures required for lessening or limiting the adverse impacts of hazards and related disasters. The DM Act 2005 defines "Mitigation" as measures aimed at reducing the risk, impact, or effects of a disaster or threatening disaster situation. Goal of mitigation is to minimize risks from multiple hazards and the threats from individual hazards need not always occur in isolation. At times, a hazardous event can trigger secondary events. In addition, demographics, nature of human settlements, and effects of global climate change can magnify the vulnerability of the communities at risk. The DM Plan, therefore, focuses on enhancing the mitigation capabilities for multiple hazards, their likely cascading effects. The effectiveness in disaster risk reduction will depend on coordination mechanisms within and across sectors and with relevant stakeholders at all levels. For each hazard, the approach used in this plan incorporates the four priorities

1. Understanding Risk
2. Inter-Department / District Coordination
3. Investing in DRR – Structural Measures
4. Investing in DRR – Non-Structural Measures
5. Capacity Development

For each of these thematic areas for action, a set of major themes have been identified for inclusion in the planning framework.

3.1.1 Understanding Risk

This thematic area for action focuses on understanding disaster risk, the Priority-1 in the Sendai Framework integrates into it numerous actions needed for strengthening disaster resilience. The major themes for action are:

a) Observation Networks, Information Systems, Research, Forecasting,
b) Monitoring and Warning Systems,
c) Hazard Risk and Vulnerability Assessment (HRVA), and
d) Dissemination of Warnings, Data, and Information.

Having adequate systems to provide warnings, disseminate information, and carry out meaningful monitoring of hazards are crucial to disaster risk reduction, and improving resilience. They are also an integral part of improving the understanding of risk.

3.1.2 Inter-Department Coordination

Inter-Department coordination is a key component of strengthening the disaster risk governance - The major themes for action required for improving the top level inter departmental coordination are a) Overall disaster governance b) Response c) Providing warnings, information, and data and d) Non-structural measures. The central ministries and agencies mentioned are those vested with hazard-specific responsibilities by the Govt. of India or those expected to play major roles in the thematic areas given in the matrix.

3.1.3 Hazard-wise Responsibility Matrices for Disaster Risk Mitigation

For the DM plans to succeed, it is necessary to identify various stakeholders/agencies and clearly specify their roles and responsibilities. At all levels - from local to the Centre - the relevant authorities must institutionalize programmes and activities at the ministry/department levels, and increase inter-ministerial and inter-agency coordination and networking. They must also rationalize and augment the existing regulatory framework and infrastructure. For each hazard, in the subsections that follow, themes for action are presented in a separate responsibility matrix for each of the five thematic areas for action. It must be noted that the role of the central agencies is to support the disaster-affected State in response to requests for assistance. However, the central agencies will play a pro-active role in disaster situations. In the domains of DM planning, preparedness, and capacity building, the central agencies will constantly work to upgrade Indian DM systems and practices as per global trends. This section covers the hazards listed below:

1. Cyclone and Wind
2. Flood
3. Toxic gas / Gas leak

4. Oil / Chemical spill
5. War / Terrorism
6. Earthquake
7. Vessel Accident / collision
8. Fires

	HAZARD	MITIGATION	MAJOR THEME	RESPONSIBILITY-ACTION
1	**CYCLONE AND WIND**	*Understanding Risk*	Monitoring cyclone	• Undertake Hazard Risk Vulnerability Assessment as a part of preparing and periodic revision of DM plans, and for development planning.
			Dissemination of warnings, data, and information	• Dissemination of warnings to all (including fishermen), down to the last mile – remote, rural or urban; Regular updates to people in areas at risk. • Deployment of communication equipment • Warnings using all types of options, types of technologies, and media
		Inter Department coordination	Overall disaster governance	• Preparation and implementation of DM plans and ensure the functioning of all departments and agencies with DM tasks.
			Response	• Organizing the immediate response of Marine, Civil Defense CISF, Traffic, CME, and other department as per DM and seek assistance of District administration.
		Structural Measures	Cyclone shelters	• Identification of safe buildings and sites to serve as temporary shelters for people and livestock evacuated from localities at risk. • Proper maintenance of drainage systems and flood embankments

	HAZARD	MITIGATION	MAJOR THEME	RESPONSIBILITY-ACTION
			Hazard resistant construction, strengthening, and retrofitting of all lifeline structures and critical infrastructure	• Collaboration with technical agencies and implementation
		Capacity Development	Training	• Training and orientation programme for all the concerned and incorporating disaster response, search and rescue and mitigation.
			Awareness Programme	• Carry out mass media campaign, promote the culture of disaster risk assessment, mitigation and management. Promote use of insurance and risk cover.
			Mock drills and exercises	• Conduct joint exercises and drills regularly with the inter-departments and external agencies as required by the DM
2	**FLOOD**	*Understanding risk*	Dissemination of warnings, data, and information	• Dissemination of warnings to all (including fishermen), down to the last mile – remote, rural or urban; Regular updates to people in areas at risk. Probability only during the high water combined with rains and blockade of drains.
		Inter Department coordination	Overall disaster Governance	• District administration takes over the charge of flood and assistance to be provided with our team as required.
		Structural Measures	Drainage system	• CME to ensure the system in order. Dewatering pumps in readiness. Identification of safe buildings and sites to serve as temporary shelters for people and livestock evacuated from localities at risk.

	HAZARD	MITIGATION	MAJOR THEME	RESPONSIBILITY-ACTION
		Nonstructural measures	• Wetland conservation and restoration • Catchment Area Treatment/ Afforestation	• Discourage reclamation of wetlands, natural depressions • Action plan managing wetlands and natural drainage systems for flood moderation • Implementation of watershed management including catchment area treatment and afforestation programmes
			Encroachment laws	• Implement land use norms of coastline areas. Prevent and remove the encroachment along the coastline and drainage.
		Capacity Development	Training	• Training and orientation programme for all the concerned and incorporating disaster response, search and rescue and mitigation.
			Awareness Programme	• Carry out mass media campaign, promote the culture of disaster risk assessment, mitigation and management. Promote use of insurance and risk cover.
			Mock drills and exercises	• Conduct joint exercises and drills regularly with the inter-departments and external agencies as required by the DM
3	**Toxic Gas/Gas leak**	*Understanding risk*	Dissemination of warning	• The information received from terminal manager or vessel to be immediately disseminated to mutual aid partners, district, and national agencies. Immediately stop cargo ops and action to be taken by Site group as per the DM.

	HAZARD	MITIGATION	MAJOR THEME	RESPONSIBILITY-ACTION
		Inter Department coordination	Overall disaster governance	• Dy. Conservator & PFSO reports from the action group to crisis management group. Ensure functioning of all departments and agencies as per the DM.
			Response	• Organizing the immediate response and seeking assistance of external and district agencies
			Warnings, Information, Data	• To issue of warnings to all, down to the last mile – remote, rural or urban; Regular updates to people in areas at risk from updates as received from crisis management group.
		Structural measures	PPE, Evacuation	• Onsite Group to initiate all actions as per SOP
		Non Structural Measures	SOPEP, Air Laws	• All vessels to ensure the compliance of maritime laws of pollution and air emission. Loading master and oil companies ensure the compliance
		Capacity Development	Training	• The ship staff and the staff handling are already trained and regular refresher course conducted by DG.
			Awareness	• The operation is clearly marked and posters displayed. The new handling personals familiarized on regular basis.
			Mock Drills	• Fire service along with the terminal representatives and the staff as well as the CWG conducts such drills on regular basis. Further Briefing and Debriefing done.
4	**Oil and Chemical Spill**			• As per Sec 6.1 of part II – Page 242

	HAZARD	MITIGATION	MAJOR THEME	RESPONSIBILITY-ACTION
5	**War and Terrorism**			• As per Sec 6.19 and 6.20 of part II – Page 261 & 262
6	**Earthquake**			• As per Sec 6.17 of part II – Page 259
7	**Vessel Accident / collision**			• As per Sec 6.1 of part II – Page 245
8	**Fires**			• As per Sec 6.1 of part II – Page 237

4. MAINSTREAMING DRR

- The DM Plan will come into force as soon as any of the disaster alerts is received. OR, when the Port organization has gathered enough data to forecast the alert to any threat.
- The Port Control Room will come into operation at Jawaharlal Nehru Port Authority. The Staff Officer, Port Control Room will be in charge.
- Storm warning will be broadcasted through VHF.
- Sr. VHF Operator VTMS/Port Control will inform Deputy Conservator & PFSO / HM telephonically the status of worsening weather conditions.
- All the departmental Control Rooms will be made functional in their respective offices.
- The Port Control Room will be in constant touch with the District and Local Administration for rescue and relief operation.
- Disaster co-ordination center and control rooms will function round the clock and will be closed only after obtaining the necessary orders from the Chairman. Press reports will be released through the chairman‘s office.
- The Heads of Departments may use Cell telephones to get information. Precautionary measures will have to be taken by each department immediately after the receipt of the warning signal (details as follows)
- The following steps shall be immediately taken:
- All leave of pilots and marine personnel stands cancelled

MARINE DEPARTMENT

The HM or any of his Pilots will make 6 hourly, or if required make frequent, visit to the VTMS/Port Control and will apprise the cyclone station of the developments. If the storm is observed on the radar screen, the visiting officer will inform the HM and cyclone station. The HM will liaise with the DC at all times. Hourly weather fax pictures will be obtained directly or through a vessel in port with electronic means.

Under the overall supervision of the HM, the specific duties of marine personnel will be as given below:

Deputy General Manager / Dock master

- He will keep in touch with the Harbour Master who will be responsible for the operation of the Cyclone Station and will issue necessary standing orders for the purpose.
- He will keep close liaison with Radar Station, Police Wireless Station, Coast Guard HQ, and Ships in Port in regard to the likely weather conditions in the near future using electronic means weather fax.

- He will prepare special signals and promulgate them to the Masters of the vessels, dredgers, tugs and any other crafts in Port. He will inform the Masters of all vessels at the berths to double the moorings, put out insurance wires and to keep engine ready to proceed out to sea if situation warrants. Decision regarding sending ships to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.
- He will maintain a close liaison and co-ordination with the Dy. CME for arranging the staff for manning the Port Crafts.

VTMS/PORT CONTROL

Sufficient number of staff will be detailed in accordance with the HM's instructions.

- They will keep in close touch with the man signal station. The staff of signal station/port office will remain on duty until they are relieved by next shift staff or till alternative arrangements are made or till the storm has passed and the HM releases them.
- Every two hourly barometer reading will be recorded after cyclone warning signal from a vessel in port.
- One lamp with battery will be kept ready at VTMS/Port Control room.
- The VTMS/Port Control will maintain a continuous watch on channel 16. VTS station will keep Civil Defense Control Room informed of all the messages received by telephone, VHF sets or bymessenger.
- VTMS/Port Control will inform the MMPC / Sr. Pilot on duty any buoys or crafts are seen adrift or any Port installation is seen or informed to be in danger.
- The staff on duty will have sufficient provisions to stay on duty for a period ranging from 24 hours to 48 hours.
- VTMS/Port Control will receive weather facsimile report from New Delhi or any other station and pass on to the HM and Traffic Manager for information.

MMPC/ DOCK MASTER

- He will detail one shore team to remain on duty as emergency duty squad unit being relieved by the next shift staff.
- He will take all necessary steps for the safety of the Port crafts. It will be ensured that all other crafts are placed at safe place and properly secured excepting one pilot launch and one stand by launch used for inspection and emergency duties.
- He will ensure all barges will be secured at safe place along with emergency squad will make frequent round (minimum two hourly) to check the safety of Port Crafts.
- He along with emergency squad will make frequent round (minimum two hourly) to check the safety of Port Crafts.
- Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.
- Sufficient provision food will be kept as staff may have to stay for 24 to 48 hours.

MASTER OF TUG/PILOT LAUNCHES AND OTHER LAUNCHES

- Masters of respective crafts will notify their staff to remain on board until they are relieved by next shift staff or Senior Duty Pilot releases them from duty.
- Masters will shift their respective crafts at suitable places as directed by the HM/Traffic Manager and will secure them suitably with additional moorings. Masters of respective crafts will be responsible for proper securing and safety.
- Masters will keep the engines of their crafts ready to proceed at short notice as per the instructions of the HM / Manager Marine Pollution Control.
- Extra fenders will be kept ready on board the Tug for use as required.
- Master will see that sufficient provision is kept for staff on board as period of stay may range from 24 to 48 hours.
- If any craft is seen adrift or any other port installation is seen in danger, the Master of the crafts will immediately inform the VTMS/Port Control.

CIVIL ENGINEERING DEPARTMENT

The cyclone mitigation team shall be headed by Chief Engineer in co-ordination with the Executive Controller Civil Defense. The Chief Engineer will be the head of the Team.

ALLOCATION OF DUTIES

- The head of the field units shall intimate the Civil Defense Control Room about formation of their team by name with accountability. The field units may include assistance as required by them including their names in the formation of the team.
- On completion of the task, the head of the field unit shall fill up the check list and intimate the CD control room and on getting clearance from the control room, the field unit shall disperse.

The Field Units COMPOSITION will be as follows:

Chief Eng.	1	Asst. Ex. Eng'r ID & PV, ND, MOT	3
Dy. CE,	1	Dy. CME, Electrical	1
SE,	2	Dy. CME, Mechanical	1
Ex. E,	1	Marine Engineer	1

PRECAUTIONARY MEASURES

- Cyclone warning signals shall be communicated to all field units from Civil Defense Control Room.
- The field units shall communicate the signal to all the staff of the Divisions. Individual workers shall be intimated through special messenger/loud speakers/public address system, if possible.

GENERAL FUNCTIONS OF FIELD UNITS

- All the outside installations and equipment shall be properly secured.
- Safety of workmen on duty shall be given priority during action and all efforts shall be made to evacuate departmental held up workmen.
- Operator's cabin doors of all the equipment and vehicles shall be kept shut.
- Doors and windows of permanent buildings must be properly shut.
- Important documents/files/records must be stored well above the floor vessel.
- Power supply to be switched off before leaving the building.

SPECIFIC DUTY

The duties of task force shall be as follows:

Mechanical & Electrical Engineering Department

Deputy Manager, (M) / Executive Engineer / Asst. Executive Engineer, Elec Section to ensure the following -

- All the mobile cranes to be brought to a safe place, booms of the cranes to be lowered and jacked. Cabin doors and panels to be closed.
- All wharf cranes to be properly anchored on the rail, slewing to be blocked and booms to be placed at the highest position and to be retained by two turn buckles. End stops on the rail must be checked. Booms will remain in the direction of the track, so that more distance is kept between the ship at the berth and the cabin of the wharf crane.
- Rolling and slewing movement of all cranes must be blocked.
- Forklifts and all heavy equipment shall be parked inside the shed.

Deputy Manager (Mechanical)

- Electrical Sub-stations will be manned during the cyclone.
- Food and drinking water to be provided to all points, which are to be manned during the cyclone.
- One emergency vehicle shall be providing to Electrical Engineer, Electrical power for attending to various duties.
- CME to delegate a skeletal staff to attend to vehicle breakdown.
- Six nos. 24 volt batteries, one self-starter and one dynamo to be kept as standby for emergency use. Emergency spares to attend to vehicle breakdowns shall be retained by Auto Workshop.
- All the unused vehicles shall be parked inside the shed.
- Executive Engineer, Workshop Division will have a temporary advance if required to meet POL and food requirement and other contingency.

CME's- Workshop

- The Workshop shall be manned by one set of staff consisting of one Machinist, one Fitter, one Welder and three Helpers to attend to emergency requirement.
- Power supply to all the machinery and equipment to be shut off.
- Doors and windows to be kept shut.

Chief Engineer's Department-Civil Works

- The Deputy General Manager OCT ID shall identify 3 to 4 local contractors and keep them as stand by to meet emergency requirements such as requirement for manpower, equipment etc.
- The Contractors, if any, already engaged in some site works shall be intimated about the cyclone warning and directed to take necessary precautionary measures to prevent loss of life and damage to machinery /equipment and Port Trust's assets.
- Temporary building roofs will be checked carefully and any missing or loose A.C. sheets or 'J' hooks will be changed, if necessary.
- Any crack in cement parapets on buildings will be adequately repaired.
- The hinges and closing appliances of all the doors and windows will be checked.
- All the drains and obstructions in the creeks/culverts should be cleaned for easy discharge of sludge water.
- One Section Officer will be posted for each of the above jobs who will also take up immediate repair to roads, breaches and buildings, clearance of roads and water logging and other jobs which may crop up during and after the cyclone will be responsible for above jobs.
- The Deputy General Manager (MOT) will post one Manager exclusively to look after Navigational aids, fenders; transit shed doors and roofs etc. along with necessary staff.
- The Deputy General Manager (OCT ID & PV) deploys one Manager along with necessary staff to look after the sea wall maintenance and nourishment. Wherever breach is noticed alongside the sea-wall, immediate steps shall be taken to close it.
- For the above purpose he shall keep ready 3,000 to 4,000 empty cements bags to be used as sand bags.
- All measures to be taken to minimize uprooting of trees.

Chief Engineer's Department (Water Supply)

- During cyclone, each pump house shall be manned by a team headed by at least one Manager.
- Diesel engines for raw water and clean water, all pump house equipment and all generator sets meant for water supply shall be tried out and kept ready.
- The point to the Railway Shed Line to be blocked.
- The diesel pumping sets are to be kept in running condition to meet the demand in case of power failure.
- Sufficient quantities of bleaching powder, alum etc. is kept for water treatment during the period.
- As soon as the contingency plan is made operational all the water tanks should be filled up and standby arrangement for supply of water to be made with special provision for the hospital.

5. INCLUSIVE DRR

General

- After receiving the cyclone warning, different site-in-charge of Engineering Department will alert the firms/contractors executing the projects to take necessary steps for safety of the workmen/equipment/ materials.
- Door and window fittings of the Administrative building should be checked up by Engineer-in-charge to ensure closing of the same during cyclone.

TRAFFIC DEPARTMENT

Traffic Manager will take the following measures:

- All loading/unloading operations to cease-hatches closed-cranes secured
- All the cargoes under Port's custody, lying outside and likely to get damaged, will be shifted to Transit Sheds/Ware Houses.
- Doors of the sheds will be closed and properly secured.
- He will visit the site and inspect the arrangements.

ACCOUNTS DEPARTMENT

- All the departments may inform the Financial Adviser & Chief Accounts Officer the amount of cash required by them so that the same can be kept in the chest and can be disbursed by one of the Officers of the Finance & Accounts Department as per need.

MEDICAL DEPARTMENT

- Ambulances have to be kept manned and standby at all times at Port Trust Hospital.
- Mobile medical facility, if required, may be made available.

STORES DEPARTMENT

- The Deputy General Manager Materials will ensure the following:
- During cyclone season sufficient stock of stores like AC sheets, 'J' Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, kerosene oil, hurricane lantern, petromax lamps, torch lights with batteries and bulbs, electrical items etc. are kept.
- All the materials which are likely to get damaged with rain are covered with tarpaulin.
- One Store Keeper and the other minimum staff required to issue materials including POL are kept during emergency.

SECURITY SECTION

CISF Dy. Commandant will make arrangement for the following:

- To keep extra vigil on the all stores/buildings which are likely to be affected by the Cyclone.
- Till normally is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.

POST THREAT DUTIES

- All the Heads of the Departments are required to assess the damage and submit a detailed report indicating the estimate to the Dy. Chairman. For this, a team may be formed comprising Harbour Master, Traffic Manager, Chief Engineer, Chief Mechanical Engineer and assistant with one representative from the Finance Department. The preliminary report is to be submitted within 3 hours and detailed report within three days.
- Hydrographical survey to be conducted to assess the channel condition and shipping to resume as early as possible.
- In case of any small craft sunk or grounded, the same to be removed to make the channel/berth safe for navigation. HM will detail a salvage party headed by MMPC for this purpose.
- Mobile medical service, if required, to be provided by the Medical Department. Preventive measures for epidemics to be taken care of.
- All the operating systems to be attended urgently and made operational as early as possible on war footing basis to resume operation.
- Water supply and electricity to be given priority. The electrical cabling network to be checked area-wise.
- All damaged temporary roofed houses in the port premises will be attended to.
- The Deputy General Manager Materials will nominate a team for the procurement and supply of essential materials for repair of various structures and equipment as reported.
- To assess the progress of repair works, Heads of Departments meeting will be held daily till normalcy is restored.

6. COHERENCE OF DISASTER RISK MANAGEMENT ACROSS RESILIENT DEVELOPMENT AND CLIMATE CHANGE ACTION

- As an influence upon hazards, the Earth‘s climate has always changed throughout humanity‘s and the planet‘s history, including long-term trends, shifts in the state and baseline, variability, and cycles. Climate change may be due to natural internal processes or external forcing such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use. First is the anthropogenic release of greenhouse gases such as methane and carbon dioxide that trap heat and increase the global mean temperature. Second are anthropogenic changes to the Earth‘s surface, which reduce absorption of the greenhouse gases emitted by human activities. One prominent land use change is deforestation, since trees are an excellent source of uptake for and storage of carbon dioxide.

- Sea levels rising due to climate change—as water warms it becomes less dense, so its volume expands leading to an increasing sea level—are impacting some low-lying islands, through worsening floods, erosion, and water salinization. Climate change‘s projected impacts on disaster risk are not confined to the hazard side, but also encompass vulnerability. Climate change drives vulnerabilities by changing local environmental conditions so rapidly that local environmental knowledge cannot keep pace with and is less applicable to, for example, local food and water resources along with pest management, especially where new species enter an ecosystem due to the changing environment. The development, strengthening and implementation of relevant policies, plans, practices and mechanisms need to aim at coherence, as appropriate, across sustainable development and growth, food security, health and safety, climate change and variability, environmental management and disaster risk reduction agendas

- Jawaharlal Nehru Port Authority is committed for the clean and green earth. Many Forestation programmes are continual developments. Compliance of all the maritime pollution laws such as air Pollution, Water Ballast Management is strictly followed as per the DG Shipping Directives. Regular updates and implementation of any development in regards to climate change is incorporated in all its procedures.

As per the Sendai Framework, it is necessary to address existing challenges and prepare for future ones by focusing on monitoring, assessing, and understanding disaster risk and sharing relevant information.

- The framework notes that, to cope with disasters, it is "urgent and critical ***to anticipate, plan for and reduce disaster risk".***
- It requires the ***strengthening of disaster risk governance and coordination***
- across various institutions and sectors.
- It requires the full and meaningful ***participation of relevant stakeholders*** at different levels.
- It is necessary to ***invest in the economic, social, health, cultural and educational resilience*** at all levels.
- It requires ***investments in research*** and the use of technology to enhance multi-hazard Early Warning Systems (EWS), preparedness, response, recovery, rehabilitation, and reconstruction.

While the above stipulations in the Sendai framework have been made and directing member states to undertake planning and execution based on the above fundamental thrust areas, the port has undertaken the above in the implementation of DMP as follows.

Hazard Specific Prevention and Mitigation Measures, the hazards have been identified and thematic areas of Sendai framework introduced, so that the development responsibility in each of these thematic areas is properly addressed indicating present and planned arrangement and who is responsible to address each of these.

In HRVCA, the risk profile of the port has been assessed through detailed planning steps. This includes chemical and oil disaster plan in accordance with national guidelines (NOS-DCP). The capacity analysis and any short falls have been indicated. As a result of this plan (OSCP) the Net Environment Benefit Analysis (NEBA) was prepared to indicate specific measures that would be required to meet the challenge of the oil/chemical spill. Methodology for assessing environment impact of a disaster for claims settlement has also been described. Neighboring marginal communities including fishermen likely to be impacted and their claim settlements have been assessed. Thus, building resilience for oil and chemical disasters. The gap analysis for equipment's is a continuous process which the port will undertake through periodic reviews.

With regard to natural disaster, the vulnerability profiling has been prepared and areas requiring immediate actions are identified. For NAT-CHEM disasters the vulnerability areas have been identified.

With regard to the participation of stakeholders in the risk governance the following mechanisms are in place:

- Availability of Mutual Aid Agreement for disaster situations;
- Joint planning and execution of mock drills at unit level (individual facility) and also at the level of the entire port (including non-custom bound area);
- To combat the oil spill around JNPA and Mumbai Harbour, a common oil spill response Tier- I facility (spillage upto 700 MT) is set up at Jawahar Dweep, Mumbai Port Trust through OSRO agency.

In respect of aspects relating to climate change the following issues have been identified having bearing on disaster risk reduction and resilience:

- Sea level rise – Minimum height of landside construction has been kept at 7.1 m above Mean Sea Level (MSL) which is considered adequate for developmental activities.
- Heavy rain fall (cloudburst) and flooding – Land use planning and the detailed development thereafter will meticulously factor-in the requirements of natural slope, land topography, storm water drainage, height and width of culverts, natural drainage for ponds.
- High wind and cyclone – Meticulous implementation of SOPs for preventing damage during an event.

7. CAPACITY DEVELOPMENT AND COMMUNICATION

- Capacity development is a theme in all the thematic areas for action. The capacity development includes training programs, curriculum development, large-scale awareness creation efforts, and carrying out regular mock drills and disaster response exercises. The capabilities to implement, enforces, and monitor various disaster mitigation measures has to be improved at all levels from the local to the higher levels of governance. It is also strengthening the DRR governance at all levels to better manage risk and to make the governance systems more responsive.

7.1 CAPACITY DEVELOPMENT

The capacity development covers all aspects of disaster management. The key aspects and broad thematic areas for capacity development applicable are summarized in Table 28. The hazard-specific capacity development needs for prevention and response are given in the plan matrix of the Chapter-3. The effort will be to follow the industry best practices especially in the area of oil spill response and chemical disaster response which affect the ports in a major way.

Table 28: Summary of Broad Capacity Development Themes

	Capacity Development themes
Key Aspect	**Thematic Areas**
Prevention or mitigation for disaster risk reduction	Hazards, Risk, and Vulnerability Assessment • Safety awareness and training • Improve the awareness and preparedness of stakeholders at all levels Documenting lessons from previous disasters and ensuring their wide dissemination • Preparing DM plans, regular updating, and mock drills • Institutional arrangements, policies, legal support, and regulatory framework • Developing appropriate risk transfer instruments by collaborating with insurance companies and financial Institutions • Mainstreaming of disaster risk assessment, mapping and management into development plans and programs • Retrofitting as per relevant standards • Rapid visual surveys for safety evaluation of buildings • Training and skill development for dock operators, crane operators, truck drivers, management staff. • Promoting community-based DM taking into account specific needs, • Disaster resilience by maintaining list of nearby hospitals and health care centres

Key Aspect	*Capacity Development themes* Thematic Areas
	• Business resilience of productive assets by strengthening the supply chains and service providers, ensuring continuity of services • Integrate disaster risk management into business models and practices Preparedness and response plans at all levels
Effective preparedness and response	Emergency response capabilities – EOCs, infrastructure, equipment upgrades and adoption of best available technologies • Strengthening of the Fire and Emergency Service through revamping, institutional reforms, and modernization • 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 • Housing and Temporary shelters • Power and fuel supply management • Transportation systems and network • Logistics and supply chain 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

Training

Regular training should be provided to all personnel who have a role in planning and operational response to an emergency. The goal of training for emergencies is to enable the participants to understand their roles in the response organization, the tasks associated with each position and the procedures for maintaining effective communications with other response functions and individuals.

The training objectives are:

1. To familiarize personnel with the contents and manner of implementation of the Plan and its procedures,
2. To train personnel in the performance of the specific duties assigned to them in the plan and in the applicable procedures,
3. To keep personnel informed of any changes in the plan,
4. To maintain a high degree of preparedness at all levels of the emergency response organization,
5. Train new personnel who may have moved within organization,

A well-coordinated programme of training exercises includes activities of varying degrees of interaction and complexity.

The SIC is responsible for the development and maintenance of emergency capabilities of the IRT through ongoing development and rehearsal of emergency response procedures and plans. Specific inductions are to be provided for all team members and support personnel to ensure they are conversant with the roles and responsibilities outlined in this plan prior to their appointment in any capacity.

Personnel allocated to the IRT should undergo skills training over and above that received by other personnel of the port. The skills training are delivered by external service providers to national competency standards in the following areas;

1. First aid
2. Self-Contained Breathing Apparatus
3. Rescue from heights
4. Rescue from confined spaces
5. Fire fighting
6. Rescue from water
7. Handling Oil and Hazardous Material Spills

Drills & Exercises

Emergency drills and integrated exercises have the following objectives.

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

The frequency of the drills should vary depending on the severity of the hazard. However, drills should be conducted at least once a year. Scenarios may be developed in such a manner as to accomplish more than one event objective

Notification exercises

- Test communication systems, frequency, public warning system

Tabletop exercises

- To check availability of participants and check response time

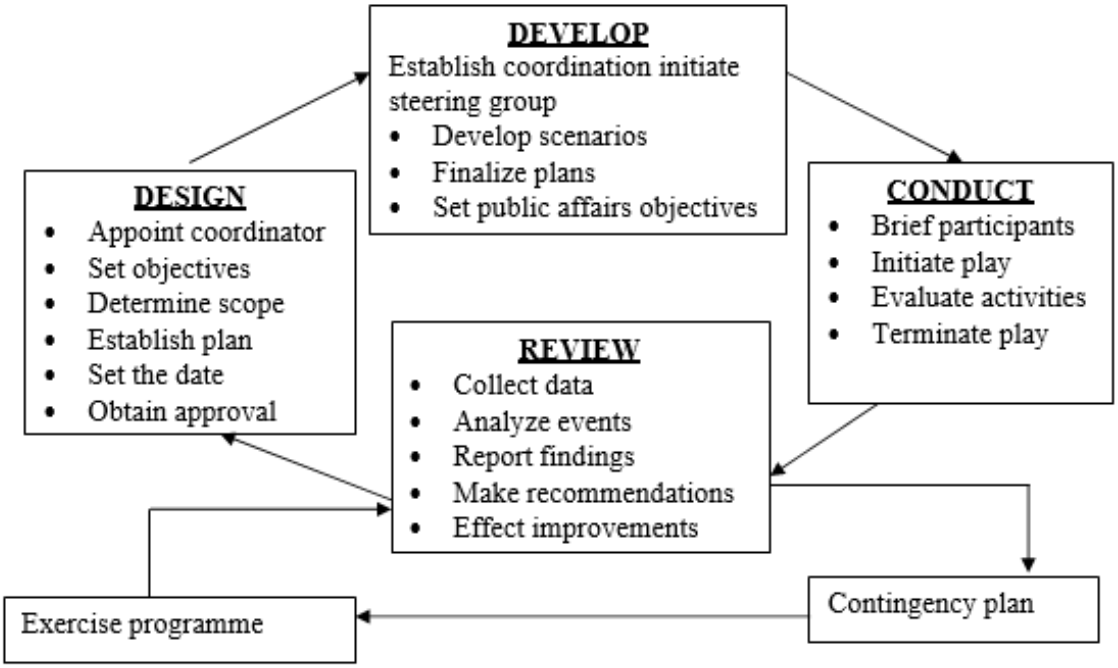
Equipment deployment exercises

- Alarm systems to be tested,
- Frequent tests of firefighting and other response equipment.

Incident management exercises

- Simulated emergencies like fire, gas leakage, oil spillage, cyclone and vessel related emergencies like grounding, collusion, leakage, Pollution etc., to be conducted and monitored and feedback to be documented.
- Evacuation practice
- Deployment of Machineries

Figure No. 11: The Exercise Planning Process



The evaluation of a drill or exercise shall be submitted by Manager (F&S) to CIC/SIC for review and acceptance who shall then determine the corrective actions to be taken and assign the responsibility to appropriate personnel. Thus, gap identification in terms of resources and procedures can be made and exercise plan amended accordingly.

Records of drills, exercises, evaluations, and corrective actions should be duly maintained.

The SIC shall prepare an Incident response exercise and training schedule for the forthcoming year, in consultation with the CIC and all the HODs of the Port and stakeholders.

Business Continuity Framework – The CIC/SIC is responsible for ensuring that a program exists for training new staff and refreshing existing staff on the Port Business Continuity and that Managers ensure appropriate personnel complete the training.

7.2 COMMUNICATION STRATEGY

Communication Flowchart

Figure No. 12: Cyclone /Tsunami/Flood/Earthquake

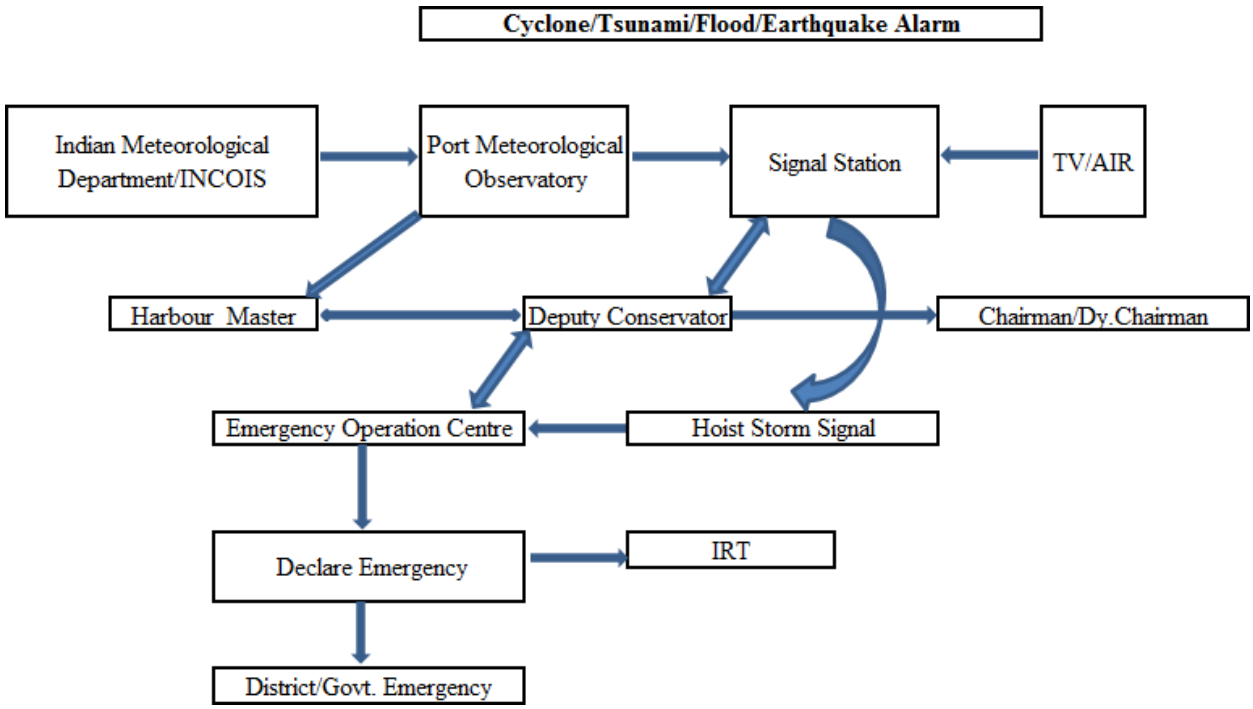


Figure No. 13: Toxic Leakage

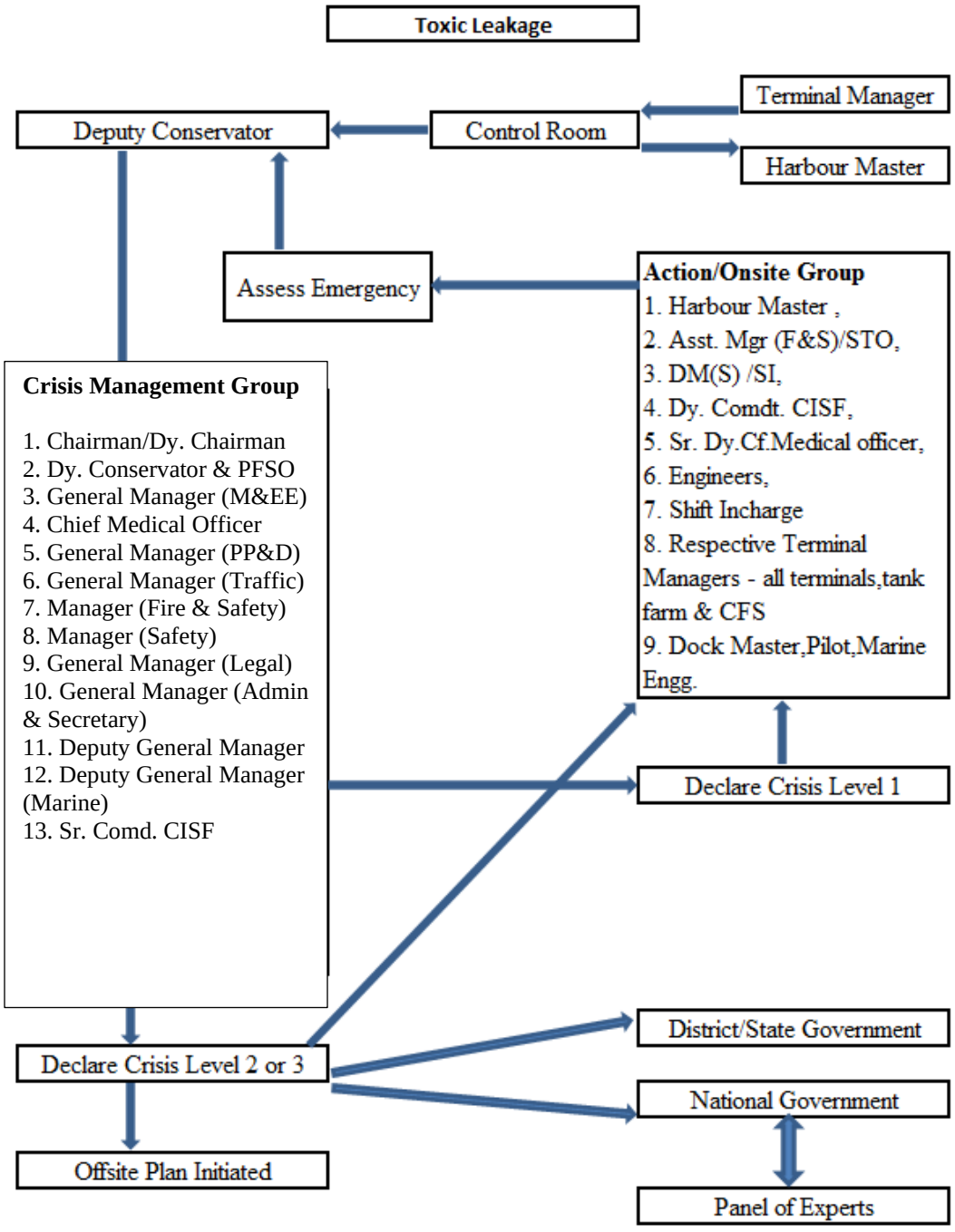
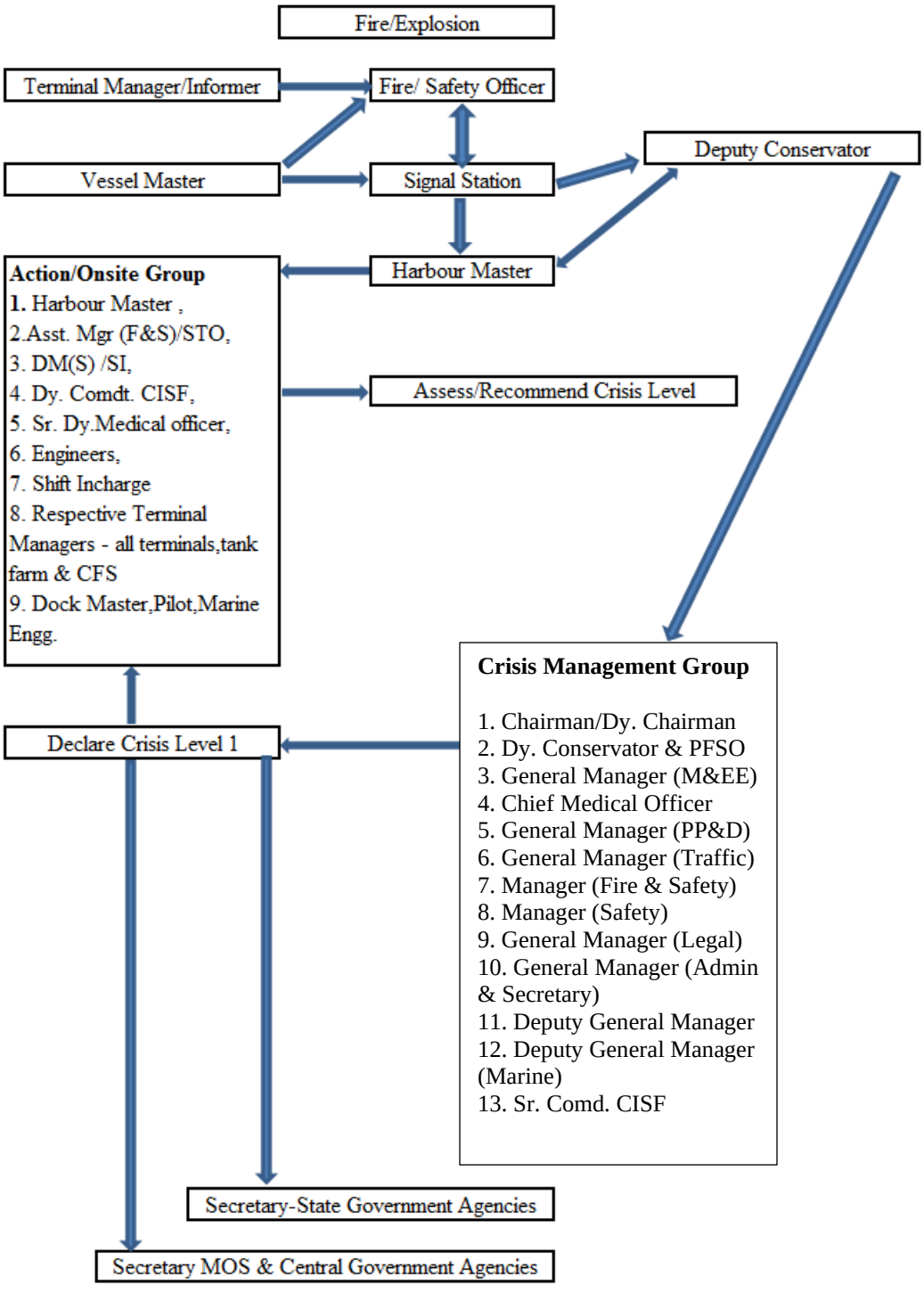


Figure No. 14: Fire/Explosion



8. COORDINATION

All the coordinators are responsible for coordination of emergency activities based on the requirement of the situation.

General duties of all the Coordinators:

1. Be in touch with CDC & keep on giving periodic feed back to him.
2. Keep list of employees in their section ready, for necessary deployment.
3. Keeping track of the employees involved in emergency handling.

Specific duties of various coordinators:

Traffic:

1. Act as a link between site & CDC.
2. Take/implement decision related to isolation, resources deployment, rescue, dispatch etc.
3. Liaise with other dept. like safety, fire, Engg, services for effective & smooth coordination of activities.
4. Control / stop all loading unloading operation in the section, if required.
5. List out all available ambulance with all information. If required, pre-contract with private ambulance owners.
6. Ensure smooth transportation links at all level.
7. Arrange transportation of resources needed for emergency.
8. To provide necessary man power, equipment, material and logistic support to all concerned dealing with emergency.
9. To provide support for requirement not specifically identified. It addresses the effort and activity necessary to evaluate, locate, procure and provide essential material/resources including excess and surplus.

Marine:

1. To control/stop shipping movement as required.
2. To combat and control water, soil and air pollution. Liaise with MPCB.
3. To Keep manpower, equipment readily available for shipping movement at any time.
4. To carry out disposal of any waste, formed during emergency with help of CE & MPCB.
5. To ensure conservation of Port.

Safety: Assist the emergency operation.

1. Advise to avoid escalation of situation.
2. Extent technical help based on The National Institute for Occupational safety and Health (NIOSH) guidelines and hazards of chemicals, etc.

Fire:

1. Depute fire-fighting squad with resources for their optimum utilization.
2. Develop strategy with SC, IC & Ship coordinator for the fire-fighting, emergency containment & rescue operation.
3. Directs and control operations regarding fire prevention, detection, fire suppression, rescue and hazardous material incidents.
4. Extinguish fire. Be in readiness for additional firefighting assignments as there is a possibility of secondary fire incidents.
5. Advise / assist the rescue operation & handling of casualties.
6. Establish search & rescue operation.
7. Prioritize the operation to ensure that maximum lives are saved.
8. To provide life and property saving assistance to manage fire incidents following emergencies.
9. To provide personnel. Equipment and supplies during firefighting operation.
10. Co-ordinate and call for mutual aid members to assist emergency operation. Keep record

C.I.S.F.:

1. Control gates, allow only essential men and vehicles. Allow exit for men & vehicles with permission of CDC. Keep record of the persons & vehicles going out.
2. Control traffic to avoid road chocking. Regulate vehicle movement.
3. Depute manpower to cordoning off the affected area.
4. Arrange CISF Staff/ QRT for patrolling in the area to maintain law & order situation.
5. Cordon off the area, Control and disperse crowd, if required.
6. Regulate and Control personnel evacuation.

Shipping Assistant:

1. On receipt of inform of emergency communicate with important persons like CDC, safety services, administration. etc.
2. In case of fire/toxic leakage/spill is discovered and reported but no emergency siren is operated, he shall ensure the information about the location of the fire/emergency incident from the person discovered/ notices the above and communicate to different Key Personnel immediately with clear message.
3. Control use of all telephone facilities.

Mechanical & Electric Engg.: Meet any immediate break down condition viz. equipment failure, fire line failure etc.

1. Liaise Traffic, Safety & utility coordinators to extend assistance in emergency handling by releasing manpower.
2. Meet electrical requirement like power isolation, temporary power connections, requirement of emergency supply like DG, UPS etc. for essential equipment & emergency operation from CME. Man MCC, PCC stations.
3. Liaise with MSEB for requirement of power etc.
4. Release manpower to help in emergency operation, if required.
5. Ensure functioning of wireless sets.
6. Help in handling break down condition like failure of process logic, fail-safe operation of instruments etc.
7. Restore/provide communication facilities.
8. Restore/provide electric supply, lighting equipment, etc.

Civil Engg.:

1. Meeting emergency needs like barriers / bund to contain leak, demolition of some / part / total structure for effective emergency operation.
2. Release manpower to help in emergency operation, if required.
3. Quick restoration/provision of water supply and drainage system.
4. Keep essential utilities running like water for fire water and their pumps as per demand.
5. Restoration of roadways, if required.
6. Arrange water supply through mobile water tankers.
7. Clearance of debris, if any.
8. Demolish unsafe structure, if any & construction of safe structures.

Stores:

1. Important items to be store during emergency for prompt delivery.
2. Keep inventory of items handy for quick delivery.
3. Keep safety items ready for issue.
4. If require in coordination with accounts arrange for essential local purchase.

Medical:

1. Keep all ambulances ready.
2. Keep the antidote & other medicines in stock with sufficient quantity of drugs, Surgical equipment ready in hospital/dispensary.
3. Activation of Medical facilities with all manpower, supplies and equipment.
4. Keep medicine in reserve with mobile medical team on rotational basis.
5. Set up trauma counseling desks.
6. Perform medical evaluation and treatment as needed.

7. Maintain patient tracking and record of their treatment.
8. Keep reserve beds in hospital.

Civil Defense Resources: (Auxiliary Unit for Training & Awareness)

1. Activation of Civil Defense Control Room by Dy. Chairman/CME
2. Release manpower of volunteers as per requisition of Disaster Management Control Room.
3. Send Mobile First Aid/rescue etc. team at the site as quickly as possible.
4. Send Quick Response Team at sites and establish temporary medical camps.
5. To maintain inventory of, and to take optimal use of available resources of JNPA volunteers.

General Administration:

1. Liaison with external agencies like fire brigade, hospitals, blood banks, private transports, press, Local- Govt.- statutory authorities, neighboring industries. Get external aid as per the site requirement.
2. Ensure correct accounting of persons for head count & give feedback to CDC.
3. In consultation with CDC release the emergency details.
4. Ensure only authenticated information release to avoid confusion.
5. Ensure that relatives of victims are informed.

Welfare:

1. Arrange for food, refreshment for the people-fighting emergency.
2. Make arrangements for their rest/shelter.
3. Coordinate to bring manpower available in company colony.

Finance:

1. Ensure that cash is made available at any time during emergency.
2. Give authorization of purchase to concerned in consultation with CDC and maintain records thereof.
3. Liaise with insure company for information. Coordinate their visit, if required.
4. With prod., services & stores coordinator carryout preliminary assessment of damage. Ensure that vital evidences are undisturbed from insurance purpose.

Emergency procedure in case of emergency: In general course is as under,

Identification: On noticing the fire or leak the observer will do following based on the resources available,

- Shout as Help - emergency / fire / leak.
- On phone or through cell phone contact immediately to your Sectional Officer and giving his detail in brief will tell type of emergency, location, etc.

Coordination with the following external agencies would be required

- Local Crisis Group-Uran and Patalganga,
- District Crisis Group,
- State and National Crisis Group,
- Indian Coast Guards,
- DD, AIR for media briefing,
- MSEB, MWSSB, MSRTC,
- Meteorological Department, MERI,
- Co-ordinate with the NGOs and aid agencies (contact nos.),
- Enlist services of GOI/GOM laboratories and expert institutions for Specialized services.(contact nos.) e.g. BARC emergency response center in case of radiological emergencies, DRDO for CBRN emergencies

9. PREPAREDNESS AND RESPONSE

9.1 BACKGROUND

Response measures are those taken immediately after receiving early warning from the relevant authority or in anticipation of an impending disaster, or immediately after the occurrence of an event without any warning. The primary goal of our response to a disaster is saving lives, protecting property, environment, and meeting basic needs of human and other living beings after the disaster. JNPA focus is on rescuing those affected and those likely to be affected by the disaster. The provision of emergency services and public assistance during or immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected.

In Preparedness, JNPA has SOPs for all the emergencies, hazards and risks on the basis of vulnerability in the port. The knowledge and capacities are developed by training as well as governments, professional response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions as a part of the training. Based on the preparedness, the response process begins as soon as it becomes apparent that a disastrous event is imminent and lasts until the disaster is declared to be over. It is conducted during periods of high stress in highly time- constrained situations with limited information and resources. It is considered as the most visible phase amongst various phases of disaster management.

Response includes not only those activities that directly address the immediate needs, such as search and rescue, first aid and temporary shelters, but also rapid mobilization of various systems necessary to coordinate and support the efforts. For effective response, all the stakeholders have been briefed about hazards, its consequences, and plans of action as per SOPs are implemented during the mock drills. It is ensured that the entire concerned are versed with their roles and responsibilities as per DMP.

Any emergency requires a quick response to save lives, contain the damage and prevent any secondary disasters. In most cases, first responders such as members of Incident Response Teams such as vessels, Port Fire services, Port Hospitals and other agencies (medical fire, police, civil supplies, CISF) manage emergencies immediately at the local level. If an emergency escalates beyond their capabilities, the local crisis management group seeks assistance from the district administration and/or the State Government.

9.1.1 Institutional Framework

Section 2 and Section 3 provides an overview of the institutional arrangements covering all aspects of disaster management. There are specific tasks, roles and responsibilities in the domain of response, which is mentioned in section 4. This section summarizes the function and responsibilities of individuals, departments and agencies that have a key role to play in disaster response as per current guidelines. The plan will be updated periodically to reflect any changes in the key roles envisaged to particular individual, department or agencies. No single agency or department can handle a disaster situation of any scale alone. Different departments have to work together to manage the disaster with an objective to reduce its impact.

The institutional arrangements for the response system consist of the following elements:

a) Chief Disaster Controller (CDC) with complete charge for any emergency control and coordination of the response and mobilization of all the necessary resources.
b) Site Controller (SC) Core Group/ On Site Group/ is responsible for assessing magnitude of situations on the Early Warning Systems and alerts.
c) Incident Controller is the responsible person for the place of occurrence.

There will be Traffic department under the under the CDC which will be connected to the following site controllers and / or departments:

- Marine / Fire & Safety
- Medical / Welfare
- CISF / Civil Defense Resources
- Civil Engineering / Welfare
- Mechanical & Electric Engg.
- General Administration / Finance

9.2 NATIONAL EARLY WARNING SYSTEM

9.2.1 Central Agencies Designated for Natural Hazard-Specific Early Warnings

The Government of India has designated specific agencies (Table 29) to monitor the onset of different natural disasters, set up adequate Early Warning Systems (EWS), and disseminate necessary warnings/ alerts regarding any impending hazard, for all those hazards where early warning and monitoring is possible with the currently available technologies and methods. These agencies provide inputs to the MHA, which will issue alerts and warnings through various communication channels. DMP ensures the actions on reception of such alerts and warnings and maintains equipment in proper functioning order and conducts drills and trainings to test their efficacy.

Table 29: Central Agencies Designated for Natural Hazard-Specific Early Warnings

S. No	Hazard	Agencies
1	Cyclone	Indian Meteorological Department (IMD)
2	Drought	Ministry Of Agricultural and Farmers Welfare (MoAFW)
3	Earthquake	Indian Meteorological Department (IMD)
4	Epidemics	Ministry of Health and Family Welfare (MoHFW)
5	Floods	Central Water Commission(CWC)
6	Tsunami	Indian National Centre of Oceanic Information Services (INCOIS)

On their part Jawaharlal Nehru Port Authority disseminates such alerts and warnings on the ground through all possible methods of communications and public announcements and action in conformance with the SOP.

9.2.2 Role of Central Agencies/ Departments

The National Emergency Operations Centre (NEOC) will act as the communication and coordination hub during this phase and it will maintain constant touch with early warning agencies for updated inputs. It will inform State Emergency Operations Centre (SEOC) and District Emergency Operations Centre (DEOC) through all the available communication channels and mechanisms. The DM Division of the MHA will communicate and coordinate with designated early warning agencies, various nodal Ministries, and State Governments. It will mobilize reinforcements from the NDRF, Armed Forces and the CAPFs and put together transportation plans for moving resources. The NDMA will support the overall coordination of response as per needs of MHA. The NDMA will be providing general guidance, and take decisions for the deployment of the NDRF. The NDRF will be deployed as required depending on the request from State Government. They will keep the force in operational readiness at all times.

9.3 HAZARD SPECIFIC RESPONSE PLAN

As per the SOP section 5 of part II.

9.4 ACTIVATION OF RESPONSE PLAN

At the national level, the Central Government has assigned nodal responsibilities to specific Ministries for coordinating disaster-specific responses (Table 30). NEC will coordinate response in the event of any threatening disaster situation or disaster. The State Government will activate the IRTs at State, District, or block level and ensure coordination with the SEOC. The SDMA will provide the technical support needed to strengthen the response system. It is essential that the first responders and relief reach the affected areas in the shortest possible time. Often, there are inordinate delays due to real constraints imposed by the location, nature of disaster and, most regrettably, due to inadequate preparedness. In many situations, even a delay of six to twelve hours will prove to be too late or unacceptable. To make matters worse, relief tends to arrive in a highly fragmented

or uncoordinated form with multiple organizations acting independently of each other without a cohesive plan, without mechanisms to avoid overlaps and without proper prioritization of different aspects of relief such as shelter, clothing, food, or medicine. From an operational perspective, the challenges are similar across most hazards. The NDMA has formulated IRS Guidelines for the effective, efficient, and comprehensive management of disasters. The implementation of NDMA's IRS Guidelines by the States will help National Disaster Management Authority in standardization of operations; bring clarity to the roles of various departments and other agencies, which are common to most disaster response situations.

Table 30: Central Ministries for Coordination of Response at National level

S. No	Disaster	Nodal Ministry/ Dept./ Agency
1	Biological Disasters	Min. of Health and Family Welfare (MoHFW)
2	Chemical Disasters and Industrial Accidents	Min. of Environment, Forests and Climate Change (MoEFCC)
3	Cyclone, Tornado, and Tsunami	Min. of Home Affairs (MHA)
4	Drought, Hailstorm, Cold Weather and Frost, Pest Attack	Min. of Agriculture and Farmers Welfare (MoAFW)
5	Earthquake	Min. of Home Affairs (MHA)
6	Flood	Min. of Home Affairs (MHA)
7	Nuclear and Radiological Emergencies	Dept. of Atomic Energy, Min. of Home Affairs (DAE,MHA)
8	Oil Spills	Min. of Defense/ Indian Coast Guard (MoD/ICG)
9	Rail Accidents	Min. of Railways (MoR)
10	Road Accidents	Min. of Road Transport and Highways (MoRTH)
11	Urban Floods	Min. of Urban Development (MoUD)

Sites for establishment of various facilities as required for providing various services during the response are established. The administration widely disseminates and publicizes the information about these arrangements as mandated in the SDMP and DDMP. Since disaster response operations are multifaceted, time sensitive, extremely fast-moving, and mostly unpredictable, it requires rapid assessment, close coordination among several departments, quick decision-making, fast deployment of human resources and machinery as well as close monitoring. In order to prevent delays and to eliminate ambiguities with regard to chain of command, the SDMP and DDMP clearly spells out the response organization as per SOP/ IRT. These plans clearly identify the personnel to be deputed for various responsibilities in the IRT at various levels of administration along with proper responsibility and accountability framework. Provision for implementation of unified command in case of involvement of multiple agencies such as District administration, CISF, oil companies, Civil defense Resources are spelt out in the SDMP. From time to time, the DM plan must be tested and rehearsed by carrying out mock exercises.

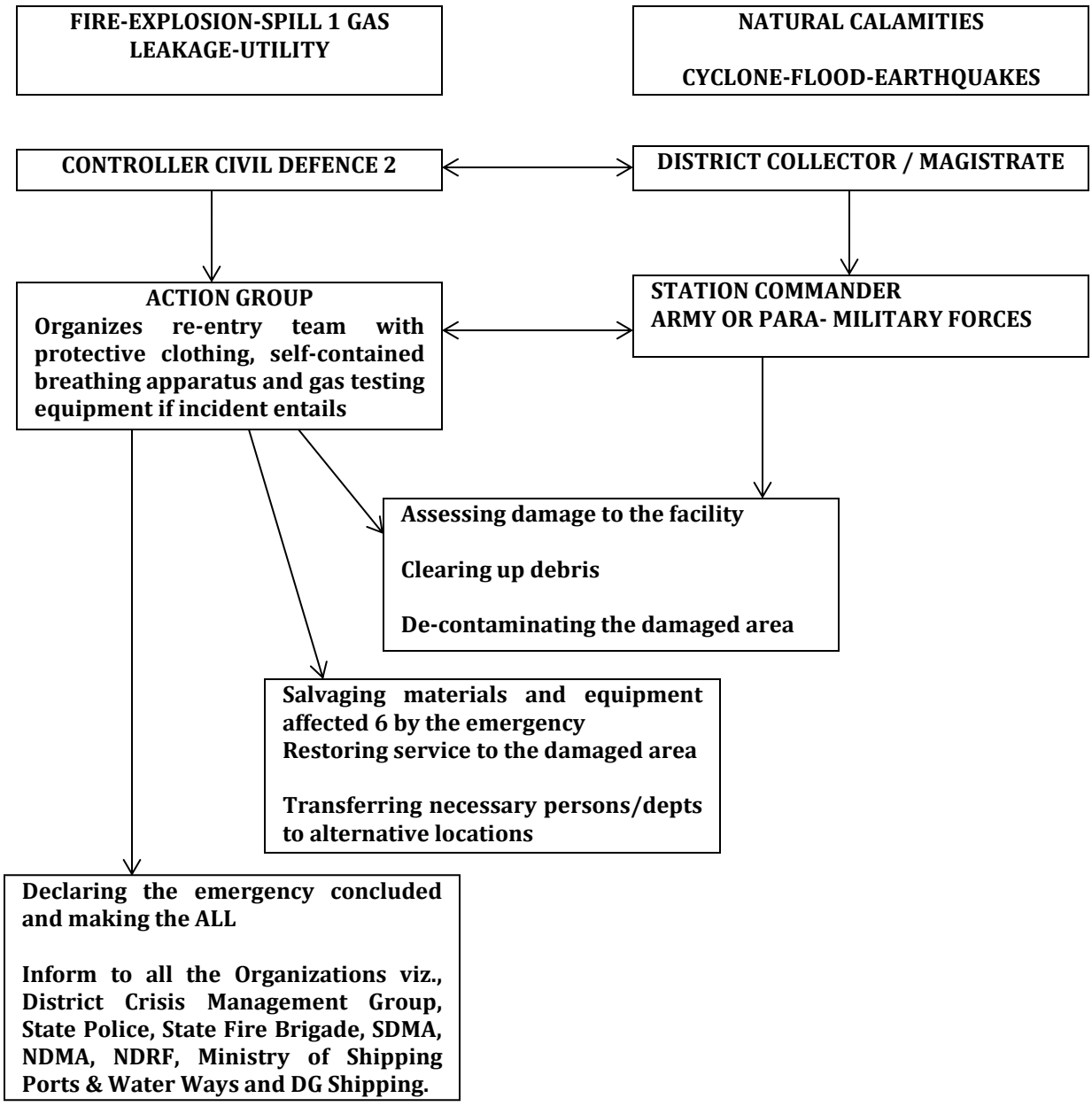
9.5 FIRE AND EMERGENCY SERVICES

Port has its own Firefighting Department. Port fire services is designated for any Fire and Emergency Services. The primary role of Fire and Emergency Services is of responding to fire incidents. However, besides firefighting, FES attends to other emergencies such as building collapse, road traffic accidents, human and animal rescue, and several other emergency calls. FES also takes part in medical emergencies. The role of FES has become multi-dimensional. The role of FES extends to the domain of prevention. FES is an integral part of the group of agencies responding to disaster situations. FES is one of the first responders during the Golden Hour after a National Disaster Management Plan disaster and plays a vital role in saving lives and property. Therefore, it is adequately equipped and developed to the capacities. Further, continuous training is also be provided to the fire staff in using and maintaining the equipment. FES is a key element in the emergency response system. It comes under the 12th schedule of the Constitution dealing with municipal functions. FES is under the jurisdiction of Municipal Corporations. With regard to the scaling of equipment, the type of equipment, or the training of their staff it is as per the state fire act.

9.6 RESPONDING TO REQUESTS FOR CENTRAL ASSISTANCE FROM STATES

Catastrophic disasters like earthquakes, floods, cyclones and tsunami result in a large number of casualties and inflict tremendous damage on property and infrastructure. The Government of India has established a flexible response mechanism for a prompt and effective delivery of essential services as well as resources to assist a State Government or Union Territory severely hit by a disaster. Disaster management is considered as the responsibility of the State Governments, and hence the primary responsibility for undertaking rescue, relief and rehabilitation measures during a disaster lies with the State Governments. The Central Government supplements their efforts through logistic and financial support during severe disasters as requested by the State Governments. Responding to such emergencies stretches the resources of district and State administration to the utmost and they may require and seek the assistance of Central Ministries/ Departments and agencies like the NDRF, Armed Forces, CAPF, and Specialized Ministries/ Agencies.

10. RECOVERY AND RECONSTRUCTION



Note:

For natural calamities etc. at the District level, the District collector or District Magistrate will make the necessary initiative through the paramilitary group.

The Port Chairman or Dy. Chairman may also request Para military Personnel to assist when the accidents have originated at the port premises.

11. BUDGETARY PROVISION

Jawaharlal Nehru Port Authority being operation centric organization, budgetary provision is made to keep in continuous readiness Firefighting equipment and staff, Oil Pollution Response equipment and staff and also to tackle natural disasters such as Floods and Cyclone etc.

11.1 JNPA FINANCIAL ARRANGEMENT IN CASE OF DISASTER

Insurance of Port Assets

In view of incidents like Earthquake, Tsunami, Cyclones, etc. and also directives received from Ministry as well as report of the Committee constituted by IPA, the Port finalized the comprehensive Port Package Policy w.e.f. March, 2006 after valuation of certain Port's Assets by an Independent Valuer. The comprehensive Port package policy comprises Insurance cover for the following properties:

- Building, Shed and other structure inside port
- Roads, Culverts, Bridges & Fencing walls in the port area/vicinity
- VTMS, Navigational aids & Firefighting aids
- Berths, Docks & Jetties
- Port Equipment & Plant & Machineries
- Oil Pipeline
- Electrical Installations
- IT Infrastructure

12. PLAN MANAGEMENT

12.1 BACKGROUND

Regular maintenance is critical to ensure the relevance and effectiveness of the DM plans. Plan maintenance is the dynamic process. The plan will be periodically updated to make it consistent with the changes in Government / Organizations policies, initiatives, and priorities as well as to incorporate technological changes and global experiences. Evaluating the effectiveness of plans involves a combination of training events, exercises, and real-world incidents to determine whether the goals, objectives, decisions, actions, and timing outlined in the plan led to a successful response. We make aware of lessons and practices from various parts of India as well as lessons from across the world. The trainings, mock drills and exercises are carried out for evaluating the operational aspects of the plan, rectify gaps, and improving the efficiency of the plan. The likelihoods of emergencies and actual occurrences are also used for evaluating the plan, making innovations, and for updating the plan, SOPs and guidelines. Further, changes of jurisdiction over is as well incorporated.

These key stakeholder agencies are required to train their personnel, so that they have the knowledge, skills and abilities needed to perform the tasks identified in the plan. Each agency shall assign nodal officers for DM and prepare adequate training schedule. Each nodal agency for DM must hold, in accordance with a mandatory timetable, training workshops with regular mock drills, at least twice a year. These drills will be organized to test their readiness to deploy within the shortest possible time following the DMP activation. They shall be conducted in a manner similar to that of the drills carried out firefighting department or the army units. These workshops and drills must be held at the pre-designated locations or base camps under the guidance of the designated incident commanders and associated departmental heads. The objective of all these trainings and drills would be to both familiarize the teams with the DMP and to increase their operational efficiencies. The workshops and drills will also provide an opportunity to practice SOPs. These workshops would also give the teams an opportunity to develop all the stakeholders into a cohesive response unit.

12.2 TESTING THE PLAN AND LEARNING TO IMPROVE

Evaluating the effectiveness of a plan involves a combination of training events, exercises and real-time incidents to determine whether the goals, objectives, decisions, actions and timings outlined as above Maintaining and Updating the Plan. Regular exercises and drills is to promote preparedness by testing the plan with equal participation of all relevant stakeholders. The process of evaluation and remedial actions will identify, illuminate, and correct problems with the DMP. This process must capture information from exercises, post- disaster critiques, self-assessments, audits, administrative reviews, or lessons-learned processes that may indicate that deficiencies exist. Members of the planning team should reconvene to discuss the problem and to consider and assign responsibility for generating remedies across all mission areas. Remedial actions may involve revising planning assumptions and operational concepts, changing organizational tasks, or modifying organizational implementing instructions (i.e., the

SOPs/SOGs). Remedial actions may also involve reassessment of capabilities, revisiting assumptions made in the DMP, and finding solutions to overcome the deficiencies. Nodal officers assigned for tracking and following up on the assigned actions.

12.3 REVISE / UPDATE

Jawaharlal Nehru Port Authority focuses on adding the information gained by exercising the plan to the lessons learnt while executing, and start the planning cycle all over again. All the relevant stakeholders should establish a process for reviewing and revising the plan. Reviews should be a recurring activity. DM plan must be reviewed at least once in a year. It will also be reviewed and updated as indicated below:

- Major review and revisions after each major incident
- After significant change in operational resources (e.g., policy, personnel, organizational structures, management processes, facilities, equipment)
- Subsequent to any notification or formal update of planning guidance or standards
- After every case of plan activation in anticipation of an emergency
- After the completion of major exercises
- A change in the demographics or hazard or threat profile
- Enactment of new or amended laws or ordinances. In exceptional circumstances where the magnitude of the incidence or the situation demands/ needs extra measures to be taken, If appropriate authority makes necessary amendments.

12.4 DEVELOPMENT, APPROVAL, IMPLEMENTATION, REVIEW AND REVISION

- This plan is developed in accordance with the template issued by MoS GoI and guidelines of NDMP (2019) and structured to suit the port organization. The implementation will be undertaken by the office of the Deputy Conservator & PFSO in association with various stakeholders. It is understood that lessons learned from previous near disaster/disaster situations have been studied and cognizance of the aftereffect of these disasters noted. Understanding of risk and preventive measures has thus been analyzed and mitigation plan prepared. Prioritization of risks has been done in the HRVCA section.
- Plan would be circulated to all stakeholders.
- Regular Drills/exercises would be conducted to test the efficacy of the plan and check the level of preparedness.
- NDRF, SDRF, BARC (for nuclear and radiological emergencies only) and other agencies e.g. civil defense, local govt. departments would be integrated into the plan.
- Review and updating of the plan would be carried out annually as per Disaster Management Act, 2005 Section 37.
- Consequent to any change/modification, the Dy. Conservator & PFSO/Harbour master is responsible for reviewing, updating and maintaining the DMP.

JAWAHARLAL NEHRU PORT AUTHORITY

PART II

EMERGENCY CONTINGENCY PLAN

CONTENTS- PART II

1. INSTITUTIONAL ARRAGEMENTS FOR RESPONSE/INCIDENT COMMAND SYSTEM

INTRODUCTION

Maritime transport, by its nature gives rise to many hazardous situations, including shipping accidents, such as collisions, grounding and sinking, accidents arising from the handling and storage of dangerous goods including bulk chemicals, gas and petroleum. It has long been recognized that port areas represent a complex interface between land and sea, between human activities and the natural environment and between different transport nodes. Due to the port 's geographical location, it is also exposed to natural disasters like cyclones, floods, earthquakes, Tsunamis etc.

Incident Prevention by Preparedness, response and mitigation backed up with sufficient resources are the key elements for attaining the objectives of these Disaster Management Action plans.

PURPOSE OF THE PLAN

The enclosed document entitled "**JAWAHARLAL NEHRU PORT AUTHORITY DISASTER MANAGEMENT PLAN"** is prepared with the objective of defining the functions and responsibilities of all concerned Jawaharlal Nehru Port Authority managerial, operational and departmental personnel with respect to preparedness, detection and effective implementation of the Disaster Management plan.

The plan objectives are as follows:

1. Rapid response, control and containment of a hazardous situation
2. Mitigation of the risk and impact of the event or accident to life, property and the environment.
3. Effective temporary rehabilitation of the affected persons during the period of crisis.

The elements of this plan are

- Reliable and early detection of an emergency such as Fire, explosion, toxic gas leakage, oil / chemical leakage / spillage, natural calamities like cyclones, floods, tsunami, earthquake, vessel related accidents such as collisions, grounding, sinking, fire and security related incidents.
- The alertness and preparedness status.
- The availability of port owned appropriate resources for handling emergencies and sourcing of additional resources and logistical support from govt. agencies
- Appropriate emergency response actions at port, and coordination at district and national level when required
- Effective communication channels and facilities

SCOPE OF THE PLAN

The on-site plan deals with emergencies which originate and are contained within the port area whereas the off-site plan addresses the impact of disasters spreading outside from the port boundary and those from outside impacting into the port area.

Offsite plans also address the following:

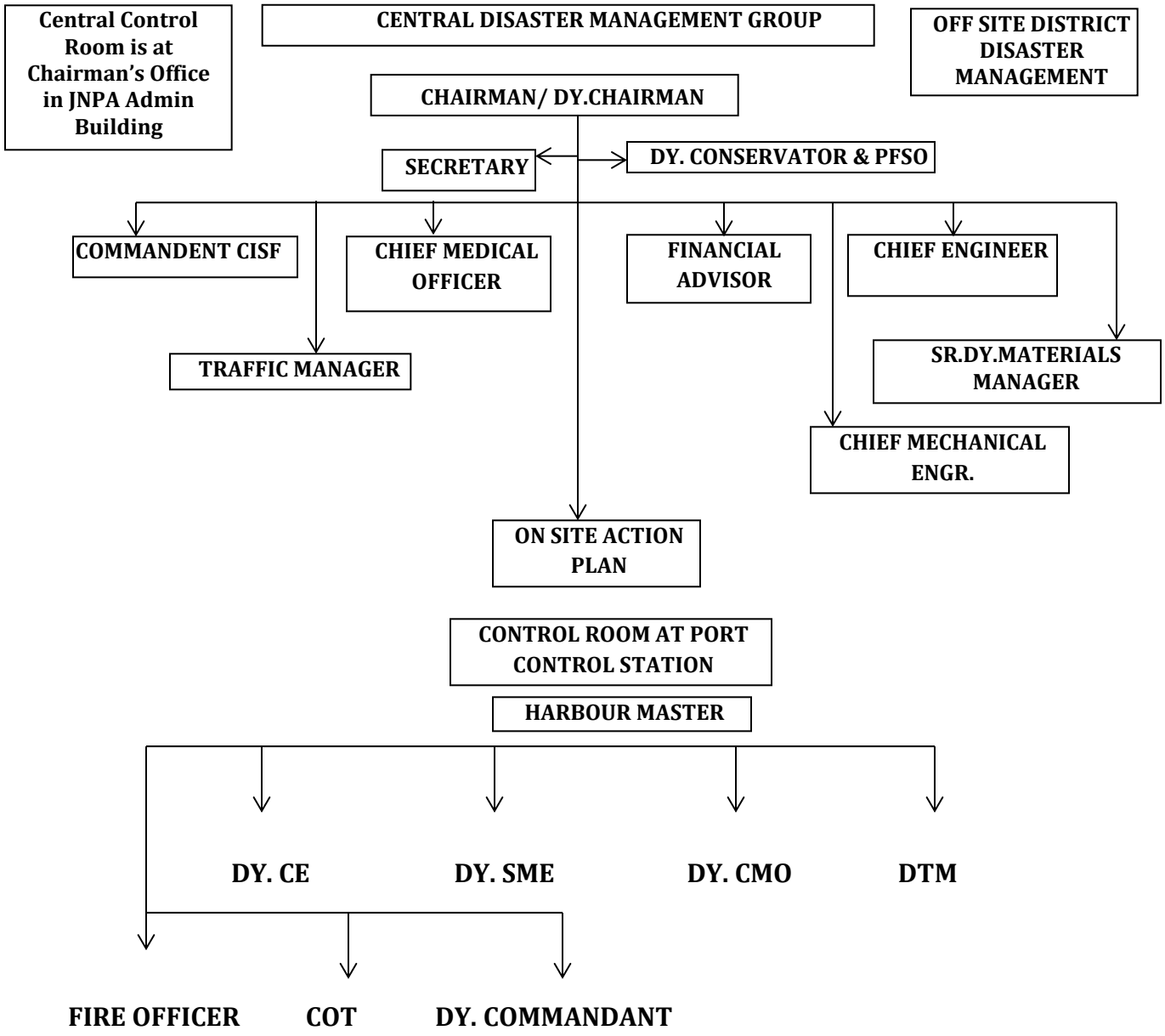
Co-ordinating with other response agencies

- Interact with other emergency response agencies
- Co-ordinate emergency plans and procedures
- Mutual aid assistance
- Open lines of communication- information sharing
- Joint education and training- common problem solving

With Local Government

- Provide a safe community
- Ensure the well-being of all residents and transients within the community
- Establish public safety programmes
- Coordinate port/ community emergency response forces during drills and emergencies
- Consider training, drills and exercises with other response agencies within the community, are and state.

ON SITE JNPA DISASTER MANAGEMENT ORGANIZATION



CENTRAL DISASTER MANAGEMENT GROUP- BASIC FUNCTIONS

Team Leader : Chairman / Dy Chairman
Members: Dy Chairman , Secretary, FA & CAO, Chief Engineer, CME , Traffic Manager, Materials Manager, Chief Medical Officer, Commandant-CISF, Commandant – Coast Guard.
Basic Functions
1-Monitor and analyze reports from the On Site Action team and identify the area/population at risk
2-Activate the Response Plan and arrange the Alert siren.
3-Support the Action Group with materials, equipment, information and human resources
4- Implement changes in the current mode of action if deemed necessary
5-Adjust the Disaster classification of the incident and actuate the Central Control Room
6- Coordinate with external organizations, State Govt. as deemed necessary
7- Make the necessary arrangements and funds for evacuation, transportation, food & supplies
8-Make media statements and reports to MOS.

ON SITE ACTION GROUP - BASIC RESPONSIBILITIES

Team Leader:- Harbour Master / Senior Pilot
Members:-Control room-Sr. pilot, Chief Fire Officer, Dy Comdt. CISF , Exec. Engineer (Electrical) Addl. TM, Dy Chief Med. Officer.
Basic Functions
1- Assess & classify Incident:-nature-location- severity-casualties-resource requirement – time to control
2- Activate elements of the disaster management plan, arrange alert signal in liaison with DC
3-Conduct search, rescue and evacuation operations. Provide medical Aid
4- Manage incident operations and terminate plan, Arrange for re-Entry and restoration

EMERGENCY CLASSIFICATION

Level 1. It is an Incident within the port and is of a minor nature with a low level of personnel injury, interruption to work, damage level and loss of capability. It can be handled by the Port Trust Staff involving Marine and other depts. The Emergency Management group leader is the Dept Head. E.g. Building/Shed Fire, Elec Supply disruption, labour accident, vessel accidents **Level 2;-** It is an Incident within the port area and is of a limited and moderate level of personnel injury, possible death(s),interruption of work, damage to port ..Besides Port resources, outside assistance may be required. The Disaster Management group leader is the Chairman, JNPA. E.g. Gas Leaks, Chemical/Oil Spills, Terminal Fires/ Explosions **Level 3:-** It is a disaster of a severe and critical nature and could have a high level of

personnel injury (and deaths), interruption to work, damage to port and loss of capability. It affects the port and possibly adjacent areas. Besides Port resources, assistance from outside agencies is required. If incident affects JNPA, group leader is chairman, JNPA and if it affects outside PPT , then information will be given to District Collector depending on the intensity. E.g. Gas Leaks, Chemical/Oil Spills, Fires/ Explosions & Cyclones

INCIDENT/REQUIREMENT SCENARIOS	**LEVEL I – ACTION BY**	**LEVEL II & III –ACTION BY**
Vessel–Grounding-Shifting-Evacuation	HM	HM + Salvage efforts + Navy + Coast Guard
Casualties	CMO	Port + District + State
Fire & Explosion on Vessel or Terminal	CFO	CFO + District (Fire wing) + CDMG
Fire & Explosion at Shed	CFO , TM	CFO + District (Fire wing) + CDMG
Oil or Chemical Spill	CFO	CFO +Central disaster Mgmt. Group+ outside agencies
Toxic Gas Leakage	CFO	Central disaster Mgmt. Group +District/ state assistance + outside agencies
Cyclone, tsunami, flood etc	Dy. Conservator & PFSO	National disaster Management group + CDMG + District + state
Electric Supply breakdown	SE (Elect.)	CDMG + District + State

CENTRAL DISASTER MANAGEMENT GROUP - RESPONSIBILITIES

Position	**Port Position**	**Alternative**
Chief Emergency Controller	**Chairman**	**Dy. Chairman**
Monitors Disaster Management action Plan and a state of emergency preparedness is maintained at all times. Authorizes release of required funds. Leads Central Disaster Management group to direct operations from the emergency control center.		
For industrial disasters, confirms level of crisis, monitors the shutting down, evacuation and other operations as necessary. Directs activation of the Central Control room at emergency level 2 and 3		
Activates the off-site emergency plan if the disaster is spreading to/from outside Port boundary in liaison with Dy chairman, DC,TM and CFO		
Approves information to the media		
Liaises with the Secretary, Jt. Secy (Ports) of the MOS (Ministry of shipping)		
Confirms the termination of the emergency.		
Leads the Central Disaster Management Group, monitors the early restoration of facilities and port activities,		
Provides timely required status reports to the Secretary MOS		

Group Position	Port Position	Alternative
Welfare & Media Coordinator	**Secretary**	**Sr. Dy. Secretary**
Co-ordinates cyclone response-acts as media spokesman Prepares a duty roster for manning of the cyclone coordination centre by officers of the Administration, Finance & Accounts and Materials Management. Mobilises vehicles. Arranges food and water to the personnel on roster duty		
Liaises with MOS and communicates inputs from the Chairman.		
Liaises with media as spokesman under guidelines of the Chairman		
Co-ordinates cyclone response plan and keeps constant touch with the local and District Administration to render assistance		
Secretary / Deputy Secy.(G) to arrange for evacuation of the township		
Maintains list of missing persons		
Monitors vehicles from shortlisted transport pool		
Provides a report to MOS		

Group Position	Port Position	Alternative
Chief Incident Controller	**Dy. Conservator & PFSO**	**Harbour Master**
Ensures that the applicable implementation procedures are reviewed and revised annually. Assists Central Disaster Management Group to Direct operations from the emergency control center		
Monitors and forecasts cyclone tracks threatening Port. Ensures stoppage of shipment operation & evacuation of vessel during disaster.		
Directs the site incident controller(HM) from control room		
Directs the shutting down, evacuation and other operations at the port		
Monitors on site personal protection, safety		
Monitors the search & rescue operation.		
Coordinates, organizes and obtains additional resources for operation		
Liaises with the senior operating staff of the Fire, Police, Coast Guards, Military and para military, Navy etc.		
Advises Central Disaster Group for the termination of the emergency situation		
Assist in assessing damages together with the CE, CME & TM		
Assists in the supervision & reconstruction of affected areas post disaster		
Preserves evidence and assists Secretary in the submission of logs for the claim process.		

Group Position	Port Position	Alternative
Traffic Department	**Traffic Manager**	**Dy. Traffic Manager**
Ensures evacuation of all dock workers and private labour, visitors, shippers, consignees from the port area.		
Prepares vessels to vacate from berth to open sea		
Arranges to protect cargo in port custody from damage by shifting		
Arranges to segregate dangerous cargo in sheds during fire		
Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area		

Ensures his dept implements the disaster response plan and assists in segregating and shifting cargo and coordinating with the Fire Fighting Authorities
Informs all cargo interests, Port Agents, stevedores regarding restoration of the port operation.

Group Position	**Port Position**	**Alternative**
Cash & Accts.	**FA & CAO**	**Dy. FA & CAO**
Maintains cash / funds for disbursement to all the depts		
Disburses cash / funds to different departments		
Provides Disbursement Statement to Secy. for processing claims		

Group Position	**Port Position**	**Alternative**
CME Department	**CME**	**Dy. CME**
Mobilizes field groups for On Site Action Monitors implementation of plans for providing continuity of emergency supplies and services such as electric power, emergency lighting, pump, bulk material handling equipment etc. Coordinates with Deputy General Manager (Material) to procure essential materials Arranges for the fabrication of any specialized equipment required for the emergency Monitors that his field group have secured, loader, conveyors, mobile equipment, bulk material handling equipment, locomotives, cargo handling equipment etc.		
Monitors the appropriate procedures to isolate damaged units without introducing new hazards and providing resources both in terms of personnel and equipment to accomplish this		
Activates the necessary utilities during the emergency, like activating back up emergency generators for general lighting purpose, pumps, welding services etc.		
Monitors the rendering of assistance for rescue of trapped personnel by cutting structures, wires etc		
Ensures the dept. group remain alert on duty for any electrical isolation of equipment during an emergency		
Assess damages and provide technical assistance to determine the operability of damaged units.		
Assist in the accident investigation		

Group Position	**Group Port Position**	**Alternative**
Engineering Department	**Chief Engineer - Civil**	**Deputy General Manager**
1. Mobilizes on-site action group to ensure proper functioning of the creek/culverts/Roads/ drainage system/Water supply system.		
2. Ensures proper manning of the pump houses during the disaster		
3. Ensures proper functioning of the drinking water supply to the relief/ cyclone shelter.		
4. Assists in recovery and port restoration activities		

Position	Group Port Position	Alternative
Security Coordinator	**Sr. Commandant - CISF**	**Dy. Commandant CISF**
Directs the gate security and facilitates evacuation, transport, first aid, rescue		
Keep extra watch over stores, sub stations, berths, transit sheds, warehouses, administrative building, loco sheds.		
Controls the entry of unauthorized persons and vehicles-disperses crowd-cordons off restricted areas-prevents looting		
Permits the entry of authorized personnel and outside agencies for rescues operations without delay.		
Allows the entry of emergency vehicles such as ambulances without hindrances		
Ensures that the people are as per the head count available with the assembly point section of that area to arrange for orderly evacuation		
Monitors that Dy. Commdt CISF completes a reconnaissance of the evacuated area, to enable declaration of the same as evacuated and report to the Chief Incident controller		
Participates in recovery and re-entry activity		

Position	Port Position	Alternative
Medical Aid Coordinator	**Chief Medical Officer**	**Dy. CMO**
Set up casualty collection center and arrange first aid posts		
Arrange for adequate medicine, antidotes, oxygen, stretchers etc		
Advises Chief Incident Controller on industrial hygiene and make sure that the personnel on duty are not exposed to unacceptable levels of toxic chemicals		
Makes arrangements of Ambulance for transporting and treating the injured		
Maintains a list of blood groups of each employee with special reference to rare blood groups. Arranges additional medicine and equipment as required		
Liaises with selected NGO‘s under instructions of the chairman		
Arranges Equipped Ambulance to be kept fully ready.		
Ensures that the casualty section of Port hospital has specialists		
Arranges for extra beds and in emergency contact with the state Govt. Hospital for extra medical supplies.		

Group Position	Port Position	Alternative
Logistics Coordinator	**Dy. General Manger (Material)**	**Sr. Manager (Material)**
Arranges purchase of stores and supplies		
During cyclonic season sufficient stock of stores like GI corrugated sheets, J. Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, kerosene oil, hurricane lantern, petromax lamps, torch lights with batteries and bulbs, electrical items etc. are kept.		
All the materials which are likely to get damaged with rain are protected by a tarpaulin cover and raised above ground level.		
One Stores Supdt., one Store Keeper and the other minimum staff are required to issue materials including POL are kept during emergency.		
Informs FA & CAO the approximate funds required.		
He will replenish stock if possible		

DISASTER MANAGEMENT ON SITE ACTION GROUP- ORGANIZATION RESPONSIBILITIES

Group Position	**Port Position**	**Alternative**
Site Incident controller	**Harbour Master**	**Senior Pilot**
Directs and co-ordinates all field operations at the scene of the accident		
Monitors early warning for cyclones and rescue operations		
Assesses the level of incident -nature-location- severity-casualties and resource requirement		
Classifies the incident - Advises Pilot at Port Control to convey to Main incident controller (HM) about Crisis Severity status and Emergency level , resource requirements etc.		
Activates elements of the terminal emergency plan / site response actions **Coordinates** –in combating operation of the fire fighting and toxic gas leakage with the CFO, if Oil spillage with the Coast Guards, if Vessel accidents with the Dy Conservator & PFSO, if Natural calamities like cyclone and floods, tsunami with the Secretary, CME,CE , for Cargo opn. shutdown with the Traffic Manager, for Search& rescue Sr. Comdt CISF, for First aid and hospitalization with CMO.		
Coordinates all functional heads in field operations group to take action		
Arranges tugs, mooring boats and pilot(s) for un-berthing vessel(s)		
Arranges for additional resources and periodic tactical and logistical briefings with Main Incident Controller (Dy. Conservator & PFSO) of CMG (Central Management Group).		
Liaises with Coast Guard, Navy and CISF Fire Service		
Co-ordinate with the search and rescue operations of CISF		
Manages incident operations to mitigate for re-Entry and restoration including channel hydrographic survey and navigation aids survey in liaison		
Arranges survey of damaged marine flotilla for necessary repairs Makes claims if the incident is due to the vessel from owners , P& I Club or agents		

DISASTER MANAGEMENT ON SITE ACTION GROUP

Group Position	**Port Position**	**Alternative**
Communications Officer	**Senior Pilot**	**Pilot**
Maintains 24 h vigilance towards the channel/anchorage & port		
On receipt of instructions from the chief Incident controller, informs the fire brigade/CISF/HM		
Refrains from exchanging any information with unauthorized persons unless authorized to do so by the Chief Incident Controller		
Maintains contact with other vessels and on VHF		

DISASTER MANAGEMENT ON SITE ACTION GROUP – RESPONSIBILITIES

Group Position	**Port Position**	**Alternative**
Cargo Storage, Sheds & Labour coordinator	**Sr. Dy.TM**	**Dy.TM**
Co-ordinate with HM in de-berthing vessel to vacate the berth		
Arranges to segregate and protect cargo in sheds		
Submits consolidated list of dangerous goods in port including tankers in port during fire.		
Coordinates with ship-owners/agents/C & F agents/stevedores and with labour Officer to arrange and ensure evacuation		
In case of Fire at Cargo Berths/Transit Sheds - liaises with Dy Commdt CISF Fire to extinguish fire and in search and Rescue Operations		

DISASTER MANAGEMENT ON SITE ACTION GROUP-RESPONSIBILITIES

Position	**Port Position**	**Alternative**
Fire Search & Rescue	**CFO**	**Dy. CFO**
Keeps all firefighting appliances and resources in readiness Maintains patrols and ensure unsafe practices are eliminated Liaises with Site Incident controller (HM) and is responsible for keeping the Fire Dept in a state of alertness on a 24 hour basis.		
Sounds action alarm at the Fire station. Keeps HM,DC, Chairman, Dy Chairman informed the level of crisis & leads team directly to incident site		
Initiates firefighting procedures immediately and ensures firefighting team reaches the incident location with the correct resources.		
Assists CISF in the evacuation of workers to the assembly points in liaison with the Dy. Commandant CISF		
Informs Site Incident Controller (HM) if external fire tender/firefighting equipment /materials is required		
Arranges safety equipment e.g. fire suits, protective gloves and goggles, breathing apparatus as required		

DISASTER MANAGEMENT ON SITE ACTION GROUP- RESPONSIBILITIES

Group Position	**Port Position**	**Alternative**
First Aid	**Dy. CMO**	**Medical Officer**
Maintains a list of blood groups of each employee with special reference to rare blood groups - Liaises with CMO as necessary		
Sets up a casualty collection center , Arranges first aid posts at assembly points		
Arranges for adequate medicine, antidotes, oxygen, stretchers etc		
Contacts and cooperates with local hospitals and ensure that the most likely injuries can be adequately treated at these facilities e.g. burns		
Advises Incident Action Group not to be exposed to unacceptable levels of toxic exposure		
Submits reports-indents to replenish medicines ,resources used		

DISASTER MANAGEMENT ON SITE ACTION GROUP-RESPONSIBILITIES

Position	**Port Position**	**Alternative**
Security	**Dy. Commandant-CISF**	**Inspector CISF**
Controls the entry of unauthorized persons and vehicles		
Permits the entry of authorized personnel and outside agencies for rescues operations without delay.		
Allows the entry of emergency vehicles such as ambulances without hindrances		
Ensures that all people are aware of the assembly points, where the transportation vehicles are available.		
Ensures that the people are as per the head count available with the assembly point section of that area		
Liaises with the Addl. TM for transport arrangements of the people at assemble point		
Carries out a reconnaissance of the evacuated area before declaring the same as evacuated and report to the Commandant CISF & Chief Incident controller		
Submit report to Sr. Commdt CISF copy to Chairman-Dy Chairman-Dy Conservator & PFSO & Traffic Manager		

DISASTER MANAGEMENT ON SITE ACTION GROUP- RESPONSIBILITIES

Position	**Port Position**	**Alternative**
CME DEPT.	**DY. CME**	**Exe. engineer (M)**
Suggests optimal strategies for conducting emergency isolation of damaged equipment, the emergency transfer of materials etc.		
Provides the necessary utilities during the emergency like back up emergency generators for general lighting purposes, pumps, welding services.		
Renders assistance for extricating trapped personnel by cutting structures, wires etc.		
Recommends the appropriate procedures to isolate damaged units without introducing new hazards and provides resources both in terms of personnel and equipment to accomplish this		
Assess damages and provide technical assistance to determine the operability of damaged units.		
Assists in the re- entry and restoration process of the port operation.		

Position	**Port Position**	**Alternative**
Civil	**Dy. CE**	**Sup. Engr (CM)**
During cyclones/floods arranges sand bags & develop methodologies to control hazardous spills. Co-operate with on-site action group to conduct the clean-up work during and after the disaster. Assist in the restoration and recovery activities.		

EVACUATION ACTION-COORDINATION AND SPECIFIC FOLLOW UP

Evacuation Operation will be coordinated by the Commdt. CISF

DEPT & ACTION BY	SPECIFIC ACTION
Administration - Secretary	**1-Overall Supervision** of Evacuation & Reports to Chairman
Traffic & CISF	**2-Evacuation of work force** at harbour area.
Administration - PRO	**3-Announcement** of Evacuation through PA on mobile units
Administration – Dy. Secy & Estate Officer	**4-Arrange Relief Centres** ready to accommodate evacuated persons
Administration- Dy. Secy (G)	**5-Procure Transport vehicles** to transport persons at relief centers
Civil Eng - Addl CE	**6-Provide** adequate **Drinking water** at temporary evacuation shelters
Medical - Dy CMO	**7-Provide** Medicine and **First Aid** at Assembly points & relief centers
CME Dept. EE	**8-Provide adequate lighting** at temporary evacuation shelters
Administration- PRO	**9-Provide food** at temporary evacuation shelters
Comdt CISF	**10-Confirmation** that evacuation operations are complete
Administration- Secretary	**11-Status Report** to Chairman/Dy Chairman **every hour**

All vehicles whether it is of Port Trust or hired should be parked in the location as decided by Secretary, JNPA from where it can be taken for immediate use as soon as the people move into action. Search and Rescue Operation will be coordinated by the Commdt. CISF.

COMMUNICATION SYSTEMS

Vulnerability is partly a function of the degree of protection available to potential victims as a result of a disaster. Improved warning reduces vulnerability. Warning' incorporates the communication of risk in times of impending emergencies, with the purpose of obtaining public protective actions through the implementation of the Disaster Management Plan.

Communication Network Elements within the Port on Site -

Internal Fire Service	Special fire alarm and normal communication system VHF- TELEPHONE-EPABX-WALKIE TALKIE- MOBILE
Forward control	UHF/VHF Transceivers-normal communication systems in reserve
Personal and internal Medical services	Normal communication services
Fire-fighting craft and Rescue launches	UHF/VHF Radio telephones, Via port authorities as reserve
Ships at Berth	Normal UHF/VHF Radio telephone link used in cargo

	operations. Terminal representative at tanker berth to also have own radio
Civil Authorities Including Fire Services, Police and Medical Services	Direct telephone link with failure alarm, UHF/VHF radio telephone or public telephone system. Cascade system to be used i.e. through dept heads to subordinates Enable keep lines clear
Harbour Authorities, Pilots, Tugs and other Harbour Craft	UHF/VHF Radio telephone or public telephone
District Collector or State Secretary	UHF/VHF Radio telephone, public telephone-hot line for emergency level 2 & 3-
It Secretary- Most New Delhi	Public telephone-hot line for emergency level 2 & 3

MANAGEMENT	**MOBILE VHF**
Secretary, C E, CME, Traffic Manager	Walkie talkie
Dy. Conservator & PFSO - Comdt CISF - CFO Port Entry Gates- Harbour Master	Walkie talkie
Port Control	VHF / Walkie Talkie

2. PREVENTION AND MITIGATION OF DISASTER

2.1 PREVENTION/ PROTECTION ACTION

Jawaharlal Nehru Port has a reporting system for the incidents taking place in the Port premises. Regular training programme and mock/fire drills also take place within the port involving the operators.

Prevention/Protection action include:

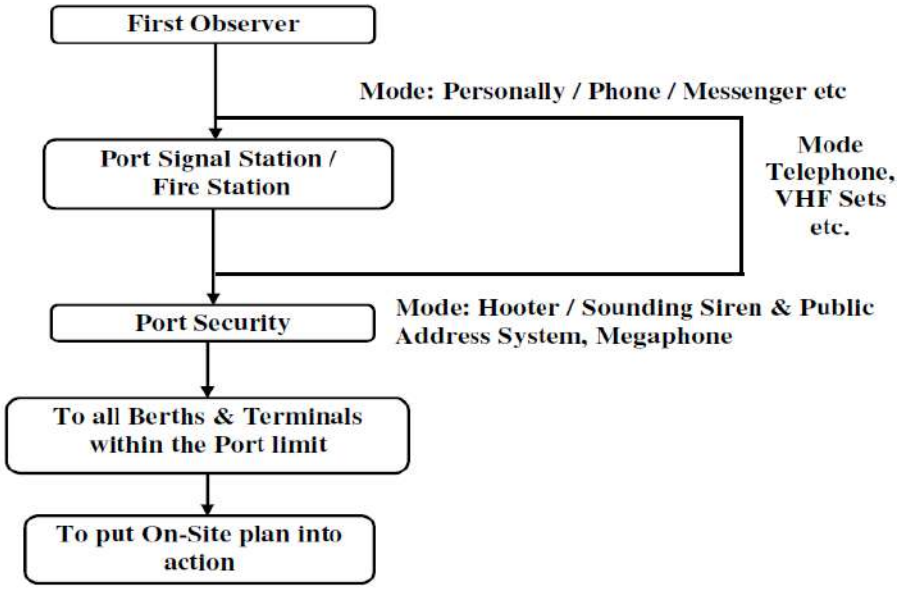
- Passage abort procedures (For navigational channel),
- Passage record keeping,
- Master/Pilot exchange

  – Master to Pilot (The Pilot card),
  – Pilot to Master (Pilotage Passage plan),
  – Master to Pilot (Hazard Checklist- vessel carrying dangerous or polluting goods).

- Patrolling,
- Conduct investigation of the incidents and identify the short-comings and make good of the same,
- Warning Signboards,
- Restricted zones.

2.2 PREVENTION/PROTECTION ACTION IMPLEMENTATION PLAN

Following is the typical Prevention/Protection action plan.



Action Implementation Plan

The person who observes the emergency first is called as the First Observer. The First Observer, noticing an unusual occurrence like a fire /gas release /collapse of structure etc., should immediately notify the Port Control Room with available means of communication and also contact the concerned Officer of the area in person.

He would:

1. Raise alarm
2. Call fire station and signal station and pass on following information:
   - Introduce himself
   - State briefly 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 cross-wind to the wind direction and standby to give assistance if he is part of the action group.

After receiving information from the First Observer, the Signal Station would notify all the key personnel of the Port and also direct the security personnel to activate Siren and will subsequently announce on the available means of Public Address System as follows:

- Location of the emergency,
- Type of the emergency,
- Severity of emergency.

After hearing siren or the public announcement, all concerned personnel (identified in the plan) would move to their respective positions and will begin actions as documented in the plan.

2.3 PUBLIC WARNING

The capabilities and processes the Port has in place to information collection and disseminates warning messages to the stakeholders and all the personnel as to the nature of the hazard, the timing, and the recommended or required protective/preventive actions which are to be implemented by the action group are described in the following sections.

Message content

The message needs to be announced at least in local language which may be for example - Evacuate, Assemble etc.

Public Warning System

The various types of warnings through hooters/sirens with indication locally and in control room, depending on the location of emergency as specified below:

- **Siren for declaring Emergency**

1. On receipt of the information about the Emergency, the control station will authorize CISF at the Gate to actuate the Emergency Siren as follows: -
   - Siren to be sounded continuously for 30 Seconds with an interval of 5 seconds to be repeated 10 times.

- **Siren declaring Evacuation from the Port area**

1. On receipt of the orders from the Deputy Conservator & PFSO or in his absence the Harbour Master, the port control room will authorize CISF at Gate to actuate the Siren as follows:
   - Siren declaring Evacuation from the Port area: Siren to be sounded for 5 seconds till the area is evacuated by people or for ½ hour whichever is less

- **Siren declaring All Clear and returning to the work**

1. On receipt of the information from the Deputy Conservator & PFSO or in his absence Harbour Master, the port control room will authorize CISF at Gate to actuate the Siren as follows:
   - Continuous ringing of siren for 5 minutes

JNPA has the following Public Warning Systems in place

1. Public Address System (PAS),
2. The initial announcement may be made from the fire jeep fitted with megaphone,
3. Sirens in the port premises,
4. VHF sets are provided to all key personnel of the Port as well as other terminal installations for communication both during normal operation as well as during emergency,
5. Manual Call Points,
6. Fire Alarm System.

Communication Flowchart

Using the above Public Warning Systems, the warning or messages can be disseminated through various ways depending on the type of disasters.

3. PREPAREDNESS

3.1 EMERGENCY OPERATING CENTRE (EOC)

The EOC will be located in the Chamber of Deputy Conservator & PFSO or JNPA Board Room or as directed by the Chairman/Dy. Chairman.

Emergency Operating Room Equipment

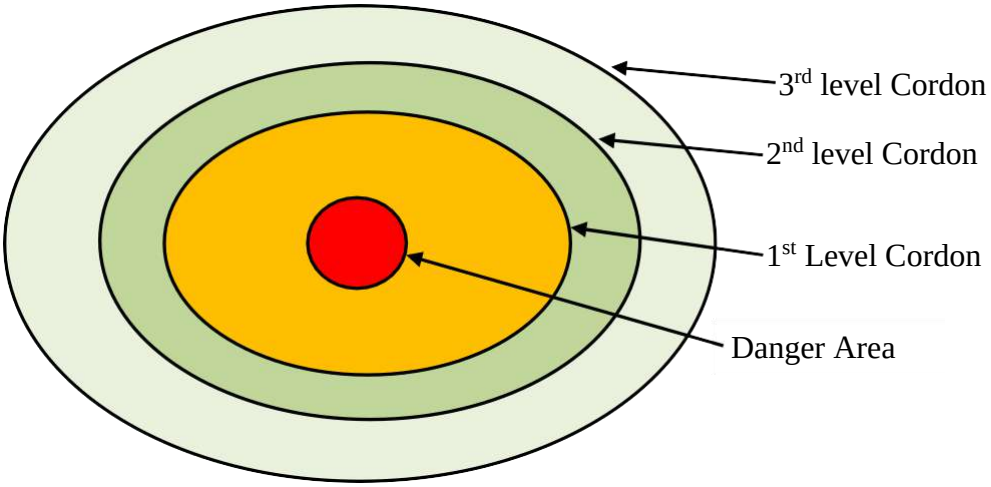
As a general guideline the following equipment should be catered to

- Flip up of maps should be available-preferably a digitized map on the computer,
- Terminals storing toxic chemicals and terminals storing flammable chemicals,
- Transportation map depicting transportation route for LPG and chemical tankers by road,
- Map showing sensitive areas,
- Map depicting densely populated areas,
- Emergency lights and torches,
- Computer,
- Fax,
- Printer,
- Telephone,
- Portable PA Sets,
- Walkie-talkies / mobile telephone,
- Chemical protective suit,
- Loud hailer,
- VHF sets,
- Binoculars,
- Copy of Disaster Management plan,
- Reference books-chemical Encyclopaedia,
- Table-seating,
- Chairs,
- Stationery,
- Gas masks with canisters,
- Safety goggles,
- Self-contained breathing apparatus.

3.2 MECHANISM FOR ACCESS CONTROL AND ISOLATION OF THE DANGER AREA

1. All gates of the 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. Firefighting facilities and other required resources should be available till the operation is terminated,
7. The restricted areas should be under surveillance at all times.



Danger/Hazardous 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

3.3 EVACUATION SUPPORT

1. On blast of Disaster warning siren, the workers will assemble at the respective assembly points to be transported to the refugee centres.
2. The assembly point earmarked at JNPA are as follows

Table 31: Assembly Points

Sr. No	Assembly Points
1.	CT Shift in-charge office
2.	In front of POC building
3.	POC Canteen building
4.	In front of Administration building
5.	NSDT
6.	TT Maintenance Section
7.	Office of Deputy General Manager (LCB & NSDT)

Sr. No	Assembly Points
8.	ICD Building
9.	E-7 Substation
Sr. No	**BPCL Jetty - Assembly Points**
1.	Jetty Control Room/Pump House building
2.	Near Liquid Cargo Jetty Entry Gate
3.	At the South west corner of Loading Berth
Sr. No	**APM Terminal – Assembly Points**
1.	Front House of GTI House
2.	Behind Eng. Workshop
3.	Central gate Complex
4.	Rail Head – ICD
5.	Wharf (Near Central Orange House)
6.	Yard 1U near South bridge starting
7.	ODC gate
8.	TDC
9.	Marshalling Yard
Sr. No	**DP World Terminal – Assembly Points**
1.	Wharf office (NSICT wharf office and NSIGTwharf office)
2.	Old Canteen
3.	E6 substation
4.	Operations center
5.	ICD Office
6.	Gate complex
Sr. No	**BMC Terminal – Assembly Points**
1.	Wharf office
2.	Workshop
3.	Admin Building
4.	Gate Complex
5.	Rail Goomti (near sub station1)
6.	Rail Office

3. The vehicle-carrying victim should be given the first priority in traffic movement.
4. 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.
5. As far as possible people should be advised not to use their vehicles since any breakdown of the same on the evacuation route would act as an obstacle to the vehicles being used for evacuation.

Evacuation Routes

In case of a general emergency one of the first duties of the CIC is to alert outside authorities and advise them about the actions that should be taken to protect the public, if any. The most significant risk affecting the local population is that of a toxic materials release.

The evacuation route could be by two ways

a. Land
b. Sea

Temporary Shelters

In the event of an impending disaster the affected population would have to be transported to intermediate temporary shelter. The temporary shelters identified for Port are schools and colleges located at Port Area and City.

Gathering & Rehabilitation centres

Table 32: Gathering and Rehabilitation centres

Centers	Location
Multipurpose Hall	JNPA Township
JNPA Hospital	
St. Mary's JNP School	
JNP Vidyalaya	
Officers and Staff club	

Administration department shall ensure adequate quantity of water supply at all the temporary evacuation centres.

CMO shall ensure that necessary medicine and medical assistance at the temporary evacuation centres is available.

Administration department shall take care of the requirement for food for the evacuees in the temporary evacuation centres. For supply of food packets, etc., they shall immediately contact the agencies of the area.

As a part of emergency relief Port Trust to consider 500 gm of rice per day per adult and 250 gm of rice per day per child. Relief of this scale should be catered to by consent of collector for a period of 3 days whereas a relief of 7 days could be obtained with the approval of Relief commissioner.

Extension of relief beyond 15 days could be sought from the State Government or Central Government.

Apart from the above, if required, he may contact the hotels for supply of food packets.

Transportation

Vehicle Pool

As soon as this Emergency Action comes into force, the vehicle pool is formed. The pool shall be controlled by Administration Department.

Apart from the Port vehicles, The Engineers shall hire vehicles with spark arrestors from other available sources for emergency work.

Engineers should ensure the availability of the drivers and vehicles and report compliance to the Deputy Chairman/Dy. Conservator & PFSO. All vehicles whether it is of Port Trust or hired should be parked in the location as designated by Deputy Conservator & PFSO from where it can be taken readily for immediate use.

Contact with Railways & State Road Transport Corporation

SIC should ensure for the smooth movement of workers/employees for which he may get in touch with the concerned officers and apprise them about the situation so that the movement of staff is not suffered.

Generator Sets

Wherever generator sets are required, GM (M&EE) officers shall be contacted, who shall immediately hire/procure or provide from whatever sources.

Decontamination

Additional issues in relation to decontamination of the public may arise at some hazardous materials incidents. Decontamination in this context refers to a range of procedures employed to remove hazardous materials from people and equipment. It includes terms such as:

- Clinical decontamination, meaning medical treatment by health professionals of patients affected by or contaminated with hazardous materials;
- Emergency decontamination, when time does not allow for the deployment of specialist resources and it is judged imperative that decontamination of people is carried out as soon as possible;
- Personnel decontamination meaning the decontamination of uninjured exposed persons;

- Mass decontamination is the procedure deployed where significant numbers of persons are deemed to require decontamination, beyond the normal decontamination capacity; and
- Equipment decontamination is the procedure used to clean the specialist equipment/protective suits which personnel use in dealing with hazardous material incidents.

The need for decontamination of individuals will be established by the On-Site Coordinator, in association with the other Controllers of Operations. The Medical Service Executive has responsibility for providing clinical decontamination and medical treatment to casualties affected by hazardous materials. The fire services have responsibility for providing other forms of physical decontamination of persons at the site. The Medical Service Executive will be responsible for decontamination where required to protect health service facilities, such as hospitals, from secondary contamination. Where emergency decontamination of the public is required, the fire service may use its fire-fighter decontamination facilities, or improvised equipment may be used prior to the arrival of dedicated equipment. Where persons have to undergo this practice it should be carried out under the guidance of medical personnel. It should be noted that emergency contamination carries risks for vulnerable groups, such as the elderly and the injured.

Medical Facilities

Depending on the nature of the emergency, it may be necessary to alert medical facilities within and outside the port.
Medical facilities likely to be used will need to be informed

- The nature and location of the emergency,
- The likelihood or number of casualties,
- Whether medical staff are required at the location of the emergency,
- Actual details of the casualties, including the names, as soon as these are known.

First Aid Centres

First Aid treatments provided at the port and the Port ambulance placed at every First Aid centres and hired vehicles, can be used for taking the person to the medical centre.

Search and Rescue Mechanism

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

Resource Management

Resources available with the port should be used effectively during the emergencies. The equipment should always be maintained, inspected and tested periodically.

3.4 TRAINING AND CAPACITY BUILDING

Regular training should be provided to all personnel who have a role in planning and operational response to an emergency. The main goal of training for emergencies is to enable the participants to understand their roles in the response organization, the tasks associated with each position and the procedures for maintaining effective communications with other response functions and individuals.

The training objectives are:

1. To familiarize personnel with the contents and manner of implementation of the Plan and its procedures,
2. To train personnel in the performance of the specific duties assigned to them in the plan and in the applicable implementing procedures,
3. To keep personnel informed of any changes in the plan and the implementing procedures,
4. To maintain a high degree of preparedness at all levels of the emergency response organization,
5. Train new personnel who may have moved within organization,
6. Test the validity, effectiveness, timing and content of the plan,
7. Uptake and modify the plan on the basis of experience acquired through exercises and drills.

A well-co-ordinated programme of training exercises includes activities of varying degrees of interaction and complexity.

Drills & Exercises

Emergency drills and integrated exercises have the following objectives. These constitute another important component of emergency preparedness. They refer to the re-enactment, under the assumption of a mock scenario, of the implementation of response actions to be taken during an emergency.

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

The frequency of the drills should vary depending on the severity of the hazard.

However, drills should be conducted at least once a year. Scenarios may be developed in such a manner as to accomplish more than one event objective

1. Notification exercises

- Test communication systems, frequency, Public Warning system

2. Tabletop exercises

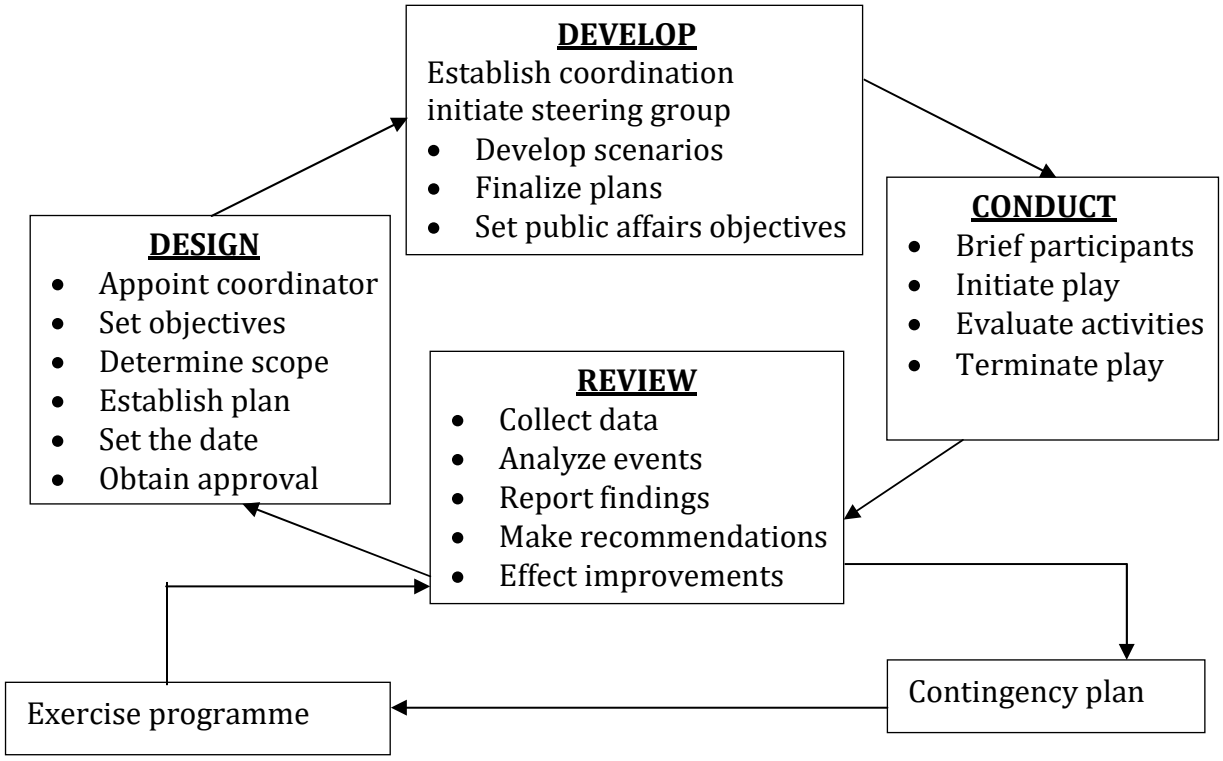
- To check availability of participants and check response time

3. Equipment deployment exercises

- Alarm systems to be tested,
- Frequent tests of firefighting and other response equipment.

4. Incident management exercises

- Simulated emergencies like fire, gas leakage, oil spillage, cyclone and vessel related emergencies like grounding, collusion, leakage, Pollution etc., to be conducted and monitored and feedback to be documented.
- Evacuation practice
- Deployment of Machineries



The Exercise Planning Process

Conducting the exercise

The conduct of an exercise consists of briefing participants, initiating play, evaluating activities and finally terminating play. All participants require an exercise briefing. In the case of a notification exercise, when one of the objectives is to test team members availability and response times, any briefing may be given a couple of weeks in advance but the exact day and time of exercise should not be informed. It is necessary to check lines of communication are established.

Review Phase

An exercise coordinator should be made responsible for implementing and communicating changes. Evaluation is critical to improving emergency and crisis response capabilities. The collection and analysing data and reports documenting the findings and recommendations for improvement should be made. The evaluation of a drill or exercise shall be submitted to the CIC for review and acceptance who shall then determine the corrective actions to be taken and assign the responsibility to appropriate personnel.

The Fire and Asst. Safety Officer should track all approved drill and exercise corrective actions as a means of assuring that corrections are made in a reasonable amount of time, and shall advise Main Controller of the status of implementation of corrective actions.

Records of drills, exercises, evaluations, and corrective actions should be duly maintained.

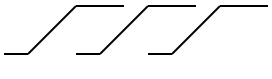
4. EARLY WARNING/ ALERT SYSTEM

Where time is the essential element in the mitigation of any crisis-an early warning system assumes the greatest priority. The Port uses the following modes of raising an alarm.

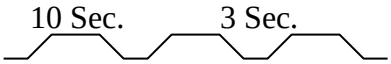
1. Siren or hooter,
2. Public Address system,
3. Raising of Flag/lights on Signal Station Mast,
4. Fire Alarm,
5. Manual Call Points,
6. Notification through VHF Channel 16/12.

Disaster Warning Alarm and Evacuation Signals

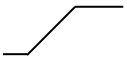
TSUNAMI - TYPE-HIGH PITCHED CONTINIOUS WAILING SIREN



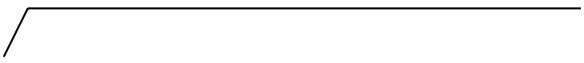
FIRE /EXPLOSION/BOMB
TYPE-LONG SIREN FOLLOWED BY SHORT SIREN



GENERAL EVACUATION ALARM FOR TOXIC/RADIATION LEAKAGES / NATURAL CALAMITIES
TYPE-HIGH PITCHED RINGING ALARM AT SHORT INTERVALS



C- ALL CLEAR SIGNAL
TYPE:-LONG CONTINIOUS SIREN FOR 90 SECONDS



Competent Agencies

List of agencies competent for issuing warning or alert is given below:

Competent agencies for issuing warnings

Disaster	Agencies
Earthquakes	IMD, MERI,BARC
Floods	Meteorology Department, Irrigation Department, Central Water Commission
Cyclones	Meteorology Department, Irrigation Department, IMD, INCOIS
Tsunami and Storm Surge	INCOIS
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical accidents	Industry, Police, MARG, DISH, BARC,AERB
Fires	Fire Brigade, Police

These agencies shall be 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. All these agencies have developed guidelines for early warning of disasters.

Cyclone

Indian Meteorological Department (IMD) has a developed detailed procedure for Four Stage Warning of Cyclone

1. **Pre-Cyclone Watch**: Pre-cyclone watch is an early warning issued about 72 hrs. in advance of the commencement of bad weather. This is issued by the IMD Headquarters to all designated authorities including the Cabinet Secretary and other senior officers of Govt. of India and the Chief Secretaries of concerned Maritime States, media and all Cyclone Warning Centres (CWS) of IMD.

2. **Cyclone Alert**: Cyclone Alert is issued to all designated authorities/Agencies as far as possible, 48 hours before the expected commencement of adverse weather.

3. **Cyclone Warning**: Cyclone warning are issued to all designated Authorities/Agencies including the Chief Secretaries of the Maritime States and the District Magistrates/Collectors of the coastal districts and the immediate interior districts expected to be affected by the cyclone. Cyclone Warning is also issued to the designated railway officials and defence personnel. After initial warning , cyclone warning are issued to above officials twice a day by high priority telegrams based on 0830 IST and 1730 IST charts till the weather improves.

4. **Post Landfall Outlook**: Post landfall outlook is issued at least 12 hours in advance of the landfall by concerned CWCs. On the basis of this outlook, the concerned Meteorological Centre will also issue cyclone warnings for the interior areas.

Cyclone Warning Dissemination System (CWDS)

Cyclone Warning Dissemination System (CWDS) receivers have been established in vulnerable coastal areas using INSAT/METSAT. The system is being used extensively on operational basis during cyclone. The cyclone warning message is originated from Cyclone Warning Centre (CWC), Maharashtra whenever a storm is observed. Warning messages are received in local languages directly by CWDS receivers located in areas likely to be affected by the cyclone.

In addition, Cyclone Warning is disseminated through the following means:

a. Police Wireless network
b. Warnings through All India Radio (AIR) Bulletins
c. Television
d. Press Bulletins
e. Aviation Warning
f. Telephone and Fax
g. Telex
h. Telegrams

Tsunami

In the aftermath of the Indian Ocean Tsunami of 26th December 2004, the Ministry of Earth Sciences has set up an Indian Tsunami Early Warning Centre at the Indian National Centre for Ocean Information Services (INCOIS) Hyderabad. The Centre is mandated to provide advance warnings on Tsunamis likely to affect the coastal areas of the country.

Tsunami Warning (RED) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the highest level wherein immediate actions are required to move public to higher grounds. Message also contains information on the travel times and tsunami grade (based on run-up estimates) at various coastal locations.

Tsunami Alert (ORANGE) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the second highest level wherein immediate public evacuation is not required. Public should avoid beaches since strong current are expected. Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations.

Tsunami Watch (YELLOW) contains information about the earthquake and a tsunami evaluation message indicating that tsunami is expected. This is the third highest level wherein immediate public evacuation is not required, Local officials should be prepared for evacuation if it is upgraded to warning status. Message also contains information on the travel times and tsunami grade at various coastal locations.

Tsunami cancellation (GREEN) will be issued if the tsunami warning was issued on the basis of erroneous data or if the warning centre determines from subsequent information that only an insignificant wave has been generated. In addition, tsunami warning may be cancelled on a selective basis when a significant wave that has been generated clearly poses no threat to one or more of the areas the warning centre warns, either because of intervening continents or islands which screen them or because the orientation of the generating area causes the tsunami to be directed away from these areas.

Tsunami All Clear (GREEN) bulletin indicates that the 'Tsunami Threat' is passed and no more dangerous waves are expected.

Flood

Central Water Commission has developed a network of flood forecasting stations and issues Daily Flood Bulletins to all designated Authorities/Agencies of the Central

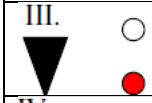
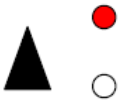
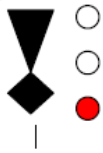
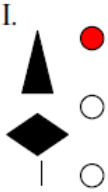
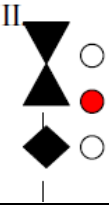
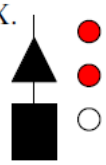
Government and State Governments/ district Administration during the South East Monsoon season for all the major river basins in the following categories:

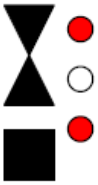
Category IV:
Low Flood (Water level between Warning Level and Danger Level)

Category III:
Moderate Flood (Water Level below 0.50m. less than HFL and above Danger Level)

Category II:
High Flood (Water Level less than Highest Flood Level but still within 0.50m. of the HFL)

Category I:
Unprecedented Flood (Water Level equal and above Highest Flood Level (HFL))

SIGNAL NO.	DESCRIPTION	ACTION
D/N		
I 	**DISTANT CAUTIONARY :** There is a region of squally weather in which a storm may be forming.	Monitor weather report, TV news Internet and keep close watch.
II 	**DISTANT WARNING :** A storm has formed.	Monitor weather report, TV news, Internet and keep close watch inform all.
III. 	**LOCAL CAUTIONARY :** The Port is threatened by squally weather.	Inform all. Warn fishermen
IV. 	**LOCAL WARNING :** The Port is threatened by a storm but it does not appear that the danger is as yet sufficient great to justify extreme measures of precaution.	Alert all concerned to be ready and available.
V. 	**DANGER :** The Port will experience weather from a storm of slight or moderate intensity that is expected to cross the Coast to the South of the Port	Implement Contingency Plan.
VI. 	**DANGER :** The Port will experience severe weather from a storm of slight or moderate intensity that is expected to cross the Coast to the North of the Port.	Implement Contingency Plan.
VII 	**DANGER :** The Port will experience severe weather from a storm of slight or moderate intensity that is expected to cross the Coast over or near to the Port.	Implement contingency Plan.
	NOTE: this signal is also hoisted when a storm is expected to skirt the Coast without (actually) crossing it.	
IX. 	**GREAT DANGER :** The Port will experience severe weather from a storm of greater intensity that is expected to cross the Coast to the North of the Port.	Implement contingency Plan.

SIGNAL NO.	DESCRIPTION	ACTION
X. 	**GREAT DANGER :** The Port will experience severe weather from a storm of great intensity that is expected to cross over or near the Port.	Implement contingency Plan.
	NOTE: This signal is also hoisted when a severe storm is expected to skirt the Coast without (actually) crossing it.	
XI. 	**FAILURE OF COMMUNICATION :** Communications with the Meteorological Warning Centre have broken down and the local Officer considers that there is danger of bad weather.	
	NOTE: Squally weather is meant to cover occasional/frequent squalls with rain or persistent type of storage gusty winds (mean wind speed not less than 20 knots) accompanied by rain. Such conditions are associated with low pressure systems or onset strengthening of monsoon. Mean wind speeds exceeding 33 knots associated with cyclonic storms are generally covered by signal higher than LC.III. The word generally has been added to permit hoisting of LC.III at Ports outside the inner storm area where wind speeds may exceed 33 knots.	

5. HAZARD SPECIFIC RESPONSE PLAN

Following potential 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 (NDMA).

Scenario 1 - Fire/explosion due to LPG leakage at BPCL Liquid cargo jetty during operation – on Ship or Ashore

1. **Precautions:** MSDS, SOP, Berthing and un-berthing procedures and House- keeping. Leaks from LPG pump glands, pipes flanges or pipeline ruptures or from vent emissions due to cargo tank over-pressure or relief valve failure will initially produce vapour. This vapour will not ignite immediately but, if the vapour production is large, there is a hazard of the resultant cold and dense vapour cloud of LPG spreading to a source of ignition before it is diluted below the lower explosive limit. Therefore, in case of release of large quantity of flammable vapour cloud, immediate effort should be directed to eliminate such source of ignition. In such event, eliminate all sources of ignitions i.e. open flames, welding,cutting, operation etc. in the entire port area.

2. **Impact Zone:** Consequence analysis indicates that the LPG (Propane) leak from pipeline would cover approx. 1000 meters for Vapor cloud explosion (VCE) scenario.

3. **Resources required:** Organizational setup enumerated in Figure S1.2.

Figure S1.1: Action Flow Chart

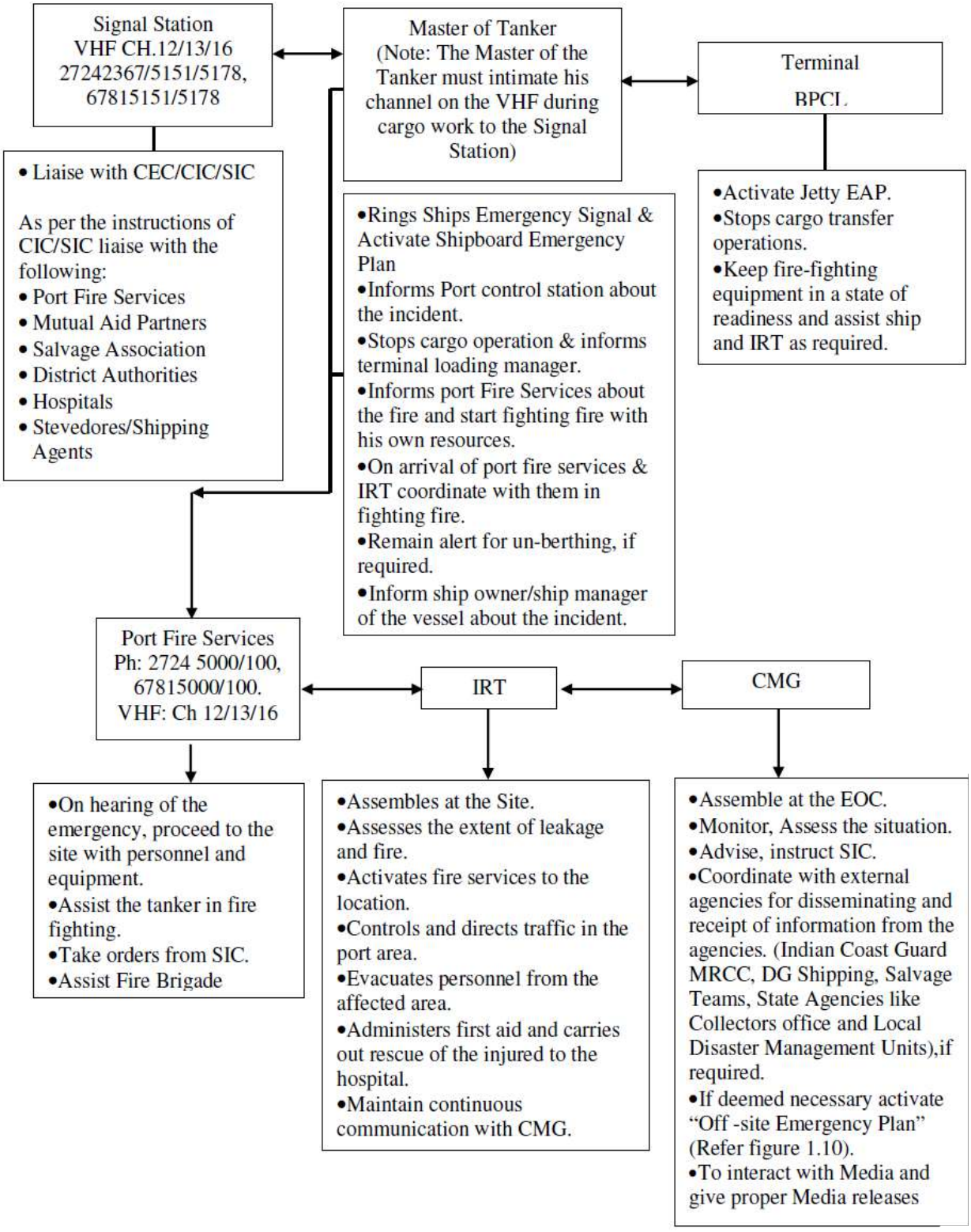
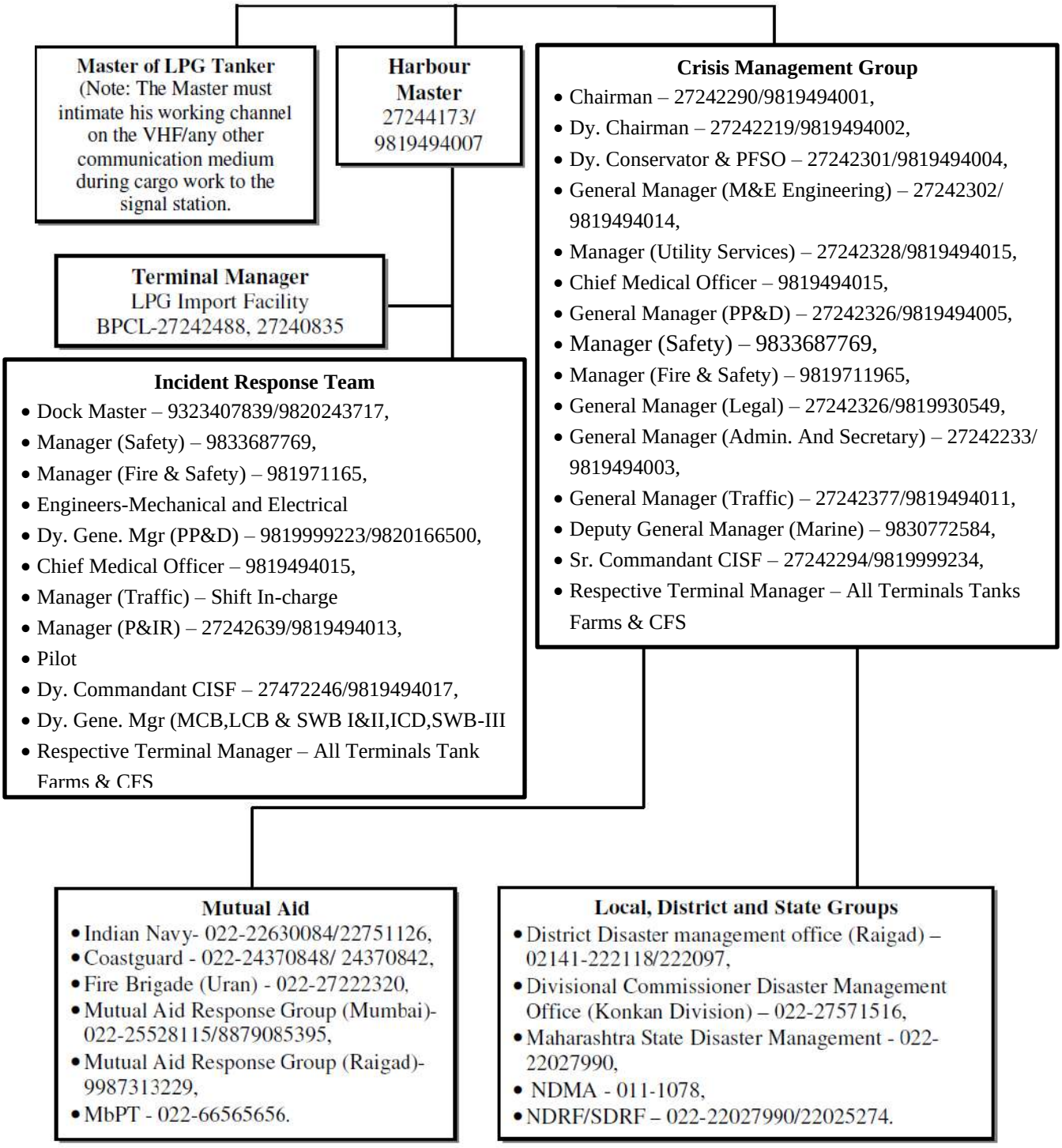


Figure S1.2: Action group



4. Action Plan

The vessel upon berthing at the BPCL jetty will follow standard procedures. However, in a less likely scenario, a leak from the pipeline system may occur at the jetty leading to self-detection by vessel personnel or by the terminal automatic alarm and detection system. Further in a more unlikely situation, due to a possible ignition the leakage might catch fire and lead to explosion. The following actions will be required

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

Response Action	Contact
a. Should raise ships emergency alarm and activate shipboard emergency action plan.	
b. Stop LPG transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• BPCL • Port Control Station • Vessels in thevicinity
d. Personnel to remain stand by to disconnect metal arms.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal personnel should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shut off isolation valve on LPG pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour Dry Chemical Powder.	
e. Assist IRT and provide all necessary equipment.	• SIC
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master) should

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ DY. Chairman.	• Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	• SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and Fire & Safety Officers.	• CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	• Master of the vessel • Pilot
c. Communication to be maintained on VHF channel-13.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain and to disperse LPG vapors.	
d. Ensure the gas leak has been stopped. Allow the gas to burn rather than extinguishing.	
e. Open the water curtain valve to protect shore installations from heat radiation.	
f. Inform fire officers to arrange for fire float fire-fighting tug and Marine Engineer to arrange for tugs , as required	• Fire Officer • Marine Engineer
g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	
h. If the fire is under control and extinguished, give all clear signal	

F. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Assess the condition of site and of potential affected area and take decision on evacuation in consultation with CIC.	
		Extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the firefighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	

Designated Officer	Role	Duties	Alternate Officer
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Organize tugs, mooring boats and Pilots for rescue.	
		Hire additional crafts, as necessary.	
		Maintain Log of events.	
Manager(Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the fire-fighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for fire- fighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure responsible actions for containing the run off fire water and other water from the damaged units.	
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant - CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant -CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible for the head count of the personnel.	
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	

Designated Officer	Role	Duties	Alternate Officer
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager(I,II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
		Liaise with SIC and assist Terminal Manager.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 2 - Fire due to leakage of POL/Chemical at BPCL Liquid Cargo Jetty – on ship or ashore SWB (NSDT)

1. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedure.

2. **Impact Zone:** Consequence analysis indicates that the MS leak from pipeline would coverapprox. 1350 meters for Vapor cloud explosion (VCE) scenario.

3. **Resources required:** Organizational setup enumerated in Figure S2.2.

Figure S2.1: Action Flow Chart

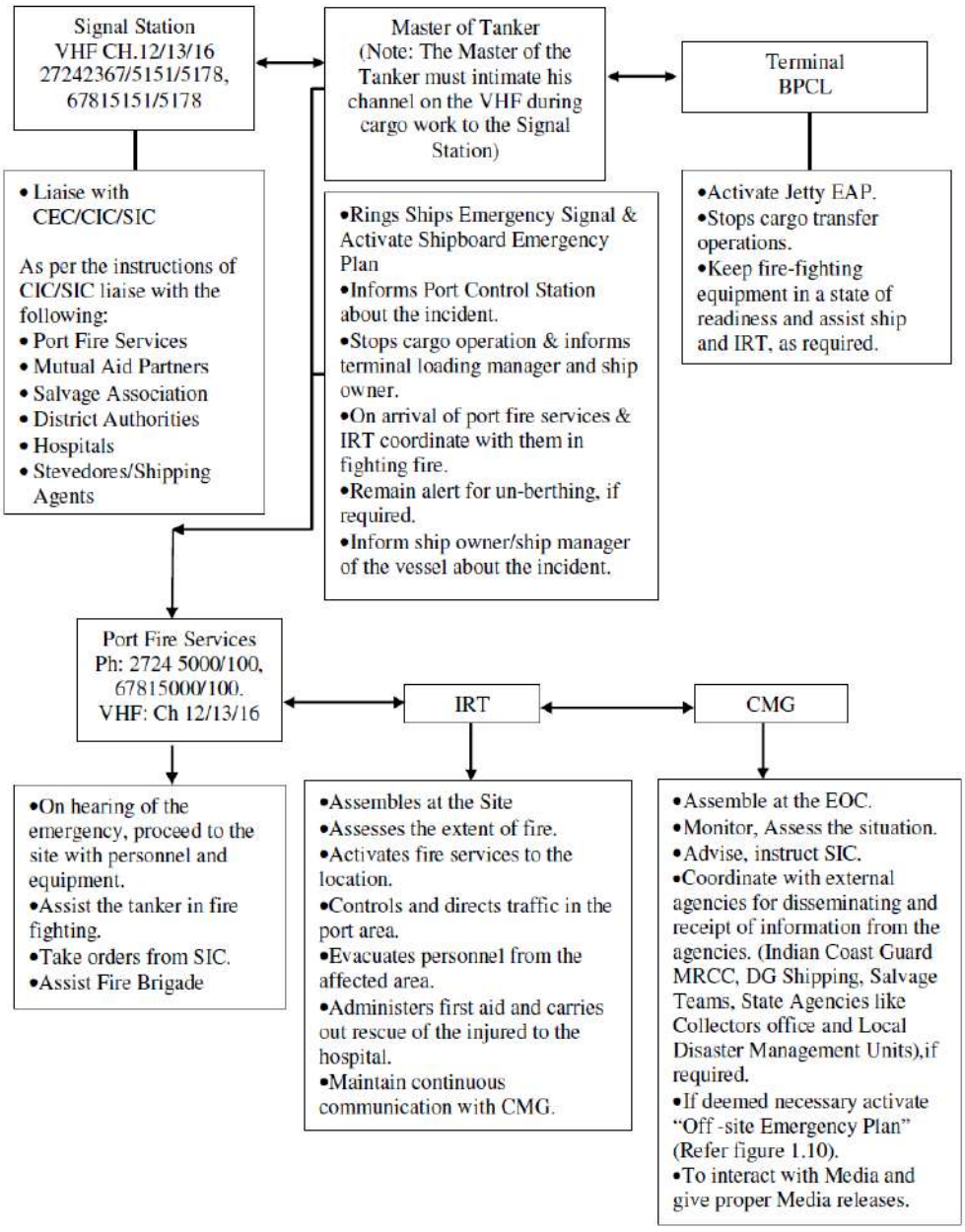
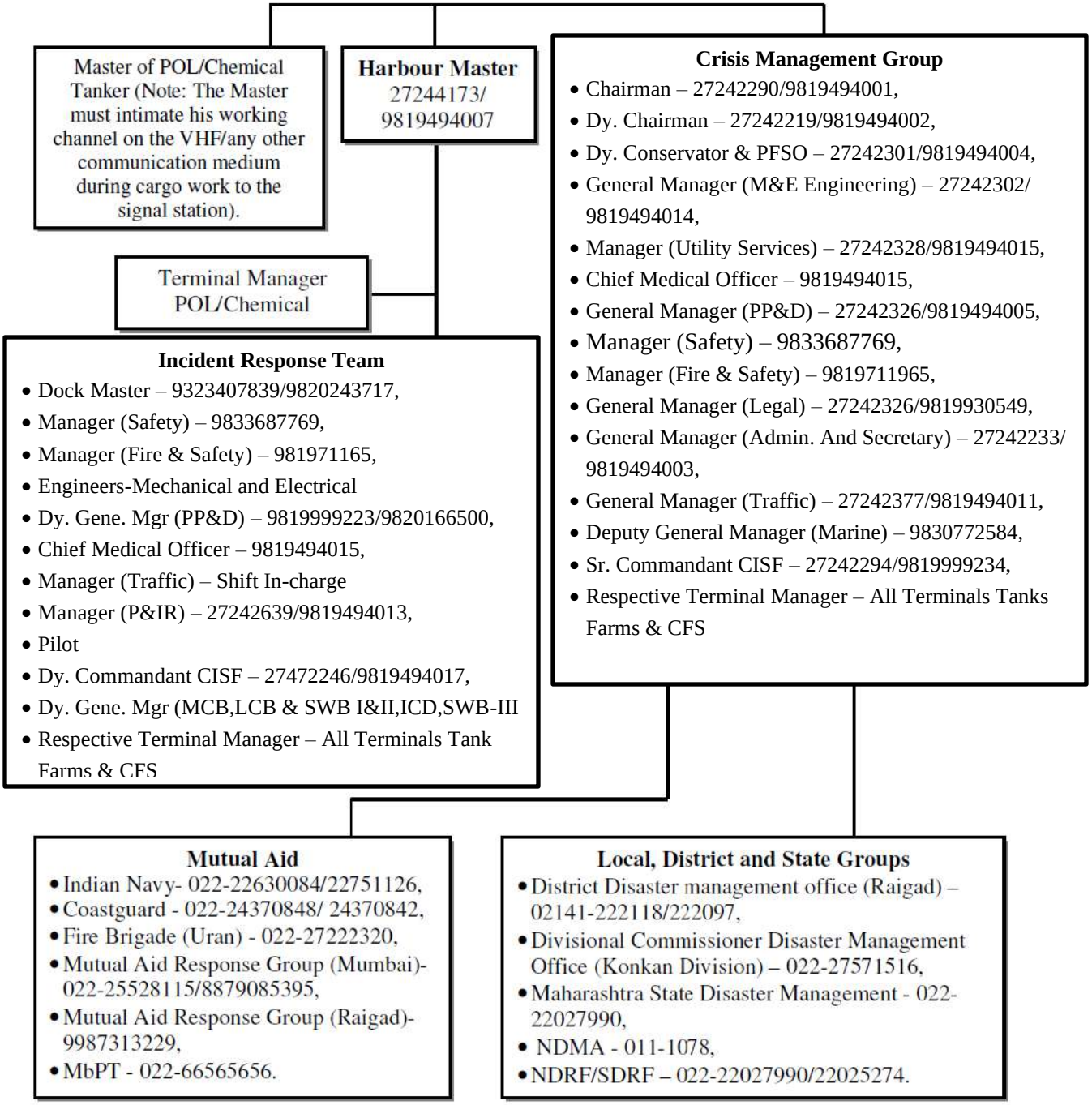


Figure S2.2: Action group



4. Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a lesslikely scenario a leak from the pipeline system may occur at the jetty leading to self- detection by vessel personnel or by the terminal automatic alarm system. Further in a more unlikely situation due to a possible ignition the leakage might catch fire and leading to explosion. The following action will be required

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop POL/Chemical transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Port Control Station
d. Personnel to remain stand by to disconnect hoses.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal persons tasked with POL/Chemical cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and inform JNPA.	• Port Control Station
b. Shut off isolation valve on POL/Chemical pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour foam/dry chemical powder on POL/Chemical spillage to reduce rate of vaporization.	
e. Assist IRT and provide all necessary equipment.	
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	• SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	• CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	• Master of the Vessel • Pilot
c. Communication to be maintained on VHF channel-13.	
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. The Fire-fighting personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain.	
d. Open the valves of the monitors and direct the jet on the seat of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs , as required	• F&SO • Marine Engineer
f. In case of fire onboard assist Master in fighting fire as per Masters Instructions.	
g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	
h. If the fire is under control and extinguished, give all clear signal.	

F. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Assess the condition of site and of potential affected area and take decision on evacuation inconsultation with CIC.	
		Extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the firefighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor

Designated Officer	Role	Duties	Alternate Officer
		Responsible for organizing tugs, mooring boats and pilots for combating the fire and rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Tank Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional firefighting & emergency equipment as required.	Assistant Terminal Manager
Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for firefighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure responsible actions for containing the run off fire water and other water from the damaged units.	
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant -CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant -CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible the head count of the personnel.	
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	

Designated Officer	Role	Duties	Alternate Officer
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 3 - Toxic gas (Liquid Ammonia) leak at BPCL Liquid Cargo Jetty during operation – on Ship or Ashore

1. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures. Stay upwind and wear positive-pressure breathing apparatus and full protective clothing, as necessary.

2. **Impact Zone:** Consequence analysis indicates that the Ammonia leak from pipeline would cover to the 9 KM for toxic dispersion with IDLH level of 300 ppm.

3. **Resources required:** Organizational setup enumerated in Figure S3.2.
   Important: Trained medical personnel and fire fighters as ammonia is toxic.

Figure S3.1: Action Flow Chart

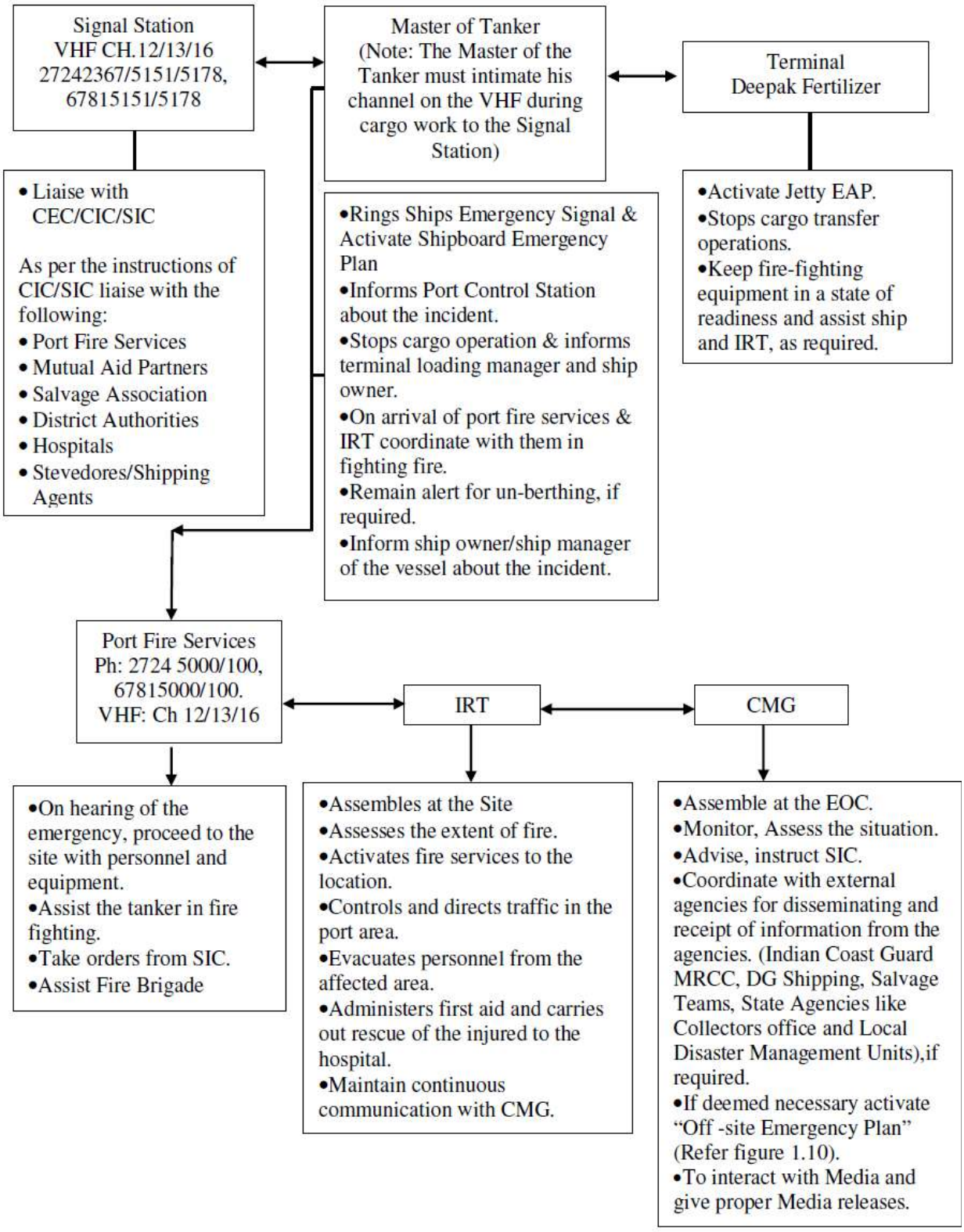
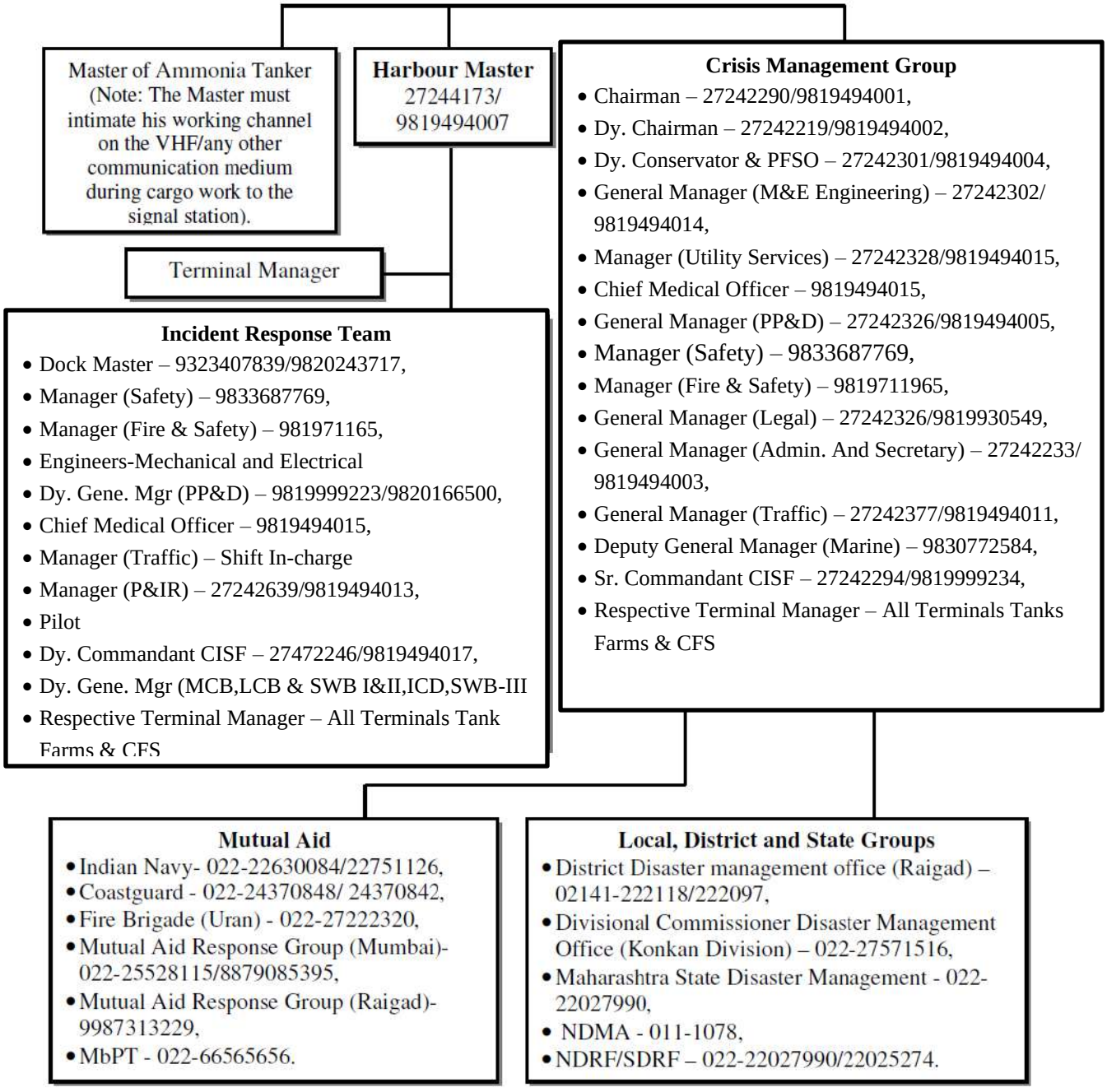


Figure S3.2: Action group



4. Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a lesslikely scenario a leak from the pipeline system may occur at the jetty leading to self- detection by vessel personnel or by the terminal automatic alarm system. The following action will be required

Spill handling: Evacuate and restrict person's not wearing protective equipment fromarea of spill or leak until cleanup is complete. Remove all ignition sources. Stop the flow of gas if it can be done safely. Stay upwind; keep out of low areas. Wear positivepressure breathing apparatus and full protective clothing.

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

Response Action	Contact
a. Should raise ships emergency alarm and activate shipboard emergency action plan.	
b. Stop Ammonia transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Vessel in the vicinity • Port Control Station
d. Personnel to remain stand by to disconnect metal arms;	
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. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal persons tasked with Ammonia cargo operations at the Jetty should

Take personal precautions, protective equipment and follow emergency procedures. Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so.

Contain spillage, and then collect with an electrically protected vacuum cleaner (vehicle mounted in some cases) or by wet-brushing and place in container for disposal.

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shut off isolation valve on ammonia pipeline at the berth (action as per SOP of the terminal).	

Response Action	Contact
c. Area should be cordoned off.	
d. Assist IRT and provide all necessary equipment.	
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships in close proximity to the incident location or to sail the ammonia tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Take decision on evacuation in consultation with SIC.	• SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, CIC/SIC and F& SO.	• Master of the vessel, CIC • SIC • F& SO
b. Liaise with Master of the Vessel/Pilot.	• Master of the Vessel • Pilot
c. Communication to be maintained on VHF channel-13.	•
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren).	
b. Start the pumps as per the requirement.	
c. Use water sprays and portable nozzles to maintain curtain and dilution.	
d. Open the valves of the monitors and direct the jet on the seat of fire, in case of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs, as required.	• F&SO • Marine Engineer
f. In case of leakage/fire onboard assist Master in arresting the leak/diluting the vapour/ fighting fire as per Masters Instructions.	
g. Announce in mobile van with PA system in the effecting zones to evacuate the zone. Ensure complete evacuation and report to the EOC.	
h. Ensure all the ignition sources in the vicinity is extinguished if fire has not occurred.	
i. If the situation is under control, give all clear signals.	

F. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Shall assess and decide on the evacuation of the personnel considering the direction of wind and dispersion and will instruct Safety Officer and CISF to carry out the evacuation in a safe manner.	
		He will extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the fire- fighting installation in a state of readiness & activate if required to fight fire or for disperse the vapour cloud.	

Designated Officer	Role	Duties	Alternate Officer
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs, mooring boats and Pilots for combating the fire and rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Terminal Managers-BPCL and Deepak Fertilizer	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	Assistant Terminal Manager
Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for firefighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from SIC.	Safety Inspector
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
Sr. Commandant -CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant-CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible the head count of the personnel.	

Designated Officer	Role	Duties	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist berth Manager.	Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager(I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical &Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 4 - Toxic gas (Acrylonitrile) leak at NSDT during operation – on Ship or Ashore

1. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures. Stay upwind and wear positive-pressure breathing apparatus and full protective clothing, as necessary.

2. **Impact Zone:** Consequence analysis indicates that the Acrylonitrile leak from pipeline would cover to the 5 KM for toxic dispersion with IDLH level of 85 ppm.

3. **Resources required:** Organizational setup enumerated in Figure S4.2.
   Important: Trained medical personnel and fire fighters as Acrylonitrile is toxic.

Figure S4.1: Action Flow Chart

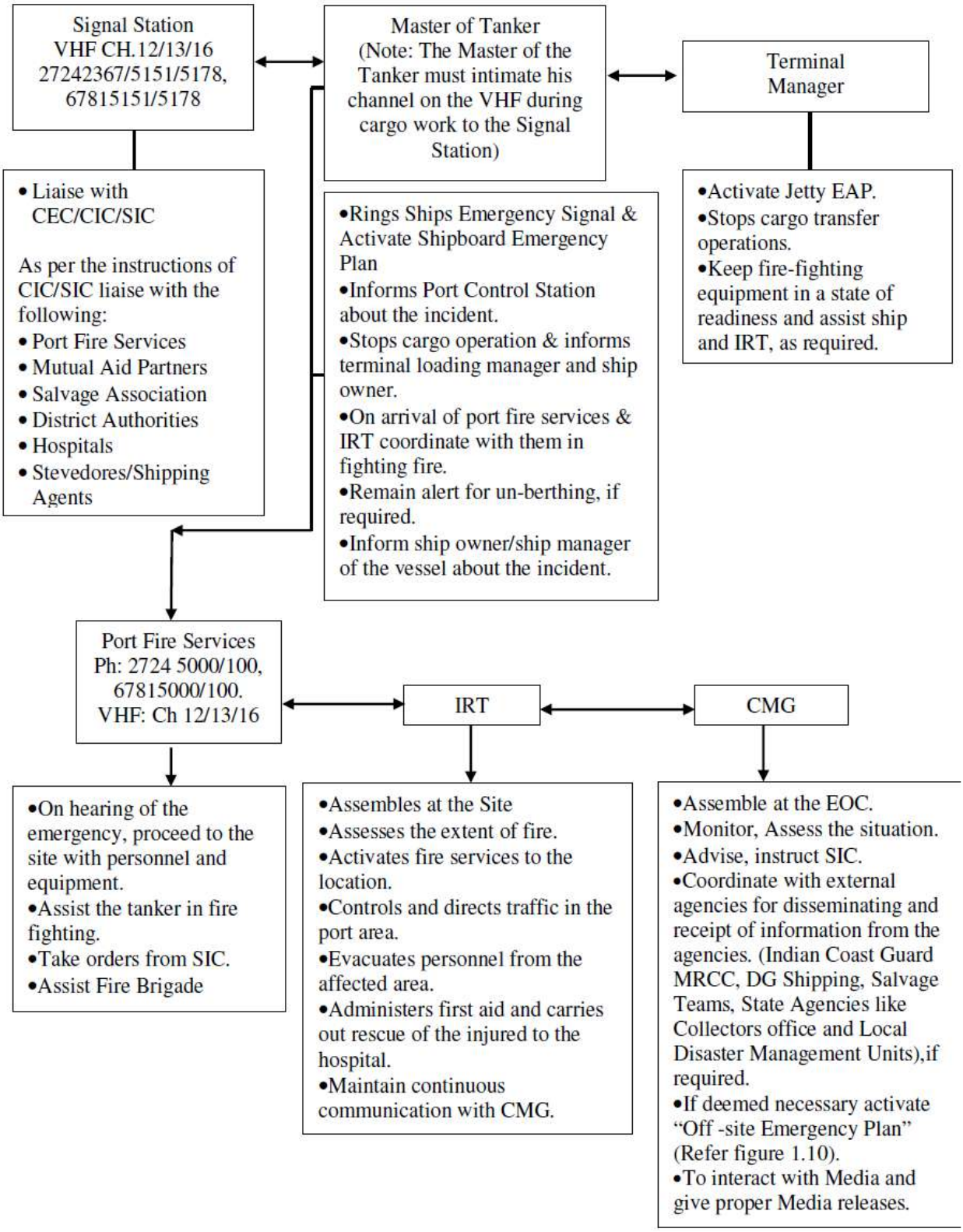
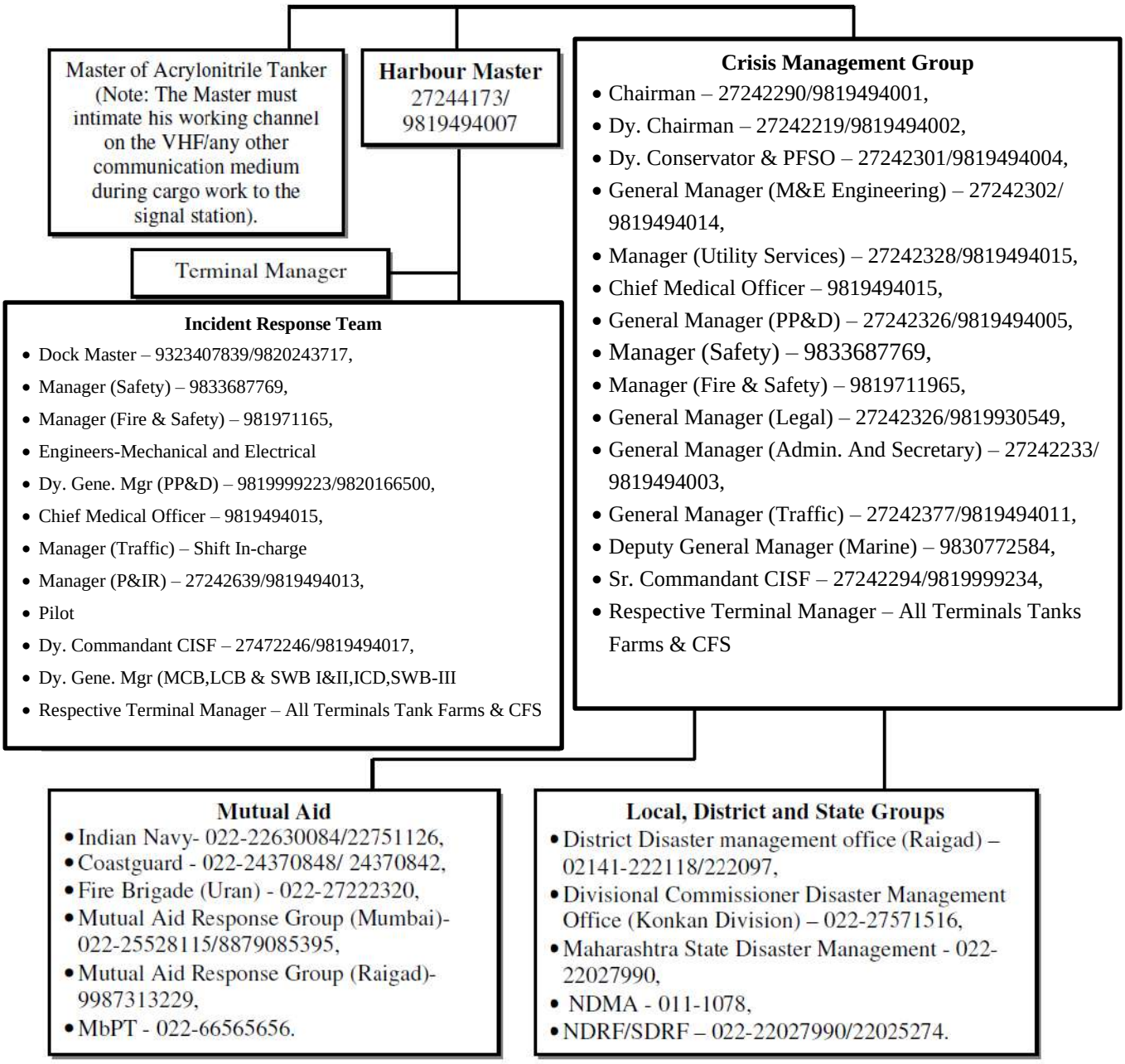


Figure S4.2: Action group



4. Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a lesslikely scenario a leak from the pipeline system may occur at the jetty leading to self- detection by vessel personnel or by the terminal automatic alarm system. The following action will be required

Spill handling: Evacuate and restrict person's not wearing protective equipment fromarea of spill or leak until cleanup is complete. Remove all ignition sources. Stop the flow of gas if it can be done safely. Stay upwind; keep out of low areas. Wear positivepressure breathing apparatus and full protective clothing.

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

Response Action	Contact
a. Should raise ships emergency alarm and activate shipboard emergency action plan.	
b. Stop transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Vessel in the vicinity • Port Control Station
d. Personnel to remain stand by to disconnect metal arms;	
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. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal persons tasked with cargo operations at the berth should

Take personal precautions, protective equipment and follow emergency procedures. Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so.
Contain spillage, and then collect with an electrically protected vacuum cleaner (vehicle mounted in some cases) or by wet-brushing and place in container for disposal.

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shut off isolation valve on pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	

Response Action	Contact
d. Assist IRT and provide all necessary equipment.	
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships in close proximity to the incident location or to sail the tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Take decision on evacuation in consultation with SIC.	• SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to Master of the vessel, CIC/SIC and F& SO.	• Master of the vessel, CIC • SIC • F& SO
b. Liaise with Master of the Vessel/Pilot.	• Master of the Vessel • Pilot
c. Communication to be maintained on VHF channel-13.	•
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. The Fire-fighting Personnel should

Response Action	Contact
a. Raise Alarm (siren).	
b. Start the pumps as per the requirement.	
c. Use water sprays and portable nozzles to maintain curtain and dilution.	
d. Open the valves of the monitors and direct the jet on the seat of fire, in case of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs, as required.	• F&SO • Marine Engineer
f. In case of leakage/fire onboard assist Master in arresting the leak/diluting the vapour/ fighting fire as per Masters Instructions.	
g. Announce in mobile van with PA system in the effecting zones to evacuate the zone. Ensure complete evacuation and report to the EOC.	
h. Ensure all the ignition sources in the vicinity is extinguished if fire has not occurred.	
i. If the situation is under control, give all clear signals.	

F. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		Shall assess and decide on the evacuation of the personnel considering the direction of wind and dispersion and will instruct Safety Officer and CISF to carry out the evacuation in a safe manner.	
		Alert vessels within the vicinity. He will extend all necessary help to the Master of the ship to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the fixed. Fire-fighting installation in a state of readiness & activate if required to fight fire or for disperse the vapour cloud.	

Designated Officer	Role	Duties	Alternate Officer
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugs, mooring boats and Pilots for combating the fire and rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	Assistant Terminal Manager
Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager for firefighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from SIC.	Safety Inspector
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
Sr. Commandant - CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant-CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible the head count of the personnel.	

Designated Officer	Role	Duties	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist berth Manager. Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area. Regulate the traffic in the area.	Manager (Traffic)
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 5 - Corrosive Acid - Leakage (Phosphoric acid) at BPCL Liquid Cargo Jettyduring operation – on Ship or Ashore

1. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedures.
2. **Impact Zone:** Respective Jetty.
3. **Resources required:** Organizational setup enumerated in Figure S5.2.

Figure S5.1: Action Flow Chart

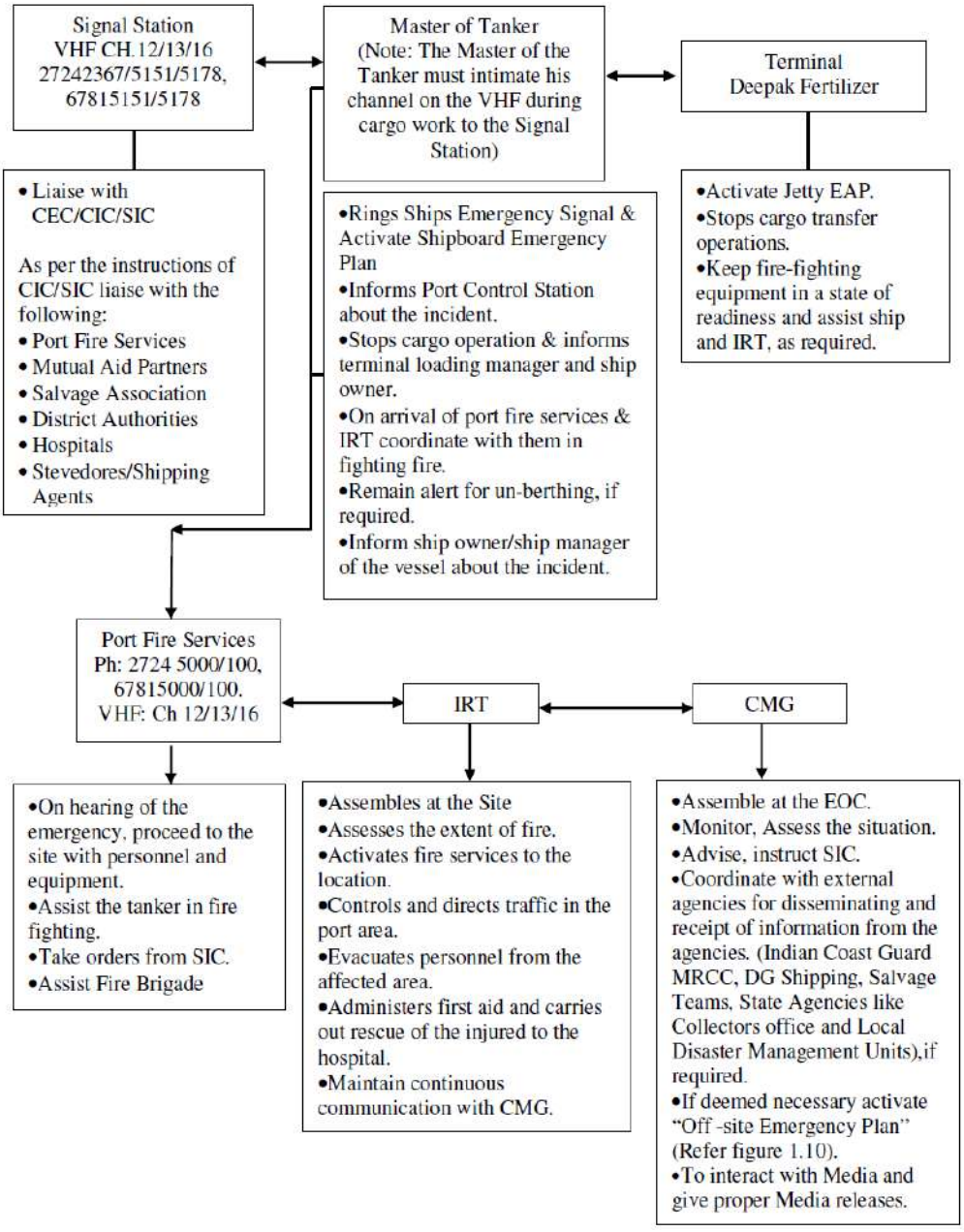
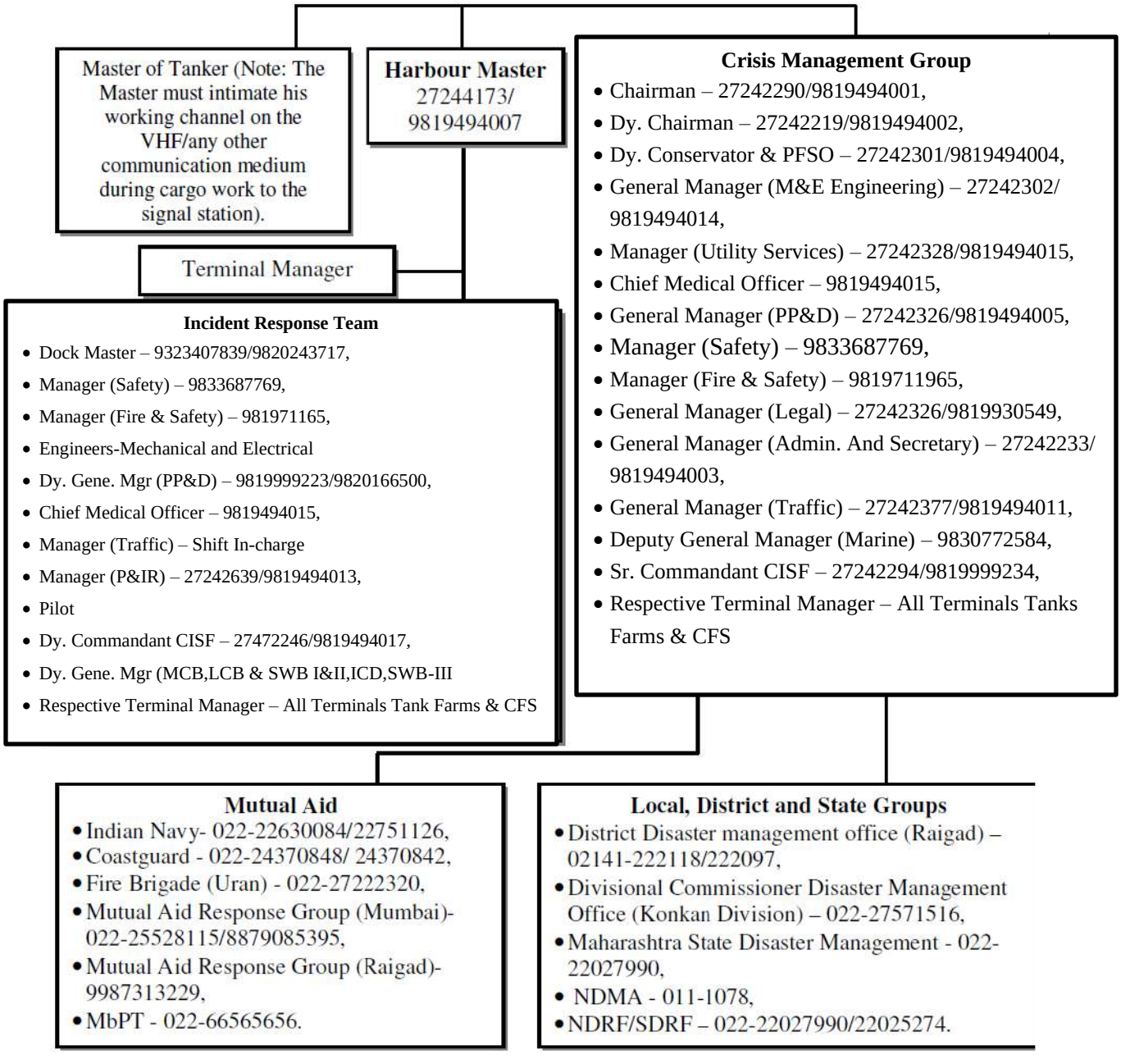


Figure S5.2: Action group



4. Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a lesslikely scenario a leak from the pipeline system may occur at the jetty leading to detection by vessel personnel or by the terminal alarm system. The following action will be required.

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Vessel in the vicinity • Port Control Station
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. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal persons tasked with cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shut off isolation valve on pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Assist IRT and provide all necessary equipment.	
e. Responsible for diluting and neutralizing the acids and disposal of the neutralized liquids down the drain.	
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station

Response Action	Contact
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location or to sail the tanker to the higher seas and evacuating the people from the likely affected zone.	
f. Assess the condition of site and take decision on evacuation in consultation with SIC.	• SIC
g. Be in constant touch with District and Local Administration for rescue and relief operation.	
h. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
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 and F& SO.	• Master of the vessel • SIC • F& SO
c. Liaise with Master of the Vessel/Pilot.	• Master of the Vessel • Pilot
d. Communication to be maintained on VHF channel-13.	
e. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
g. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		Report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	

Designated Officer	Role	Duties	Alternate Officer
		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 Manager (Fire and Safety) to keep the fixed firefighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugsfor rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Master of the tanker	In Charge of firefighting operation on board vessel	Coordinate with action group leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In Charge.	Chief Officerof Tanker
		Shall unberth the vessel as per theinstruction of SIC, if required.	
Terminal Managers- BPCL and Deepak Fertilizer	Cargo Work	Shall be responsible of shutting	Assistant Terminal Manager
		down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional emergency equipment as required.	
Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth Manager.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC. Assist in evacuation of the personnel to the assembly point or as directed by SIC.	Safety Inspector
		Conduct clean- up work during and after the emergency as quick as possible.	

Designated Officer	Role	Duties	Alternate Officer
Sr. Commandant - CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant-CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles Liaise with the State Police.	
		Responsible the head count of the personnel.	
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager NSDT.	Manager (Traffic)
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical &Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 6 - Fire /Explosion at Nhava Sheva Distribution Terminal (NSDT) during handling of Chemicals – on Ship or Ashore

1. **Precautions:** MSDS, SOP of terminal and berthing and un-berthing procedure.

2. **Impact Zone:** Consequence analysis indicates that the MTBE leak from pipeline would cover approx. 500 meters for Vapor cloud explosion (VCE) scenario.

3. **Resources required:** Organizational setup enumerated in Figure S6.2.

Figure S6.1: Action Flow Chart

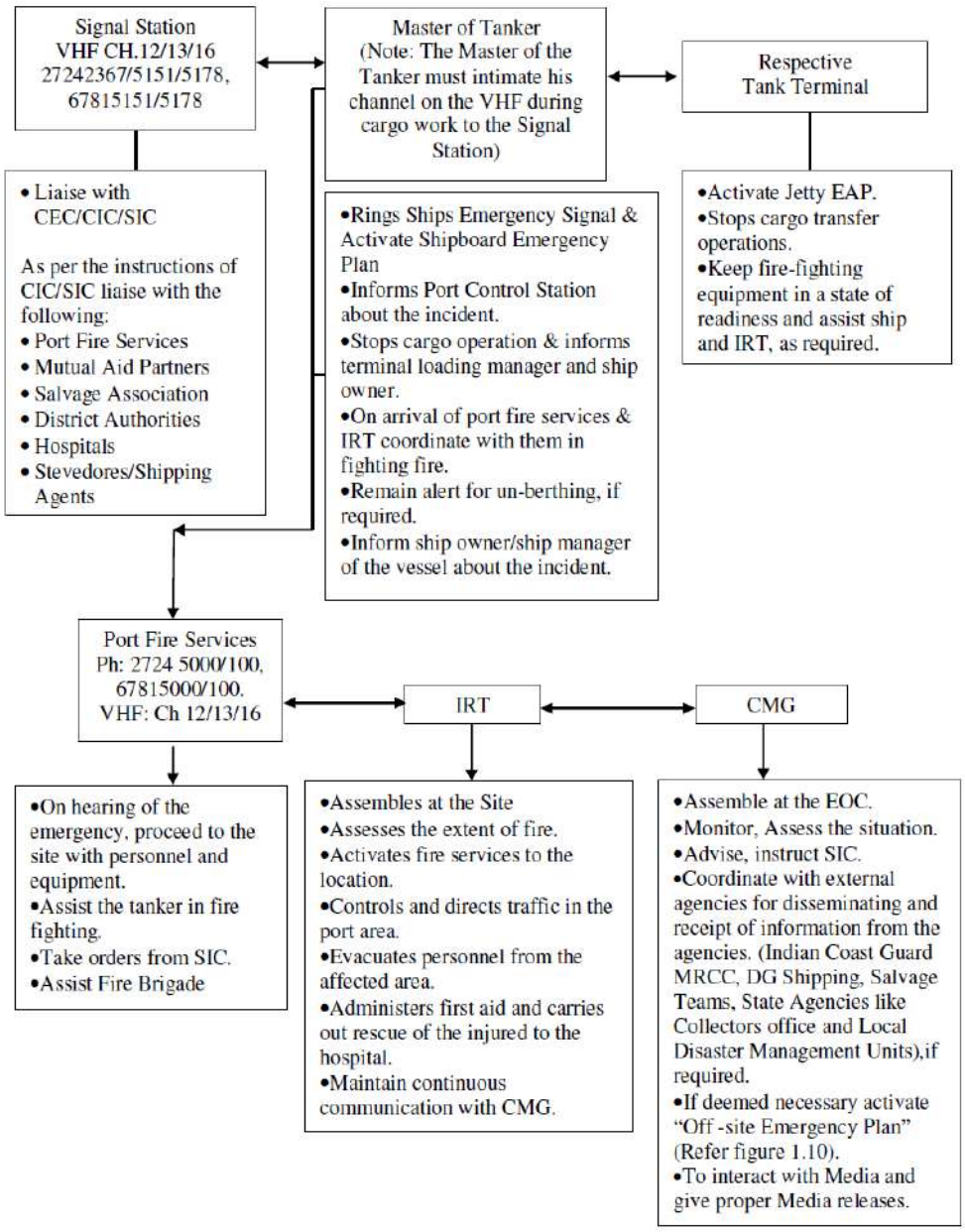
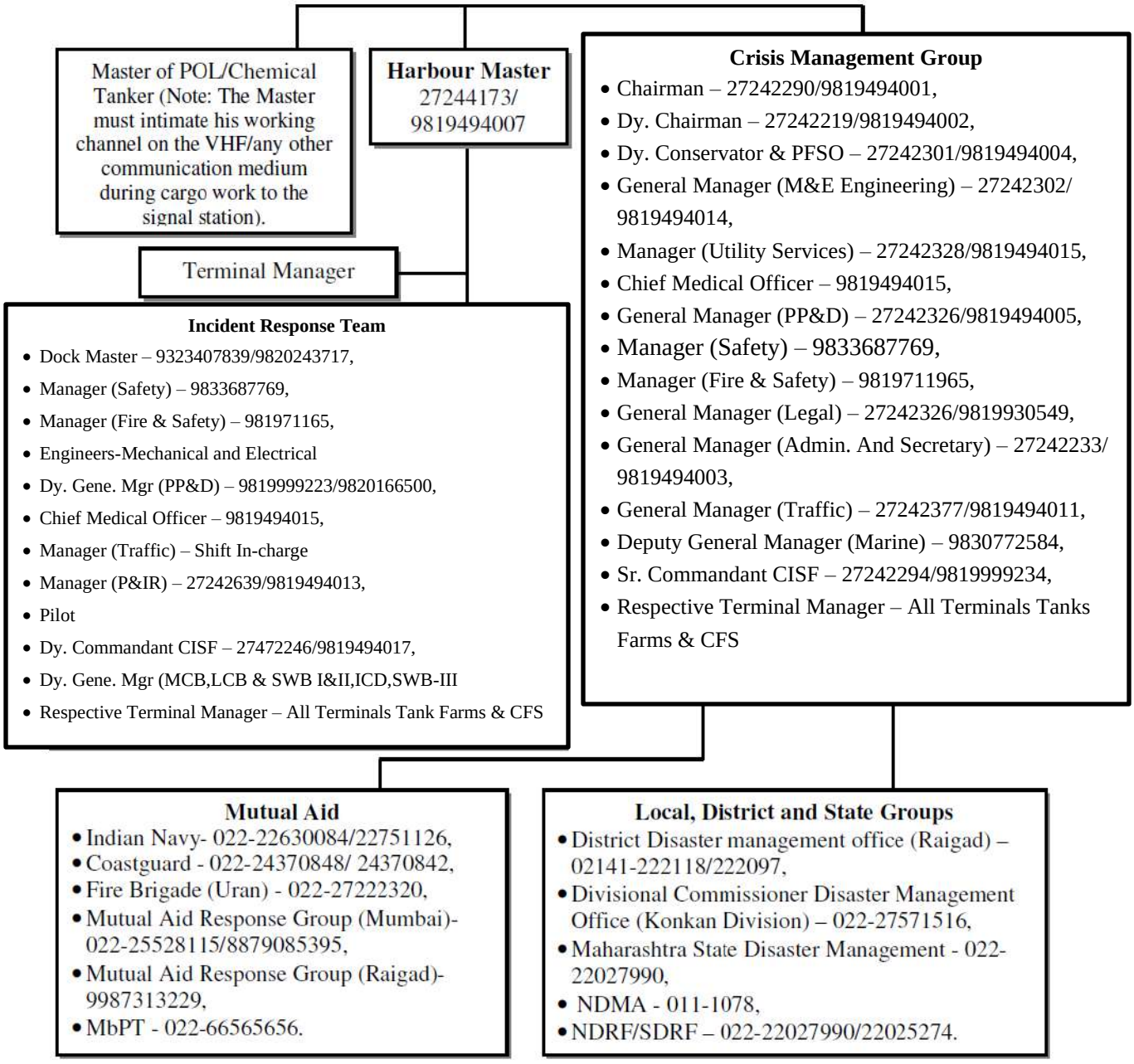


Figure S6.2: Action group



4. Action Plan

The vessel upon berthing terminal will follow standard procedures. However, in a lesslikely scenario a leak from the pipeline system may occur at the jetty leading to self- detection by vessel personnel or by the terminal automatic alarm system. Further in a more unlikely situation due to a possible ignition the leakage might catch fire and leading to explosion. The following action will be required

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Stop Chemical transfer operation (as per SOP of the ship).	
c. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Port Control Station
d. Personnel to remain stand by to disconnect hoses.	
e. Shall be responsible for fighting the fire with ships own resources as well as with the available support from IRT.	
f. Also, to remain prepared to un-berth the ship to the safe area (high sea).	
g. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	

B. The terminal persons tasked with Chemical cargo operations at the Jetty should

Response Action	Contact
a. Activate Jetty EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shut off isolation valve on Chemical pipeline at the berth (action as per SOP of the terminal).	
c. Area should be cordoned off.	
d. Pour foam/dry chemical powder on Chemical spillage to reduce rate of vaporization.	
e. Assist IRT and provide all necessary equipment.	
f. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

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

Response Action	Contact
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Assess the condition of site and of potential affected area and take decision on evacuation in consultation with SIC.	• SIC
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. The Port Control Station

Response Action	Contact
a. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	• CIC • SIC • F&SO
b. Liaise with Master of the Vessel/Pilot.	• Master of the Vessel • Pilot
c. Communication to be maintained on VHF channel-13.	•
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

E. The Fire-fighting personnel should

Response Action	Contact
a. Raise Alarm (siren)	
b. Start the pumps as per the requirement	
c. Use water sprays and portable nozzles to maintain curtain.	
d. Open the valves of the monitors and direct the jet on the seat of fire.	
e. Inform fire officers to arrange for fire-fighting tug and Marine Engineer to arrange for tugs , as required.	• F&SO • Marine Engineer
f. In case of fire onboard assist Master in fighting fire as per Masters Instructions.	
g. Ensure all the ignition sources in the vicinity are extinguished if fire has not occurred.	

Response Action	Contact
h. If the fire is under control and extinguished, give all clear signal.	

F. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the Master of the Tanker, Berth Manager and Terminal Manager.	Dock Master
		Conduct initial Briefing.	
		He will report the situation to the CIC/CMG and assist CIC in assessing the incident.	
		Initiate DMP.	
		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 ship to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the fixed firefighting installation in a state of readiness & activate if required.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for firefighting.	
		Coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC /SIC.	Duty Supervisor
		Responsible for organizing tugsfor rescue.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Tank Terminal Manager	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional firefighting & emergency equipment as required.	Assistant Terminal Manager
Manager (Fire and Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the Master of the vessel/Terminal Manager/Berth	

Designated Officer	Role	Duties	Alternate Officer
		Manager for firefighting.	
		Inform SIC for arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC. Ensure responsible actions for containing the run off fire water and other water from the damaged units.	Safety Inspector
		Assist in evacuation of the personnel to the assembly point or as directed by SIC.	
		Conduct clean- up work during and after the emergency as quick as possible.	
Sr. Commandant - CISF	Security and Evacuation	Shall take orders from the SIC.	Dy. Commandant-CISF
		Cordon off the area.	
		Controls & Directs 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 unauthorized persons and vehicles.	
		Check for entry of emergency vehicles.	
		Liaise with the Police authorities.	
		Responsible the head count of the personnel.	
General Manager (Traffic)	Traffic Coordinator	Shall take orders from SIC and assist Manager LCB.	Manager (Traffic)
		Submits consolidated list of dangerous goods in port including tankers in port and tank farms in port area.	
		Regulate the traffic in the area.	
Chief Manager (Port, Planning and Development)	Civil Coordinator	Inform MPCB and other environmental agencies and take necessary guidance.	Manager (I, II)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Shall be responsible to carry out urgent civil works as required.	
General Manager (Mechanical & Electrical)	In charge of Electrical Installation	Shall be responsible for uninterrupted electrical supply to vital equipment and utility at the berth.	Asst. Engineer
		Shall remain alert on duty for any electrical isolation of equipment during emergency.	

Designated Officer	Role	Duties	Alternate Officer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
		Shall coordinate with the local hospitals.	
Duty Pilot	In Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional crafts as necessary.	

Scenario 7 - Damage due to Crane Accidents (Container drop/crane fall) at Container Terminal- NSICT, NSIGT, NSFT, GTI-APM, BMCT

1. **Precautions:** Trained personnel for operation of crane, SOP of the terminal.
2. **Impact Zone:** Surrounding area.
3. **Resources required:** Organizational setup enumerated in Figure S7.2.

Figure S7.1: Action Flow Chart

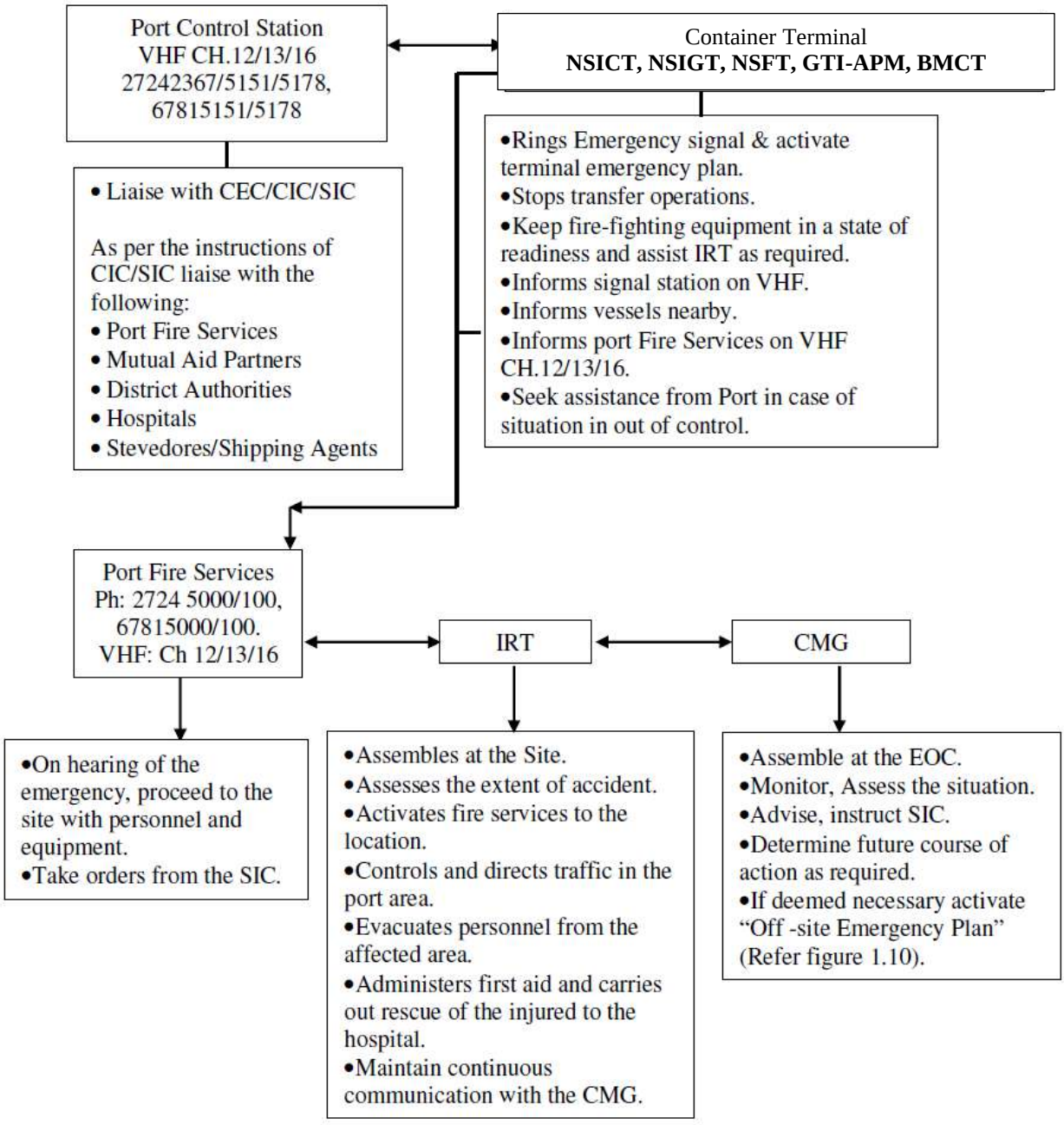
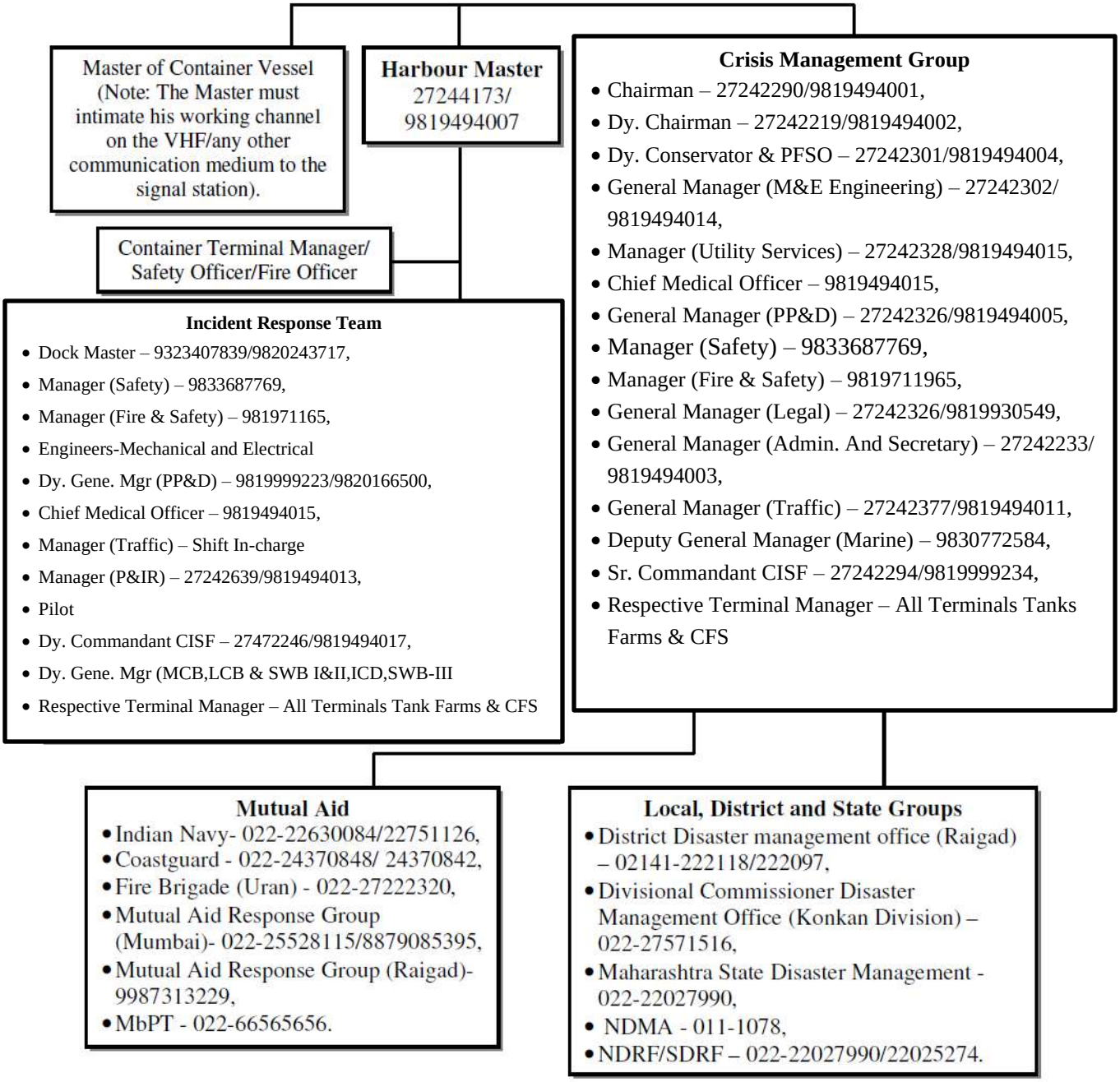


Figure S7.2: Action group



4. Action Plan

A. The crane operator

- Should raise emergency alarm and inform Terminal Manager and Port Control Station.

B. The terminal person at the Jetty should

Response Action	Contact
a. Activate EAP (prepared by the terminal) and inform JNPA and ask for assistance.	• Port Control Station
b. Area should be cordoned off.	
c. Stop transfer operations at the berth.	
d. Manage Truck movements.	
e. Assist IRT and Master of the Ship and provide all necessary equipment.	
f. He will direct operation staff.	
g. Interview operator and witnesses.	
h. Survey and cost damage to port installation. Complete maritime accident report. Give press reports.	
i. Distribute final report to concerned authorities.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Will be stationed at the EOC to review & assess possible developments to determine the most necessary course of action.	
b. He will give necessary instructions to SIC & arrange for external aid as necessary.	
c. Provide assistance to the Terminal.	

D. The Port Control Station

Response Action	Contact
a. Gather information regarding the incident and accordingly convey the message to CIC/SIC and F& SO.	• CIC • SIC • F& SO
b. Liaise with Master of the Vessels/Pilot.	• Master of the Vessels • Pilot
c. Communication to be maintained on VHF channel-13.	
d. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders

E. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the crane operator/terminal manager.	Dock Master
		Assess and report the situation to the CIC/CMG (if required).	
		Alert vessels/trucks within thevicinity.	
		Instruct the Manager (Fire & Safety) to keep the firefighting installation in a state of readiness& activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Shall prepare vessels to vacatefrom berth (if required).	
		Responsible for organizing tugs for rescue. Instruct Pilot/Marine Engineers.	
		Hire additional crafts as necessary.	
		Maintain Log of events.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	StationOfficer
		Mobilize fire tenders, men & firefighting equipment to the scene &extend all necessary support in case of fire.	
Manager (Safety)	Marine Pollution Control Coordinator	Investigate the incident and provide necessary guidance.	Safety Inspector
		Assist in Rescue.	
Sr. Commandant -CISF	Security Officer	Controls & Directs traffic in thearea.	Dy. Commandant-CISF
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Chief Manager (PPD)	Civil Coordinator	Immobilizes faulty crane, informs manufacturer representative, port workshop superintendent / surveyor to inspect and investigate.	Manager(I, II)
General Manager (Mechanical &Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems.	Asst. Engineer
		Arrange additional alternative shore cranes-power supply, wire slings blocks, shackles etc.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer

Designated Officer	Role	Duties	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	Manager (Traffic)
		Coordinates with SIC and Terminal manager.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for providing any assistance.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Assist Dock Master.	

Scenario 8 - Containers falling into water in case of extreme weather, vessel collision or grounding

1. **Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot. Depending on the level of incidents involving containers falling and their recovery will require a team of tugs and floating cranes apart from measures such as medical assistance to the stricken vessel. Offsite plan in terms of alerting the fishing vessels and normal shipping traffic, coast guard and Indian navy will have to be activated. Port will remain in touch with vessel and provide assistance within its jurisdiction. Near coastal villages and township authorities need to be alerted. The type of cargo hazardous/ non-hazardous is to be ascertained and communicated by the concerned vessel to the port. Temporary closure of navigation in vicinity of the incident may be required. Radars deployed for monitoring and reporting the floating containers by nearby vessels in port zone. Wreck marking in case of sink age of container will be required.

2. **Impact Zone:** Incident Location and vicinity of the coastline involved.

3. **Resources required:** Organizational setup enumerated in Figure S8.2.

Figure S8.1: Action Flow Chart

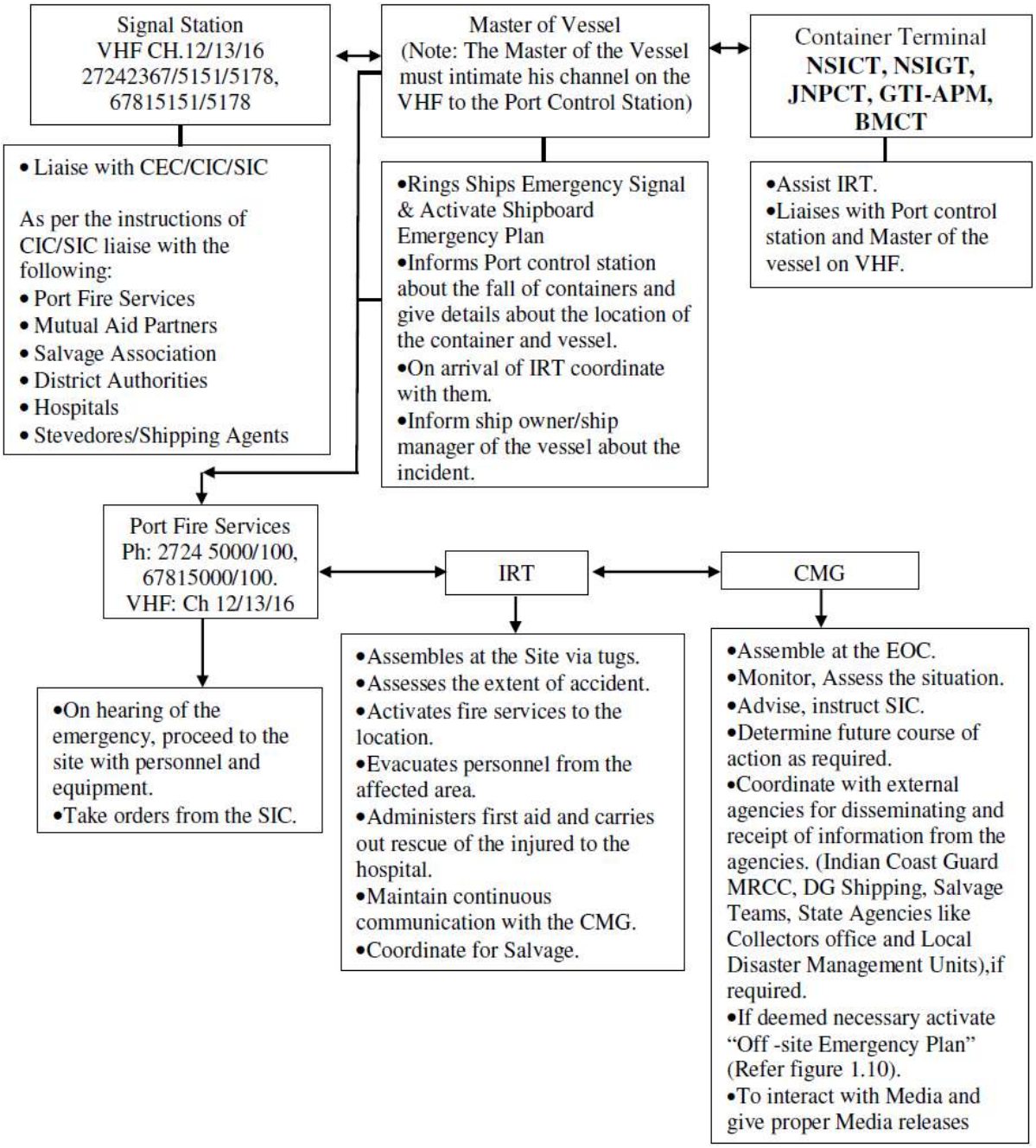
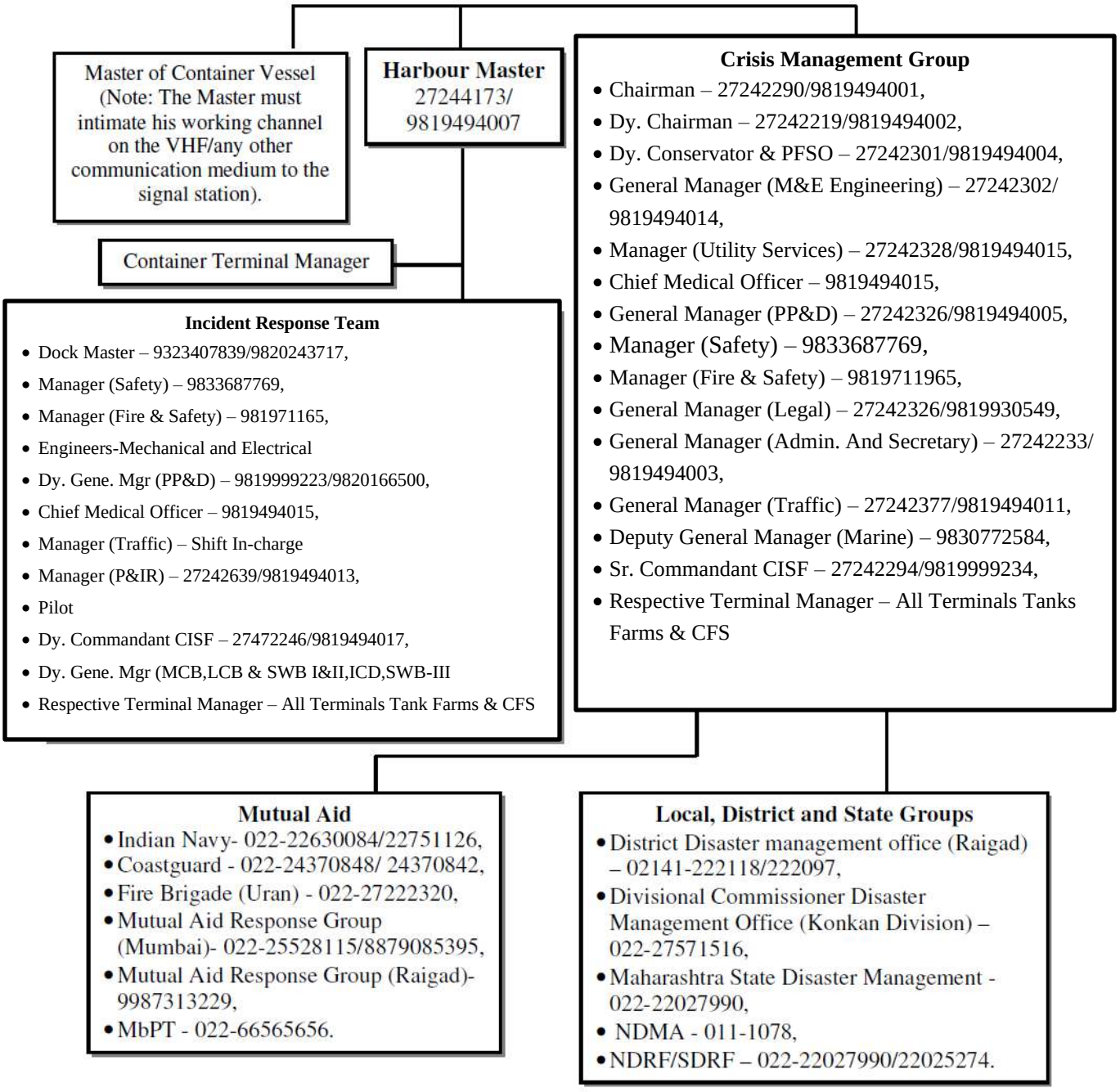


Figure S8.2: Action group



4. Action Plan

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Vessel in the vicinity • Port Control Station
c. Details of the location and type of the container and vessel, type of cargo and quantity and time of incident should be given to the Port control station and the terminal.	
d. Inform ship owner/ship manager of the vessel about the incident.	

B. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel position, container position and time of incident.	
b. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	• CIC • SIC • Navy • Coastguard • DG Shipping
c. Gather information about the weather and tide and notify CIC/SIC.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	

Response Action	Contact
g. Terminate the response and debrief before allowing normal operation.	

D. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information from the crane operator/terminal manager.	Dock Master
		Assess and report the situation to the CIC/CMG (if required).	
		Initiate DMP.	
		Alert vessels within the vicinity.	
		Extend all necessary help to the Master of the vessel.	
		Instruct Dock Master/ Marine Engineers to keep tugs ready.	
		He will coordinate with all functional heads to take actions.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Shall prepare vessels to vacate from berth (if required).	
		Responsible for organizing tugs, mooring boats and Pilots. Instruct Marine Engineers.	
		Hire additional crafts as necessary.	
		Assist SIC and maintain Log of events.	
Container Terminal Manager	Terminal Fire Coordinator	Provide assistance to port and vessel.	Assistant Officer
Manager (Safety)	Marine Pollution Control Coordinator	Investigate the incident and provide necessary guidance.	Safety Inspector
		Assist in Rescue.	
Sr. Commandant -CISF	Security Officer	Controls & Directs traffic in the area.	Dy. Commandant-CISF
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager (I, II)

Designated Officer	Role	Duties	Alternate Officer
General Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Arrange for specialized equipment if required as per the instruction of the SIC.	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Coordinates with Terminal manager. Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	Manager (Traffic)
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for providing any assistance and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue. Assist Dock Master.	Sr. Dy. Manager (Marine Engg.)

Scenario 9 - Fire in Engine room of Floating Craft

1. **Precautions:** Crew trained for Fire Fighting, Periodic Maintenance and Inspection, House Keeping.

2. **Impact Zone:** Craft and immediate surroundings.

3. **Resources required:** Organizational setup enumerated in Figure S9.2.

Figure S9.1: Action Flow Chart

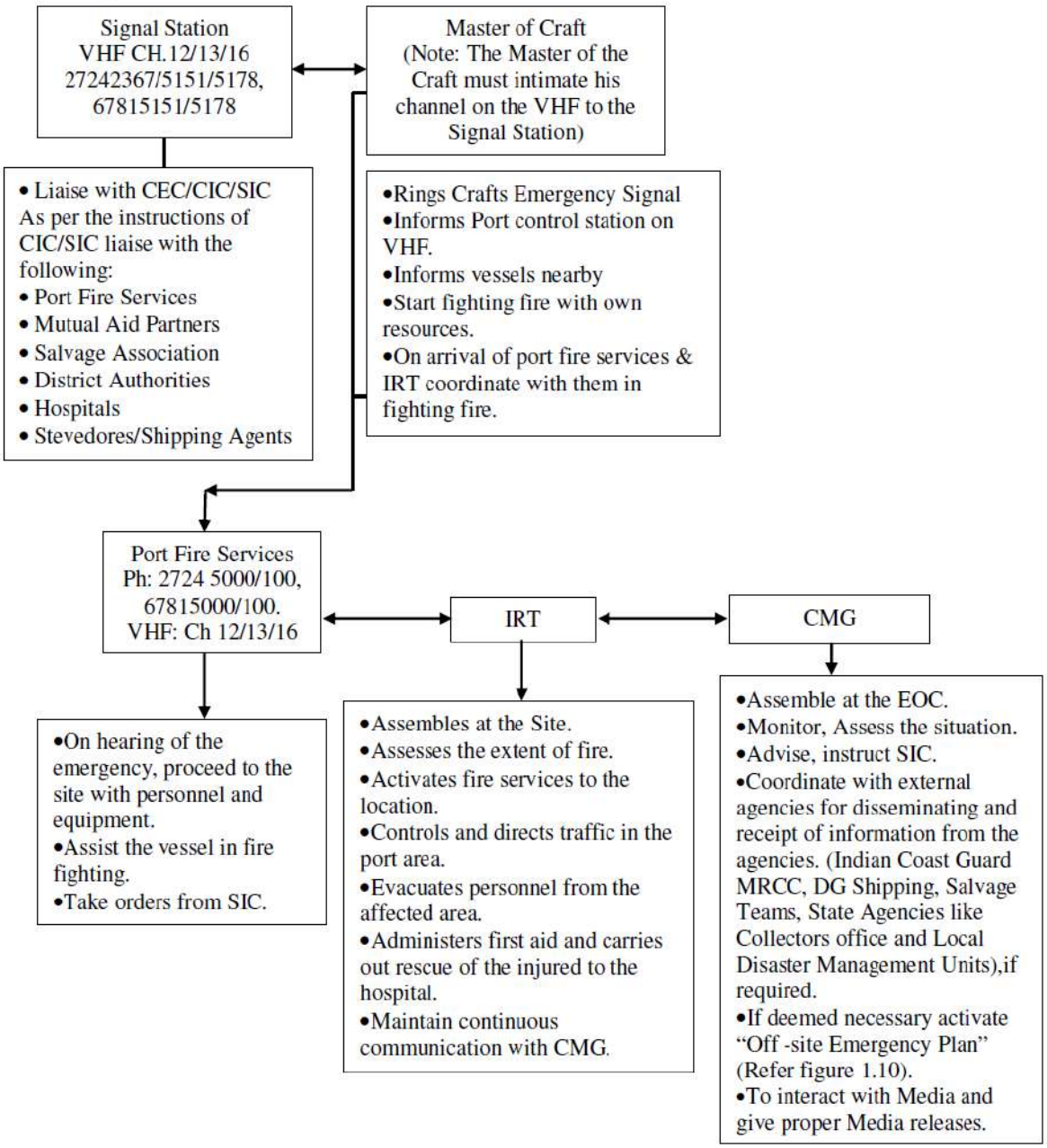
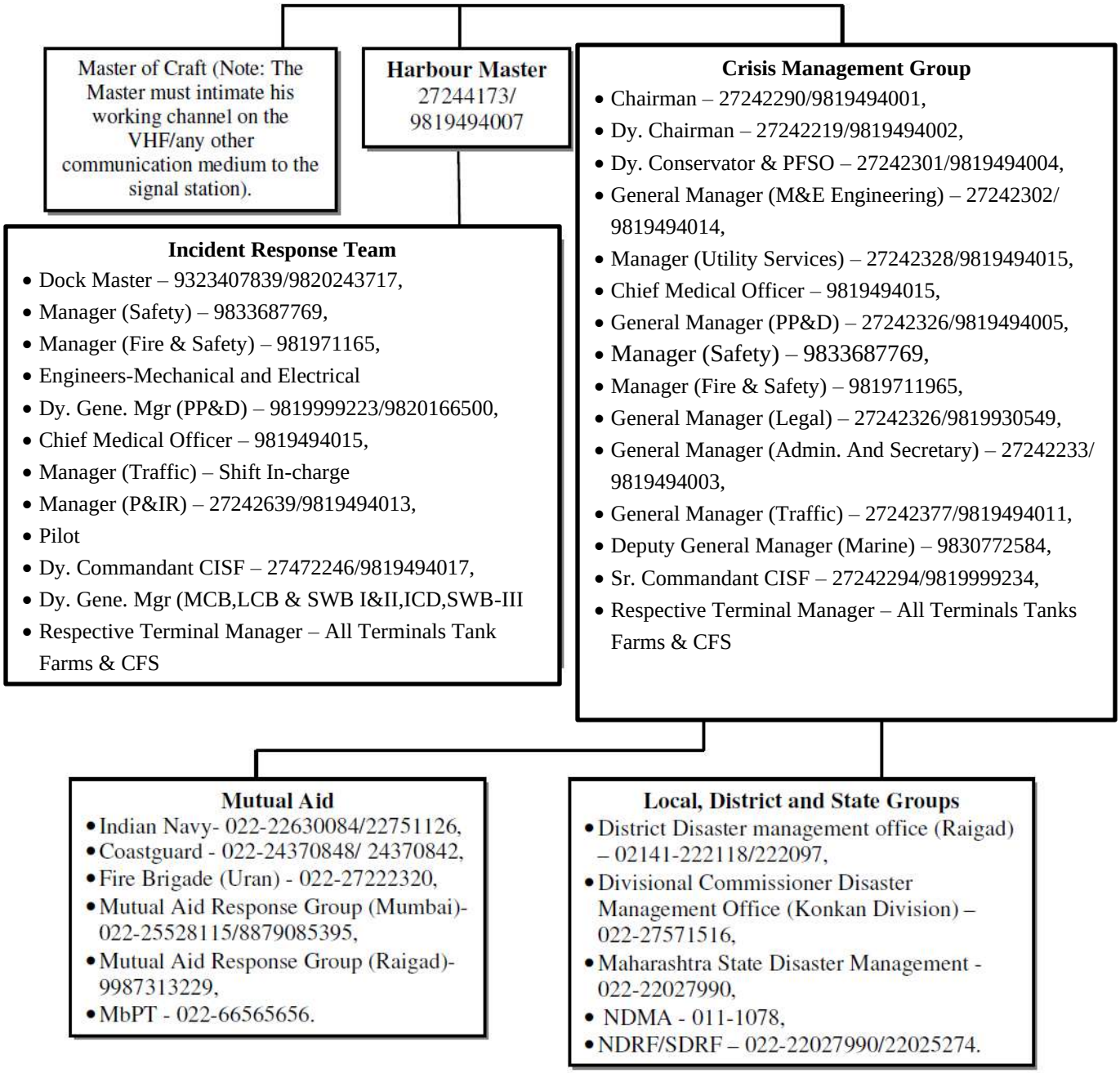


Figure S9.2: Action group



4. Action Plan

A. The Master of the Craft

Response Action	Contact
a. Should raise crafts emergency alarm and activate craft board emergency action plan.	
b. Vessel in the vicinity and Port should be informed of any incident on the craft without delay. Try to keep craft away from any vessel/craft in the vicinity.	• Vessel in the vicinity • Port Control Station
c. Shall be responsible for fighting the fire with craft own resources as well as with the available support from IRT.	

B. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel position, andtime of incident.	
b. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	• CIC • SIC • Navy • Coastguard • DG Shipping
c. Gather information about the weather and tide and notify CIC/SIC.	• CIC • SIC

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. The Fire-fighting Personnel (F &ASO-I) should (Alternate: F &ASO-II)

Response Action	Contact
a. Collect the information from Port Control Station andSIC.	• SIC • Port Control Station
b. Assist Master in fighting fire as per Masters Instructions.	
c. He will mobilize firefighting tugs, personnel & firefighting equipment to the scene & extend all necessary support in case of fire, if required.	
d. Assist in evacuation of the personnel as directed by SIC.	
e. Inform SIC for arrangement of any additional equipment as required.	

E. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceedto the scene & communicate & collect all information from the master of the craft.	Dock Master
		He will report the situation to the CIC/CMG.	
		Alert vessels/craft within thevicinity.	
		Extend all necessary support to theMaster of the craft to fight the fire.	
		Instruct the Manager (Fire and Safety) to keep the firefighting installation and firefighting tugs in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Responsible for organizing tugsfor rescue.	
		Hire additional crafts as necessary.	
		Assist SIC and maintain Log ofevents.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Lead the firefighting team and mobilize fire tenders, men & fire- fighting equipment to the scene & extend all necessary support to the master of the craft for firefighting.	
		Inform SIC for the arrangement of any additional equipment as required.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders for SIC.	Safety Inspector
		Ensure safely rescue of the Master of the craft.	
		Conduct cleanup work during and after the emergency as quick as possible.	

Designated Officer	Role	Duties	Alternate Officer
Sr. Commandant -CISF	Security and Evacuation	Controls & directs traffic in the area. Cordon off the area. Shall supervise evacuation of personnel from the scene at the time of emergency.	Dy. Commandant-CISF
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager(I, II)
General Manager (Mechanical &Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems at the berth.	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Shall prepare vessels (in the vicinity) to vacate from berth. Shall mobilize and dispatch sufficient number of vehicles to the site of emergency. Coordinates with ship owners/agents/stevedores.	Manager (Traffic)
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth, if required. Shall be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue. Hire additional crafts as necessary.	Sr. Manager (Marine Engg.)

Scenario 10 - Ship Grounding/Collision within JNPA port limit.

1. **Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot.

2. **Impact Zone:** Navigational Channel and Anchorage area.

3. **Resources required:** Organizational setup enumerated in Figure S10.2.

Figure S10.1: Action Flow Chart

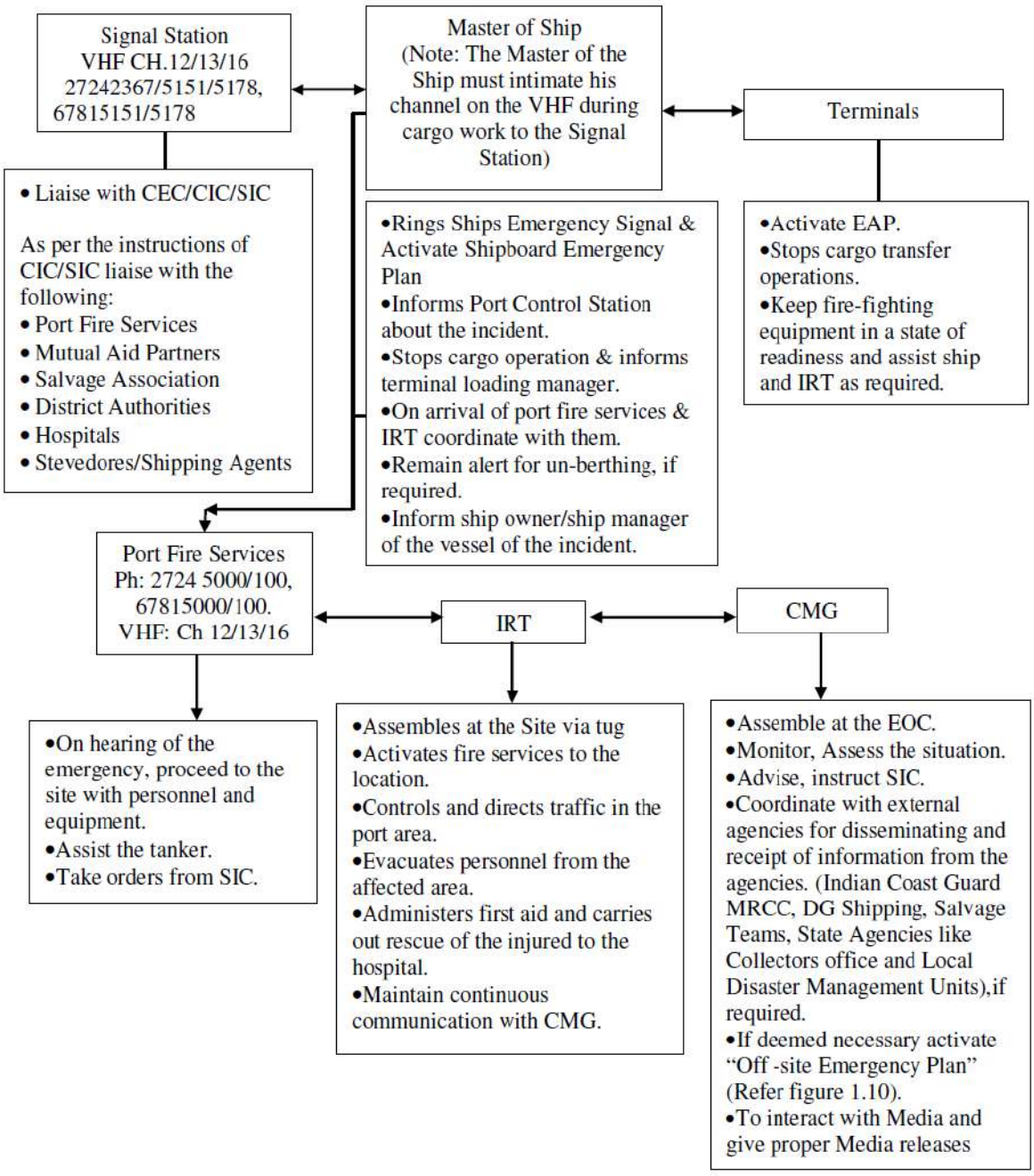
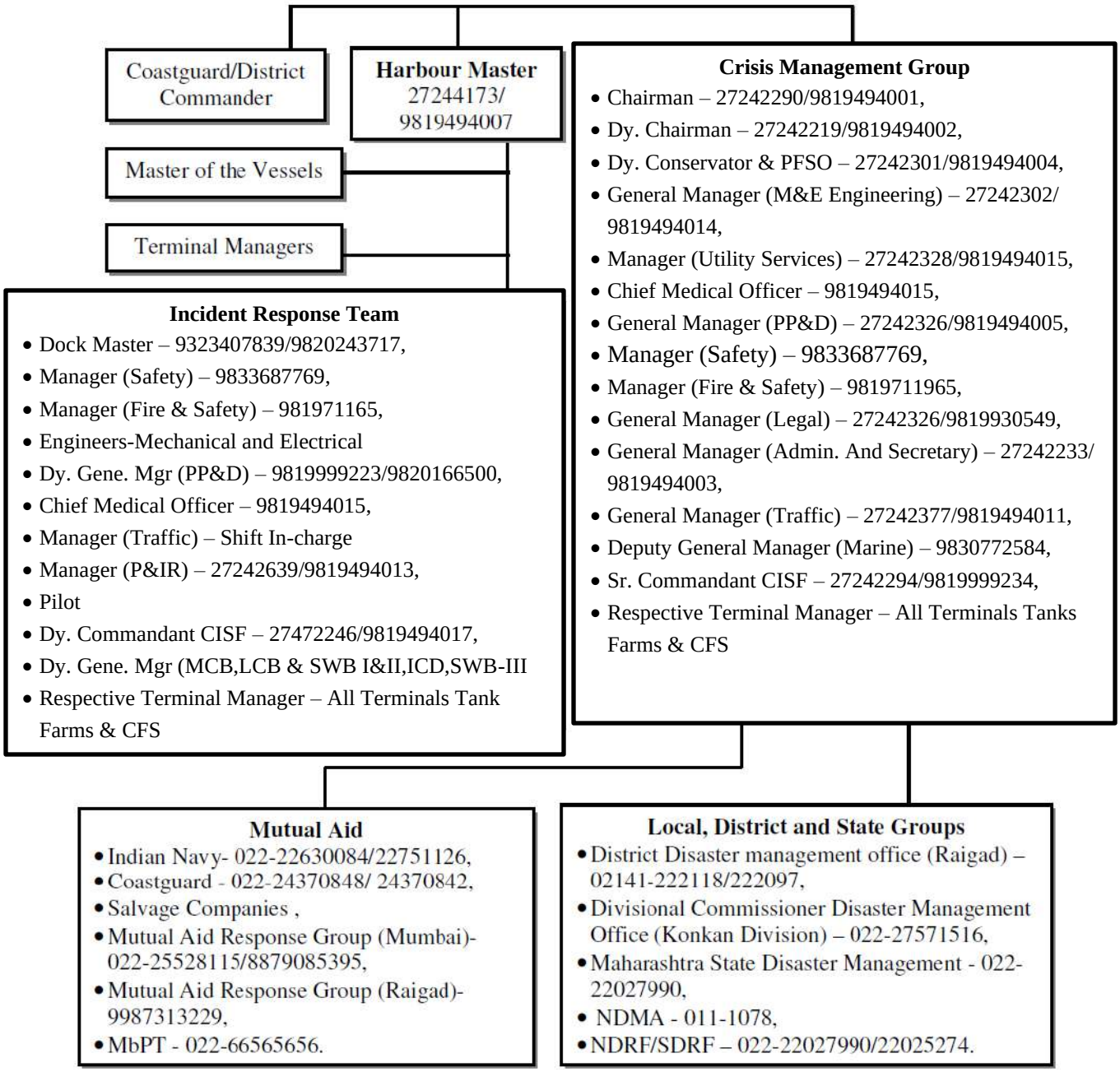


Figure S10.2: Action group



4. Action Plan

A. The Masters of the Vessels (Alternate: Chief Officers)

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan including evacuation of the personnel.	
b. Vessel in the vicinity, Terminal and Port should be informed of any incident on the craft without delay.	• Terminal • Vessel in the vicinity • Port Control Station
c. Shut down transfer operation (if at berth).	
d. Take appropriate damage control measures in case of flooding including leak stoppage and pumping out, vessel list correction etc.	
e. Estimate the extent of under water damage, sounding of tanks and actions for the refloating of the vessel.	
f. Shall be responsible for fighting the fire (in case of fire) with vessels own resources as well as with the available support from IRT.	

B. The Port Control Station

Response Action	Contact
a. Liaise with Master of the Vessel/Pilot and gather the information about the type of vessels involved in the incident, cargo and location of the incident and convey the message to CIC/SIC.	• Master of the vessel • Pilot • CIC • SIC
b. Gather information related to the weather conditions. Monitor the wind directions and accordingly convey the message to CIC/SIC and F& SO.	• CIC • SIC • F&SO
c. Communication to be maintained on VHF channel-13.	•
d. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
e. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Indian Navy • Coastguard • Stakeholders
f. Notify the information to the owner of the vessel as per the instruction of CIC/SIC/ Master of the Vessel.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP andOSCP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Decide on clearing of ships in close proximity to the incident location.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency, he shall proceed to the affected location & communicate & collect all necessary information's from theMaster of the ship.	Dock Master
		Report the situation to theCIC/CMG.	
		Activate Port DMP and OSCP.	
		In case of fire on board the vessel after collision or contact he will extend all necessary help to the Master of the ship.	
		Instruct Dock Master/ Marine Engineer(s) to keep tugs ready for fire-fighting.	
		Alert other vessels within thevicinity.	
		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.	
		In case of grounding, make arrangements through Dock Master/ Marine Engineers/ Pilots to proceed to the spot and to take	

Designated Officer	Role	Duties	Alternate Officer
		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 to commence the towing operation at least two hours before the high water or as advised by CIC/SIC.	
		Inform MOEF and MPCB approved parties for safe disposal and providing reception facilities for Oil/Sludge. Also, inform Salvage association.	
Dock Master	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Duty Supervisor
		If possible, accompany SIC to inspect the vessel.	
		Plot exact location of the incident.	
		Responsible for organizing tugs for rescue. Instruct Marine Engineers.	
		Hire additional crafts as necessary.	
Manager – Safety	Marine Pollution Control Coordinator	Supervise and direct personnel to follow the instructions given by SIC.	Safety Inspector
		Report to SIC and seek advice if in doubt.	
		Lead the response team and support personnel in combating the disaster by deploying booms and other equipment.	
		Coordinate with the party involved in disposal of the Oil/sludge in a	
		safe manner.	
		Liaise with the OSRO team and coordinate with the team in combating the disaster by taking necessary actions as per the OSCP.	
		Maintain records of the claims.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Mobilize fire tenders, men & firefighting equipment to the scene & extend all necessary support to the master of the vessel for firefighting.	
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	

Designated Officer	Role	Duties	Alternate Officer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first-aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Chief Manager (PP&D)	Civil Coordinator	Inform MPCB as per the instruction of CIC/SIC and other environmental agencies about the incident for getting necessary guidance.	Manager(I, II)
		Instruct the contractors to carry out urgent civil works as required.	
		Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.	
General Manager (Traffic)	Traffic Coordinator	Coordinates with ship owners/agents/stevedores.	Manager (Traffic)
		Regulate Traffic in the vicinity.	
Duty Pilot	In Charge of Pilotage	Shall monitor the communication on VHF & convey and relay messages on the advice from CIC/ SIC.	Standby Pilot
		He will maintain Log of events.	
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for shifting the vessel to the anchorage area if required.	Sr. Dy. Manager (Marine Engg.)

Scenario 11 - Blockage of Navigational Channel due to Grounding/sinking of vessel (Wreckage)

1. **Precautions:** Navigational Aid, Designated Pilots, Continuous monitoring and communication with the Port Control Centre and Pilot.

2. **Impact Zone:** Navigational Channel.

3. **Resources required:** Organizational setup enumerated in Figure S11.2.

***Note*:** *Under the Indian Ports Act, 1908, if a ship is wrecked, stranded or sunk within the port limits, the Conservator of the Ports or in the absence of such an office, the Harbour master may give notice to the owner of the vessel "to raise, remove or destroy the vessel within such period as may be specified in the notice and to furnish such adequate security to the satisfaction of the conservator to ensure that the vessel shall be raised, removed or destroyed within the saidperiod". If the owner does not comply and act upon the notice, the conservator may raise, remove or destroy the property and claim the compensation from the owner. Mostly, the salvage activity will be done by private salvors in agreement with the Port Trust. Within the port limits, the capacity of the party to carry out salvage, the methods used to raise or remove or destroy the vessel is subjected to the expert opinion of the deputy conservator & PFSO of the port. Normally, the court will not interfere with these technical decisions.*

Figure S17.1: Action Flow Chart

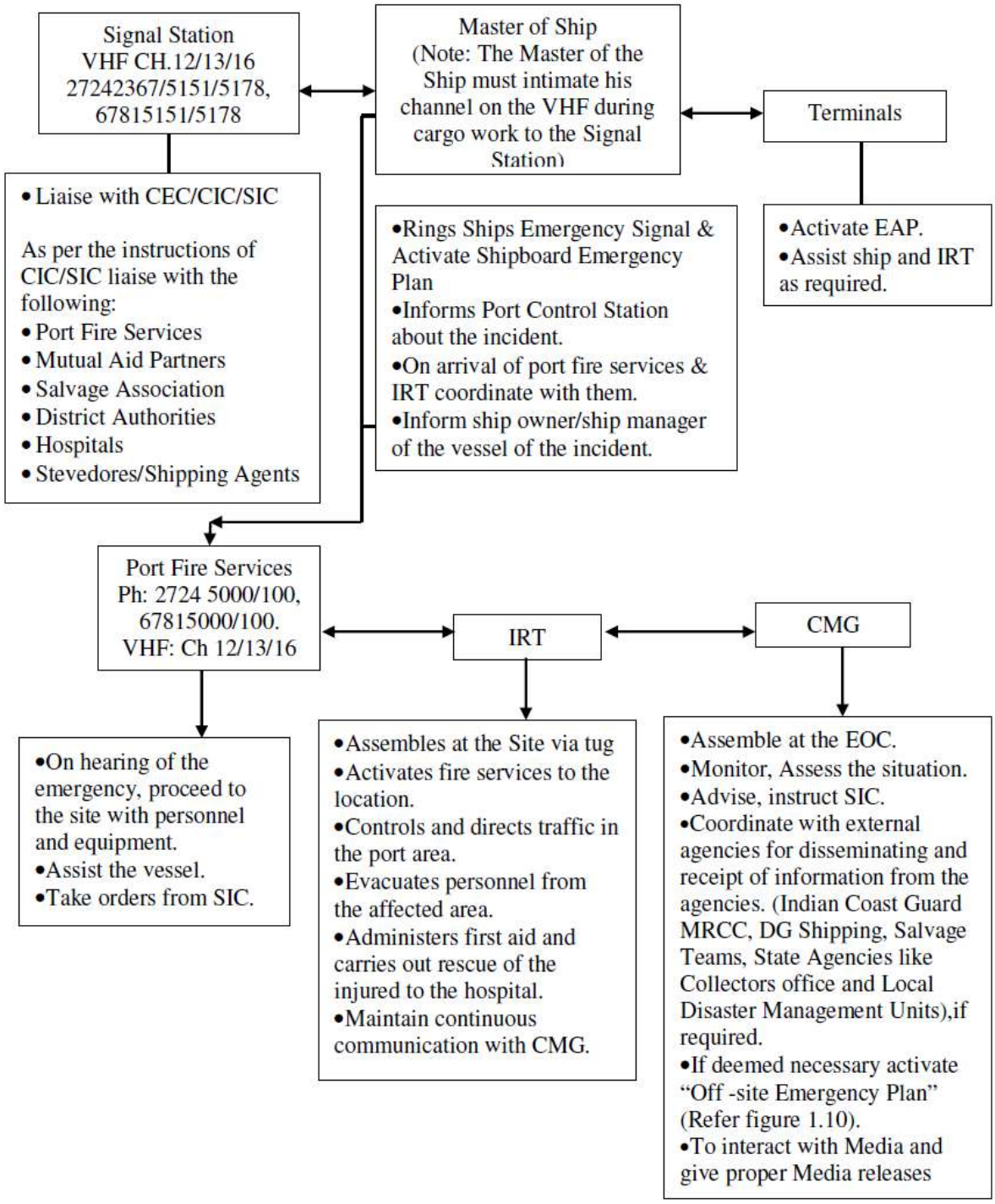
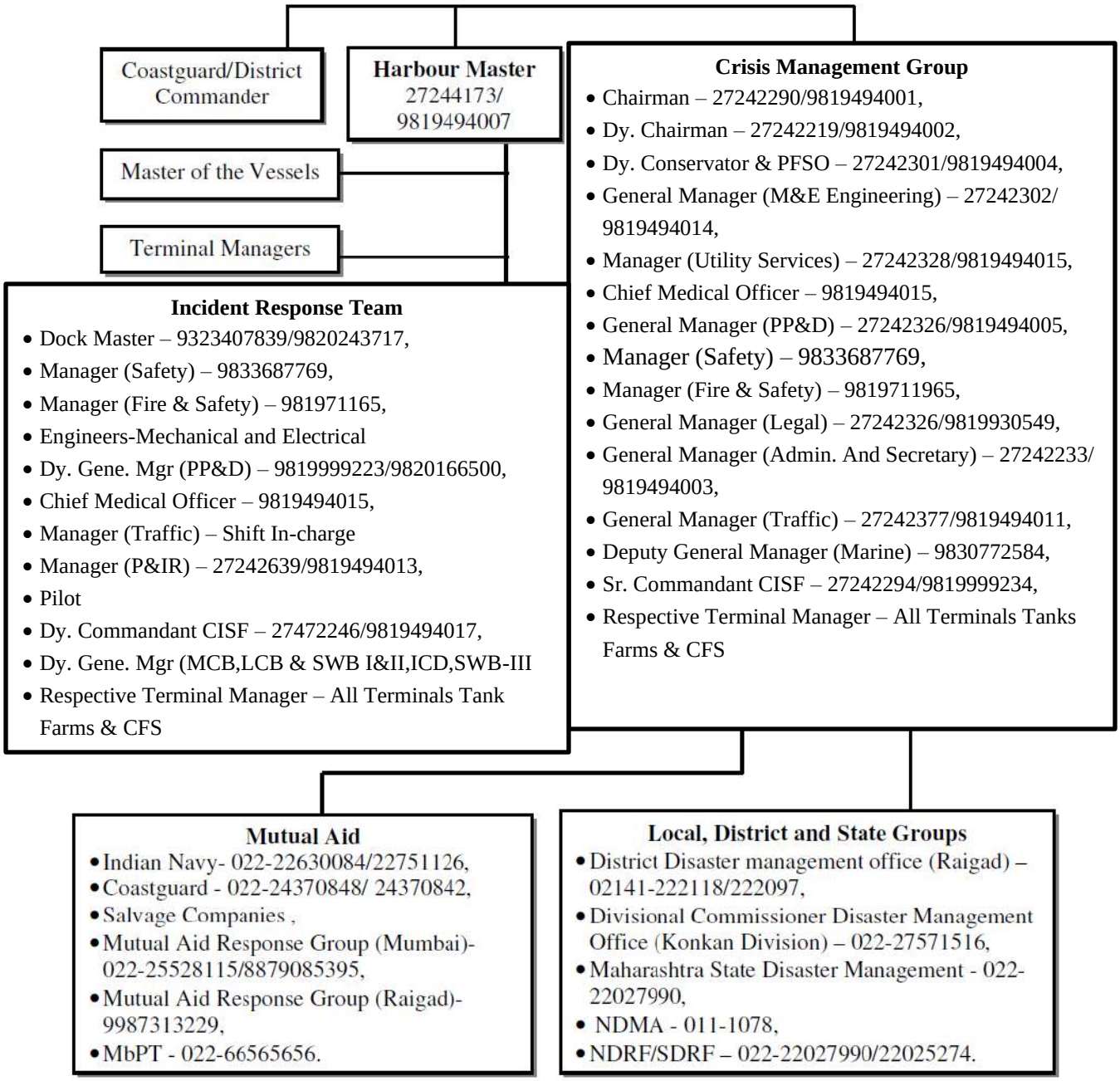


Figure S17.2: Action Group



4. Action Plan

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Terminal, Vessel in the vicinity and Port should be informed of any incident on the ship without delay.	• Terminal • Vessel in the vicinity • Port Control Station
c. 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.	
d. 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.	• Port Control Station

B. Port Control Station should

Response Action	Contact
a. Gather information related to the vessel type, position andtime of incident.	
b. Liaise with Master of the Vessel/Pilot.	• Master of the vessel • Pilot
c. Notify to CIC, SIC and the vessels moving into, through and near the casualty and inside the port.	• CIC • SIC • Navy • Coastguard
d. Notify the information to the owner of the vessel.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
b. Assess the level of disaster and activate the DMP.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station

Response Action	Contact
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Launches and rescue craft will be sent to scene of Emergency. If required they will bring necessary personnel and equipment to site.	• Dock Master • Marine Engineers
f. **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.	• Coastguard
g. **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.	•
h. **Salvage and or floating of the vessel** will be controlled by either the CIC or person assigned by him. All operations will have to be sanctioned by the CIC before implementation.	• Salvage Company
i. Coordinate with external agencies/authorities.	• Indian Navy • Coastguard
j. Be in constant touch with District and Local Administration for rescue and relief operation.	
k. CIC, once the DMP is activated and underway will ensure that, at frequent intervals, issue, through Radio and via the telephone and Media, situation reports and information updates.	
l. **Press Liaison** A press office will be set up and regular briefings organized and promulgated. The DC and representatives from each emergency service will attend as circumstances permit to brief media concerns. Where necessary, the P.R. teams from Port will be alerted to ensure fullest briefings on all aspects of the emergency.	
m. Terminate the response and debrief before allowing normal operation.	

NOTES ON SALVAGE:

- *If required inform a reputable Salvage Company;*
- *Thoughts should be given to adding ballast to secure vessel in bad weather;*
- *Secure topside openings;*
- *Topside survey;*
- *Underwater survey with a diver noting all damage on plan of vessel;*
- *Information on the seabed using diver and soundings;*
- *Based on survey, draft, stability, condition of vessel openings, cargo, fuel, water etc.,*

- *Other removable weights;*
- *Refloating plan must be agreed taking into consideration, draft, stability, a clear passage off (may have to dredge a channel); safety of personnel, fire, pollution (may have to remove bunkers and cargo);*
- *Availability of tugs, bunkering vessels, divers, salvage companies;*
- *CIC in control of salvage, Salvor in command, all plans approved by CIC.*

D. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency, proceed to the affected location & communicate& collect all necessary information's from the Master of the ship.	Dock Master
		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.	
		Gather information from Port Control Station regarding position and time.	
		He will report the situation to theCIC/CMG.	
		Activate Port DMP and OSCP.	
		Commence search and rescue operation immediately.	
		He will instruct Dock Master to keep tugs ready.	
		Alert other vessels within the vicinity and the movement of other vessels into, through and near the location should be stopped.	
		Assistance may be sought from other suitable and availablevessels.	
		Inform Salvage association and instruct Dock Master tocoordinate.	
		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.	

Designated Officer	Role	Duties	Alternate Officer
		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.	
		Ascertain oil pollution- leak source, if any.	
		Inform the MoEF & MPCB approved private parties for safe disposal and providing reception facilities for Oil/Sludge.	
Dock Master	Port Control Room Coordinator	Plot exact location of the incident.	Duty Supervisor
		Assist in monitoring of other vessels and communicating with the Master and restricting them to enter the emergency location.	
		Allow vessels directly involved in rescue operations within the vicinity.	
		Responsible for Organizing tugs for search and rescue.	
		Hire additional crafts as necessary.	
		Arrange for the marking arrangements with appropriate buoy(s) and lights.	
		Instruct the oil pollution response team to maintain a state of readiness and standby.	
		Assist Salvage association and SIC.	
		Liaise with the OSRO team and coordinate with the team in combating the disaster by taking necessary actions as per the OSCP.	
Pilot/ Marine Engineer	In Charge of Pilotage	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Standby Pilot
		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.	
Manager – Safety	Marine Pollution Control	Shall take orders from the SIC.	Safety Inspector
		Extend all necessary support to the Master of the vessel for search and rescue operation.	

Designated Officer	Role	Duties	Alternate Officer
	Coordinator	Make arrangements for oil pollution combat personnel and equipment.	
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	
		Supervise and direct personnel to follow the instructions given by SIC.	
		Report to SIC and seek advice if in doubt.	
		Maintain records of the claims.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Mobilize fire tenders, men & firefighting equipment to the scene & extend all necessary support to the master of the vessel for firefighting.	
		Coordinate with the party involved in disposal of the Oil/sludge in a safe manner.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first-aid team ready with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Chief Manager (PP&D)	Civil Coordinator	Inform MPCB as per the instruction of CIC/SIC and other environmental agencies about the incident for getting necessary guidance.	Manager(I, II)
		Instruct the contractors to carry out urgent civil works as required.	
		Hire the barges for collecting the spilled oil and coordinate with the parties involved in the safe disposal of the oil/sludge.	
General Manager (Traffic)	Traffic Coordinator	Coordinates with ship owners/agents/ stevedores.	Manager (Traffic)
		Regulate water traffic in the vicinity	
Sr. Commandant -CISF	Security and Evacuation	Controls & direct traffic in the area.	Dy. Commandant-CISF
		Shall cordon off the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
		Allow vehicles which are directly involved in rescue operations within the vicinity of the rescue operations.	

Scenario 12 - Emergency/Disaster within the facility (Reliance/IMC/GBL/Deepak Fertilizer/Suraj Agro/IOCL/Bharat Shell tank farms)

1. **Precautions:** MSDS, SOP, House Keeping,

2. **Impact Zone:** Facility area and neighboring facility/facilities.

3. **Resources required:** As per facility DMP.

4. **Action Plan**

A. Activate facility EAP.
B. Alert staff within the facility as well as the neighboring facility.
C. Inform Port signal station and CIC/SIC.
D. Inform neighboring and mutually aid partners.
E. Gather as much information as possible pertaining to the nature and scope of the impending or possible emergency.
F. Assist and advice the external Emergency services as appropriate.

If there is a potential to affect other Port operators

A. Notify CIC/SIC/Signal Station as appropriate and seek help.
B. Notify neighboring facilities as appropriate and seek help.

Scenario 13 - Fire in CFS - Warehouse

1. **Precautions:** Protected/covered Electrical installations, Firefighting systems,trained personnel to combat fire, No smoking zone, House Keeping.

2. **Impact Zone:** Warehouse and immediate area.

3. **Resources required:** Organizational setup enumerated in Figure S13.2.

Figure S13.1: Action Flow Chart

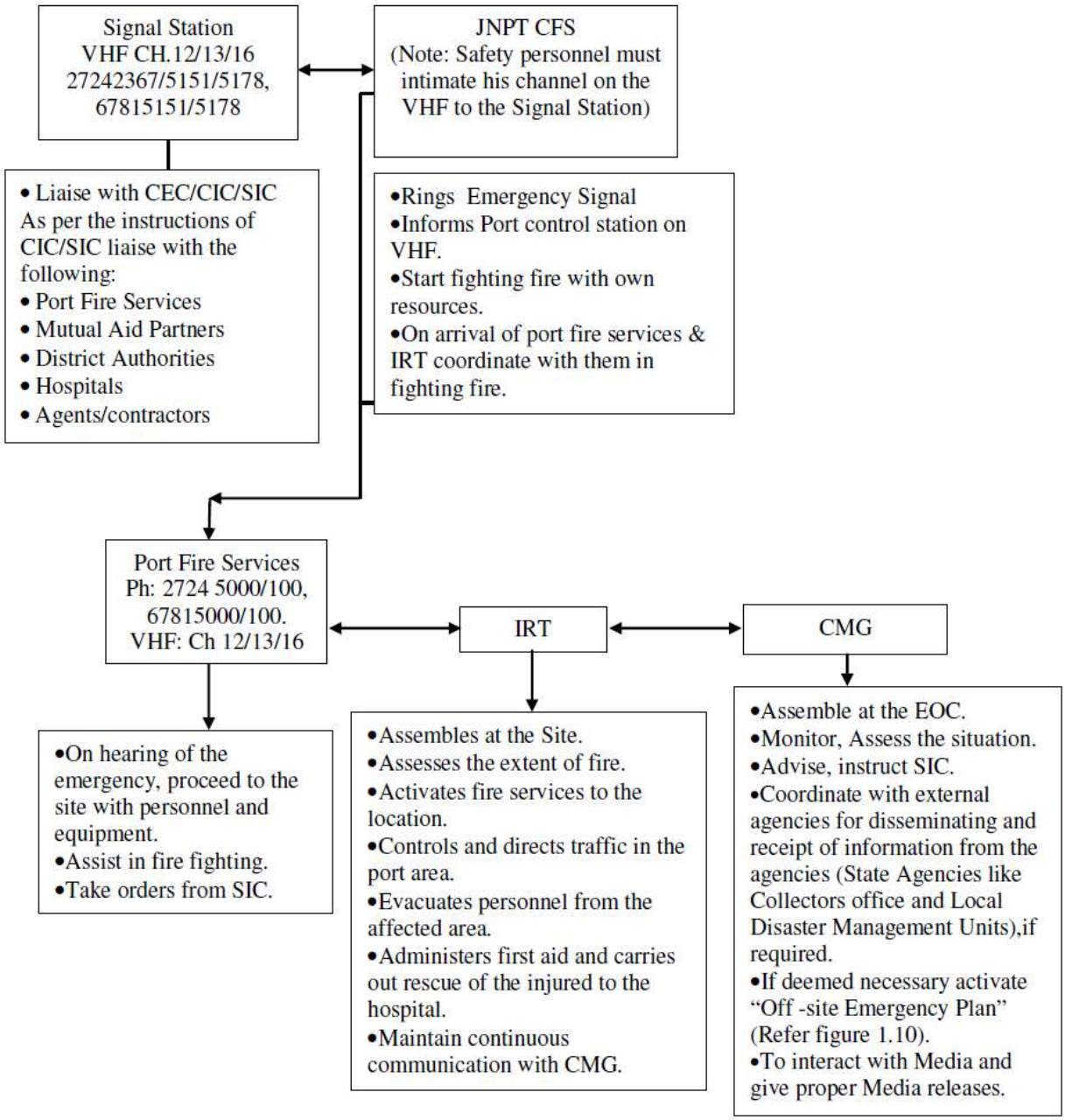
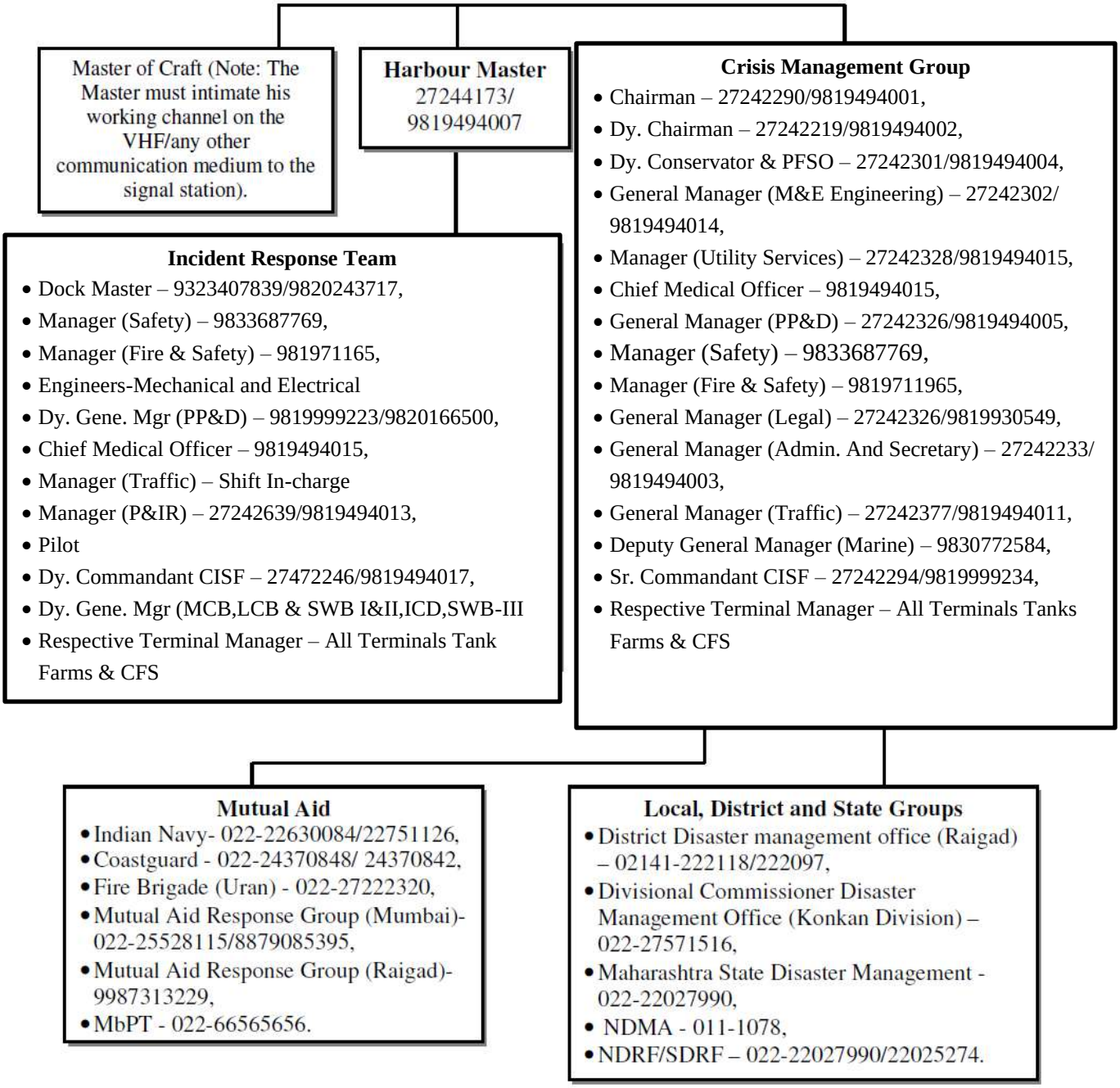


Figure S13.2: Action group



4. Action Plan

A. The safety personnel of CFS

Response Action	Contact
a. Should raise emergency alarm and activate emergency action plan.	
b. Vehicles in the vicinity and Port should be informed of any incident without delay.	• Vehicles in the vicinity • Port Control Station
c. Shall be responsible for fighting the fire with own resources as well as with the available support from IRT.	

B. Port Control Station should

Response Action	Contact
a. Gather information related to the fire and time ofincident.	
b. Notify to CIC and SIC.	• CIC • SIC
c. Gather information about the wind direction and notify CIC/SIC.	• CIC • SIC

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Coordinate with external agencies/authorities.	• Local Authorities
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

D. The Fire-fighting Personnel (F &ASO-I) should (Alternate: F &ASO-II)

Response Action	Contact
a. Collect the information from Port Control Station andSIC.	• SIC • Port Control Station
b. Assist CFS in fighting fire.	
c. He will mobilize firefighting tenders, personnel & firefighting equipment to the scene & extend all necessary support in case of fire, if required.	
d. Assist in evacuation of the personnel as directed by SIC.	
e. Inform SIC for arrangement of any additional equipment as required.	

E. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceedto the scene & communicate & collect all information.	Dock Master
		Assess and report the situation to the CIC/CMG.	
		Extend all necessary support tofight the fire.	
		He will instruct the Manager (Fire and Safety) to keep the fire- fighting equipment and firefighting tenders in a state of readiness & activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Assist SIC and maintain Log ofevents.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders for SIC.	Safety Inspector
		Ensure safely rescue of personneland labors.	
		Ensure cleanup work during and after the emergency as quick as possible.	
Sr. Commandant -CISF	Security and Evacuation	Controls & directs traffic in thearea.	Dy. Commandant-CISF
		Cordon off the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Chief Manager (PPD)	Civil Coordinator	Liaise with SIC.	Manager(I, II)

Designated Officer	Role	Duties	Alternate Officer
General Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems.	Asst. Engineer
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
General Manager (Traffic)	Traffic Coordinator	Shall mobilize and dispatch sufficient number of vehicles to the site of emergency. Coordinates with SIC/CIC.	Manager (Traffic)

Scenario 14 - Fire in Port Administration building/PUB/Customs House/Port Operation Centre

1. **Precautions:** Smoke and Fire Detection system, Firefighting system, trained personnel to combat fire, No Smoking zone, and Protected/covered Electrical installations.

2. **Impact Zone:** Administration building/PUB/Customs House/Port Operation Centre.

3. **Resources required:** Organizational setup enumerated in Figure S14.2.

Figure S14.1: Action Flow Chart

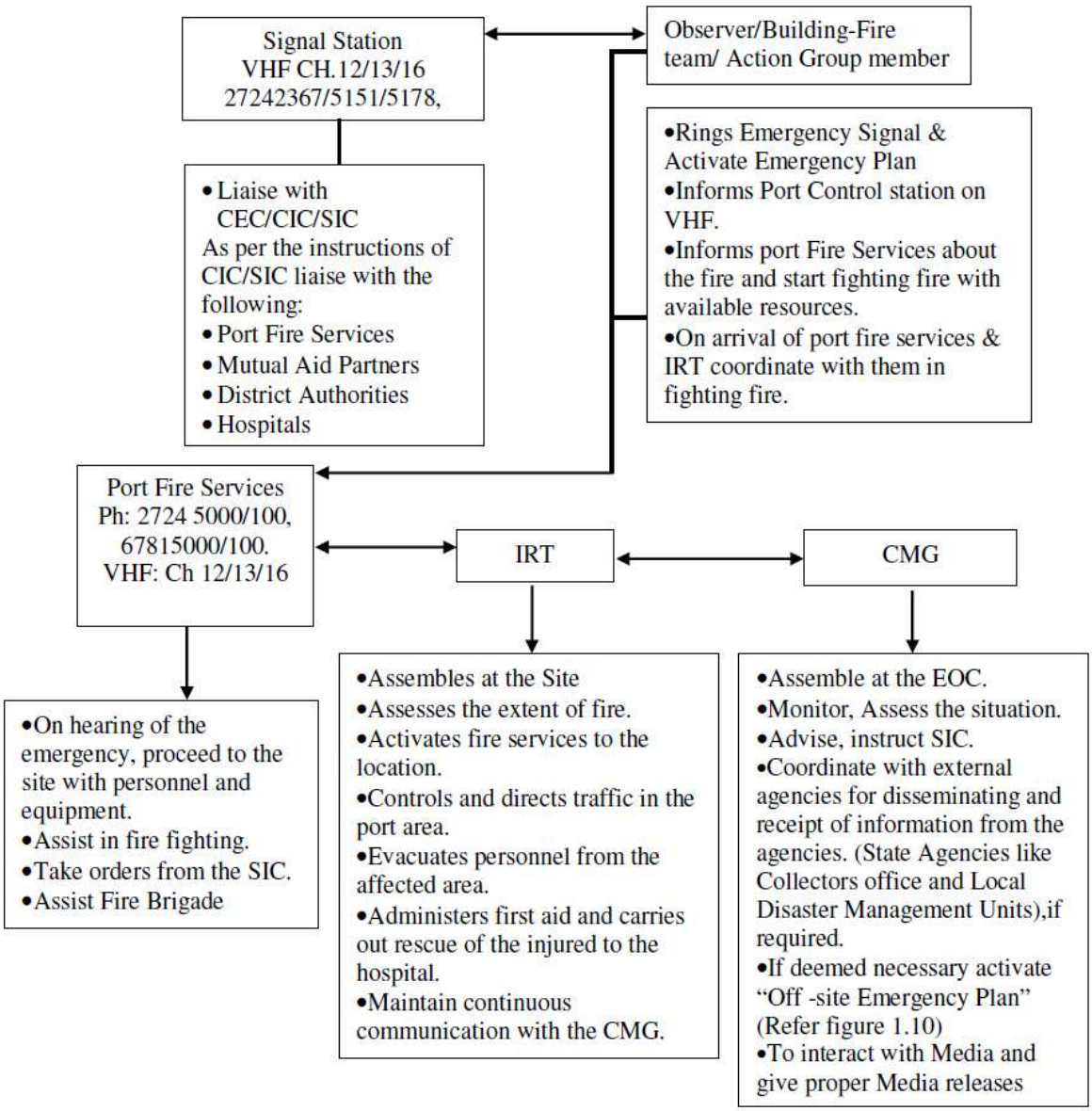
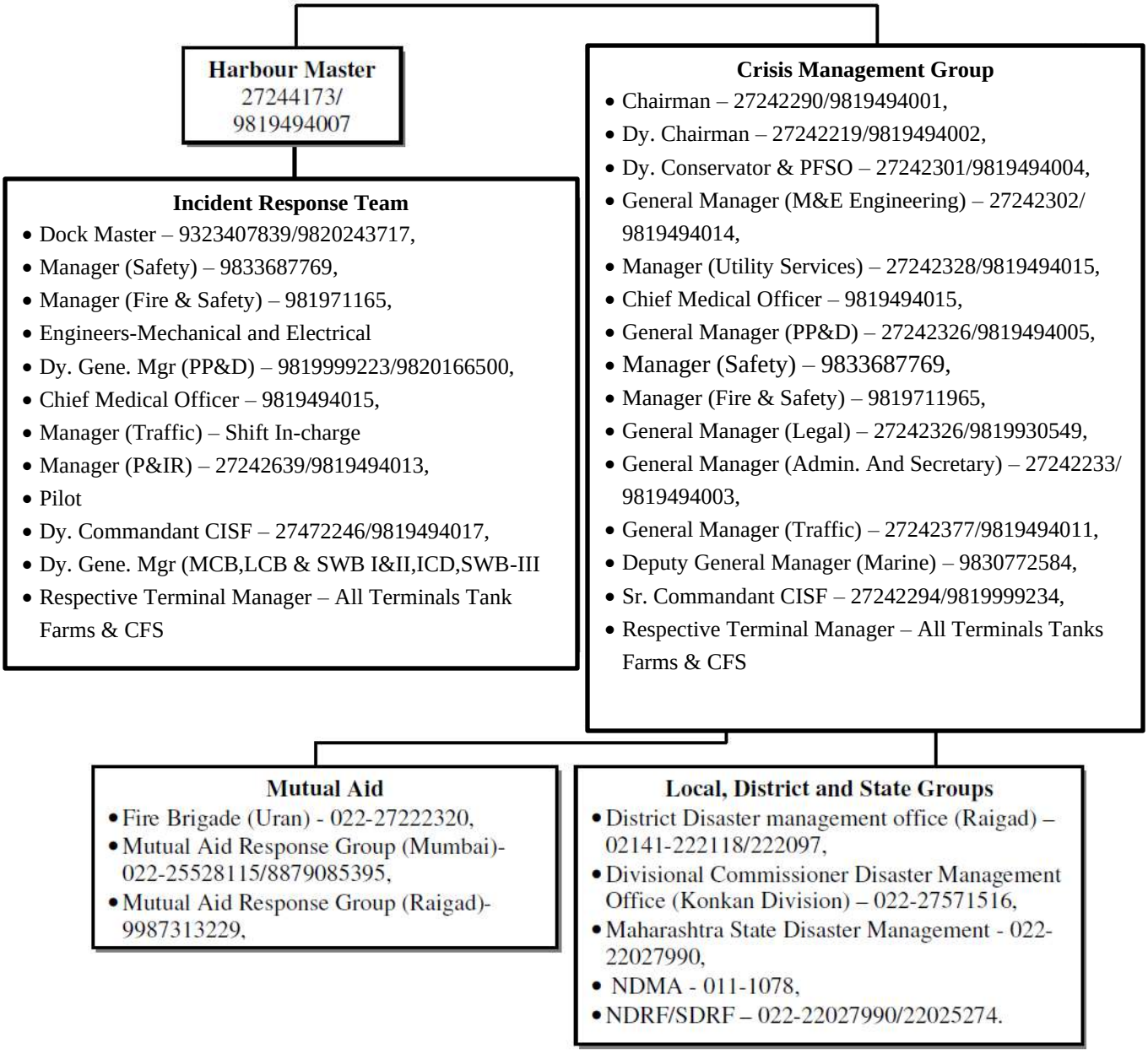


Figure S14.2: Action Group



4. Action Plan

A. The Observer/ Building-Fire team/ Action Group member

Response Action	Contact
a. Shout "Fire Fire Fire" and should raise alarm.	
b. Port Control Station should be informed of any incident without delay.	• Port Control Station
c. If fire is in the Port Control Station , inform F &SO and SIC	• F & SO • SIC
d. If trained, try to extinguish the fire and try to evacuate people.	

B. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the level of disaster and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Assess the condition of site take decision on evacuation in consultation with SIC.	
f. Be in constant touch with District and Local Administration for rescue and relief operation.	
g. Terminate the response and debrief before allowing normal operation.	

C. The Fire-fighting Personnel (F& ASO –I) (Alternate : F& ASO –II) should

Response Action	Contact
a. Raise Alarm (siren)	
b. Collect the information about the exact location of the fire and people trapped in the building. Ensure safe evacuation of the people in the affected area to a safe location.	
c. He will lead the team and mobilize fire tenders, personnel & firefighting equipment to the scene & extinguish the fire.	
d. If the fire is out of control, convey the message to CIC/SIC and seek assistance from Mutual aid partners or other organizations.	• CIC • SIC
e. Open the water curtain valve to protect shore installations from heat radiation.	
f. Control cleanup work during and after the emergency as quick as possible.	

Response Action	Contact
g. If the fire is under control and extinguished, give all clear signal	

D. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information.	Dock Master
		Assess and report the situation to the CIC/CMG.	
		Instruct the Manager (Fire & Safety) to keep the fire-fighting equipment in a state of readiness &activate if required.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Maintain Log of events.	
Manager (Safety)	Marine Pollution Control Coordinator	Shall take orders from the SIC.	Safety Inspector
		Ensure safe evacuation of the people in the affected area to a safe location.	
		Control cleanup work during and after the emergency as quick as possible.	
Sr. Commandant -CISF	Security and Evacuation	Shall supervise evacuation of personnel from the scene at the time of emergency.	Dy. Commandant-CISF
		Cordon off the area.	
		Coordinate with Police and FireBrigade.	
Chief Manager (PPD)	Civil Coordinator	Assist SIC.	Manager(I, II)
General Manager (Mechanical &Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment andsystems.	Asst. Engineer
General Manager (Traffic)	Traffic Coordinator	Provide necessary assistance toCIC/SIC.	Manager (Traffic)
		Shall mobilize and dispatch sufficient number of vehicles to the site of emergency.	
		Control and Directs Traffic in the affected area.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Duty Pilot	In-Charge of Pilotage	Shall be ready for providing any assistance on site.	Standby Pilot

Scenario 15 - War and Terrorism

1. **Precautions:** Trained Security Personnel, CCTV and Continuous Vigilance including radioactive detectors and intelligence from designated local and nationalagencies.

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

3. **Resources required:** Intelligence inputs from agencies and organizational setup enumerated in Figure S15.2.

4. **Action Plan**

When war 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, toremain ready to combat emergency and to keep normal operation going.

A. Prior Emergency Situation (after warnings/inputs)

- Set up Crisis management center and manned continuously.
- CMG to declare plan/guideline to be followed which could be based on CISF Contingency Plan/Government of India/Statutory bodies/Indian Navy/Air Force/Government of Maharashtra etc. 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 terminals should be informed.
- No movement of the vessels in the port vicinity will be allowed.

B. During Emergency

- CMG to adopt relevant DMP to combat the emergency.
- In case of an enemy attack inform relevant authorities & internal security to defend installations till the external support arrives.
- When additional security (army/BSF) 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 S15.1: Action Flow Chart

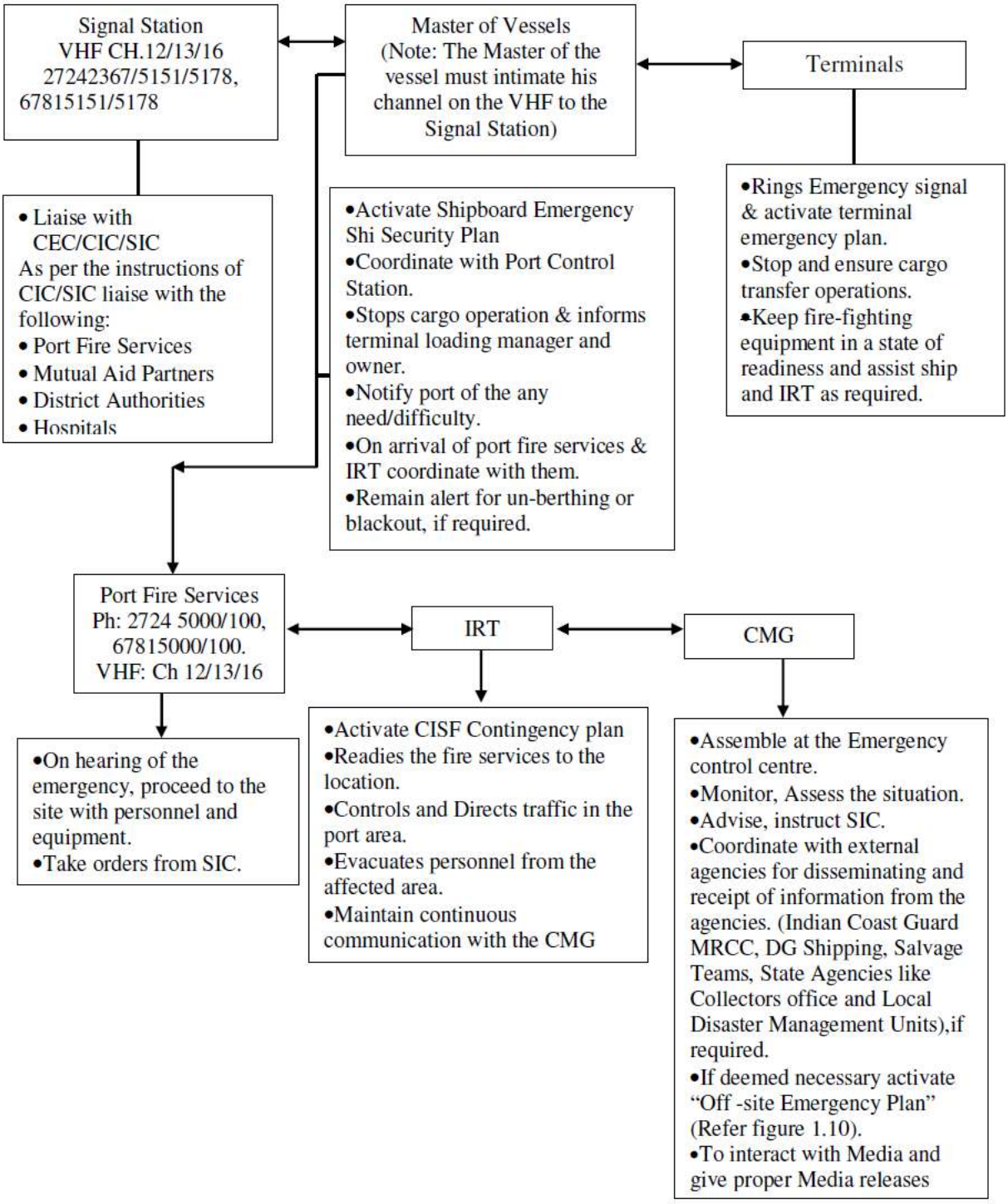
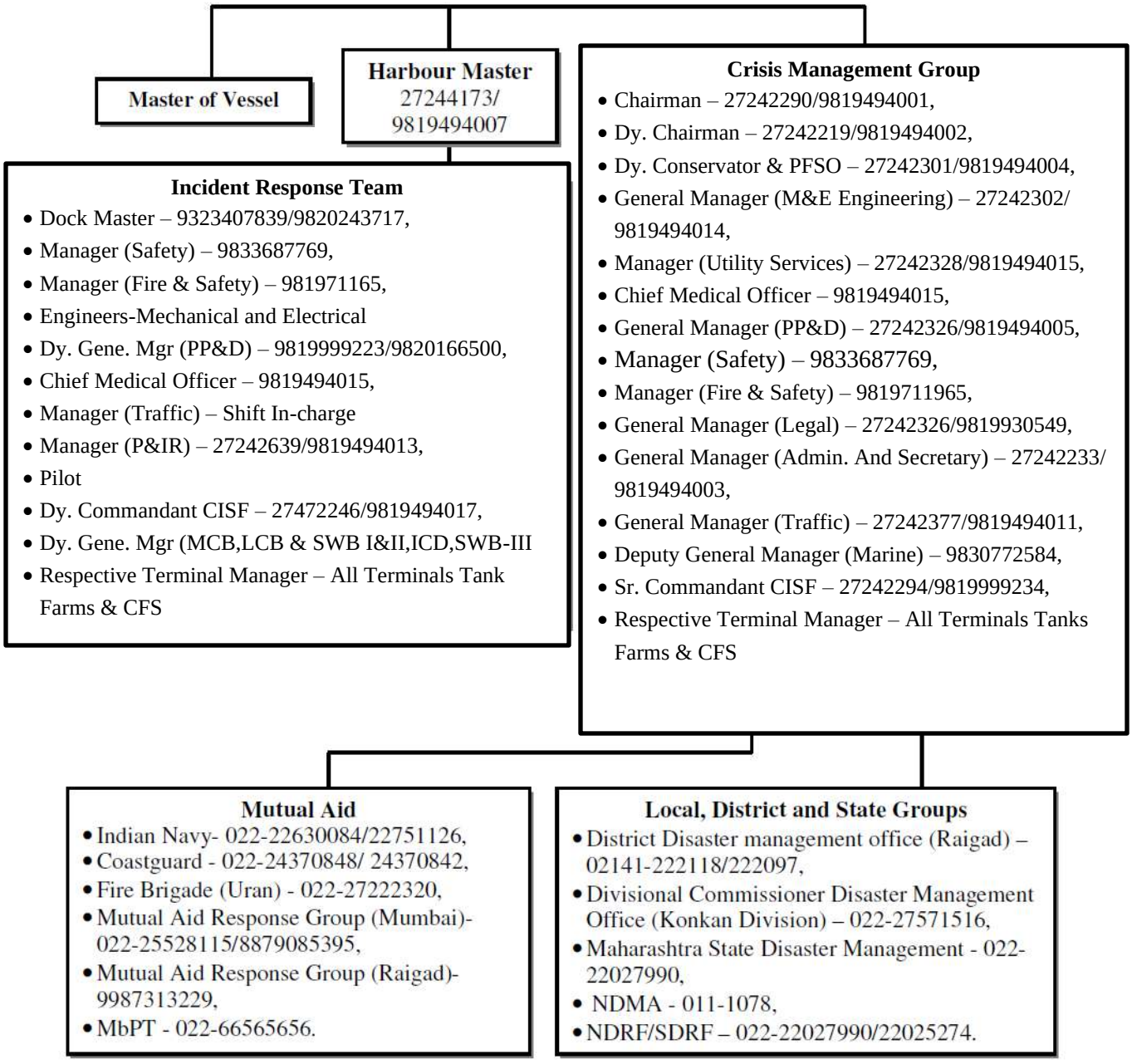


Figure S15.2: Action group



5. Action Plan

A. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the situation and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
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.	

B. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall communicate & collect all information.	Dock Master
		Report the situation to the CIC/CMG.	
		Extend all necessary help to CISF as and when required.	
		Ensure that there is blackout at the port and the vessels at the anchorage area as per the guidanceand instruction of CMG/CIC.	
Dock Master	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Duty Supervisor
Master of the vessel	In-Charge of firefighting operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC/SIC.	Chief Officer of vessel
		Coordinate with IRT leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In-Charge.	
Terminal Managers	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional firefighting & emergency equipment as required.	Assistant Terminal Manager

Designated Officer	Role	Duties	Alternate Officer
		Arrange to protect cargo in vicinity from damage.	
		Submits consolidated list of dangerous goods in port – Vessels in port.	
		Coordinates with ship in-charge/C & F agents/stevedores.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Keep the fire –fighting installation in a state of readiness and be in continuous liaise with SIC/CIC.	
Manager (Safety)	Marine Pollution Control Coordinator	Ensure all employees (port and contract) within port shifted to safelocations.	Safety Inspector
Sr. Commandant -CISF	Security and Evacuation	Act as per the CISF Contingencyplan.	Dy. Commandant -CISF
		Controls & Directs traffic in thearea.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Sr. Manager (PPD)	Civil Coordinator	Assist SIC.	Manager(I, II)
General Manager (Mechanical &Electrical)	In-charge of Electrical Installation	Arrange for specialized equipment if required as per the instruction ofthe SIC.	Asst. Engineer
		Take orders from CIC/SIC with regards to power supply and shutdown.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Berth Managers	Traffic Coordinator	Shall prepare vessels to vacatefrom berth.	Dy. Manager - Berths
		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.	
General Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tankfarms in port area.	Manager (Traffic)
		Coordinates with the tank truckcontractors.	
		Ensure sufficient numbers of vehicles are available.	
		Controls traffic in the JNPA area.	

Designated Officer	Role	Duties	Alternate Officer
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugsfor shifting the vessel to the anchorage area.	Sr. Dy. Manager (Marine Engg.)

Scenario 16 - Bomb Threat

1. **Precautions:** Trained Security Personnel, CCTV and Continuous Vigilanceincluding radioactive detectors.

2. **Impact Zone:** Entire port

3. **Resources required:** Organizational setup enumerated in Figure S16.2.

Figure S16.1: Action Flow Chart

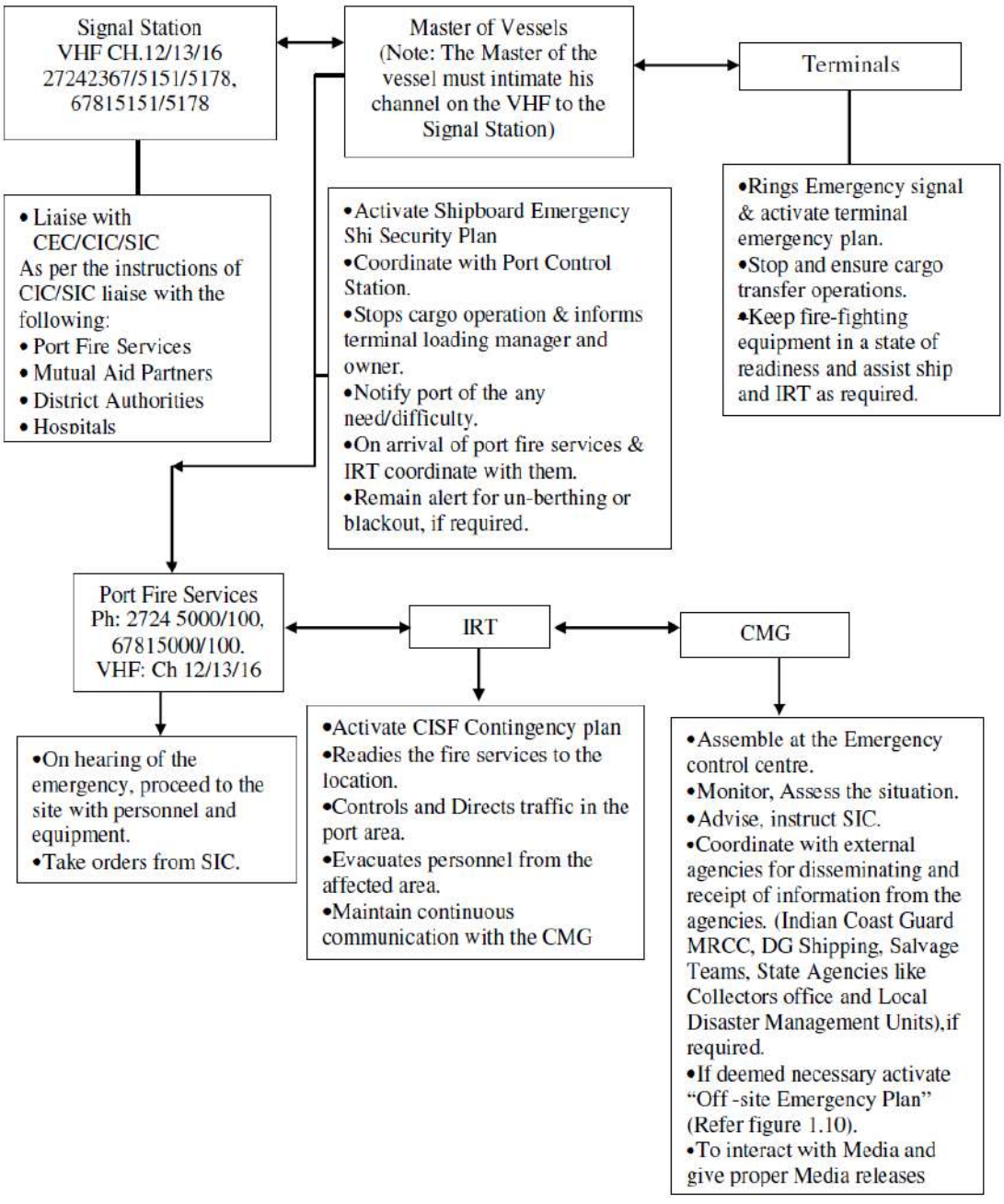
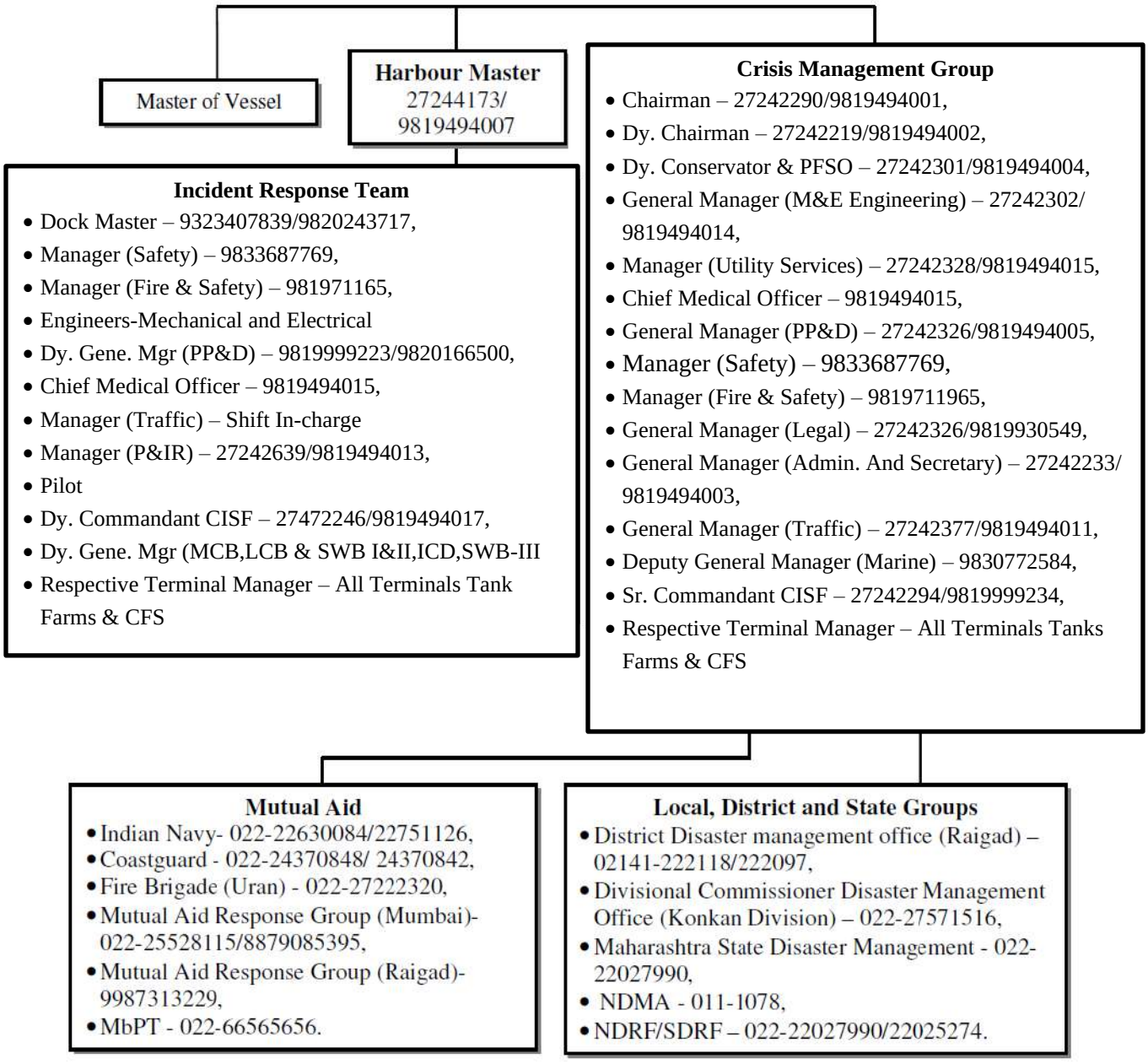


Figure S16.2: Action group



4. Action Plan

A. The Observer

Response Action	Contact
a. Port Control Station/CISF should be informed withoutdelay.	• Port ControlStation

B. CISF Should

Response Action	Contact
a. Gather the information as per CISF bomb threat checklist.	
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 Squad as required.	
e. All terminals should be informed.	
f. Port should be shut down and people inside the port should be taken to a safe location.	

C. Deputy Conservator & PFSO (Alternate: Harbour Master)

Response Action	Contact
a. Assess the situation and activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC, CISF and Port Control Station & arrange for external aid as necessary.	• SIC • CISF • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
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.	

D. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall communicate & collect all information.	Dock Master
		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 as and when required.	
Dock Master	Port Control Room Coordinator	Shall be ready for taking the instructions from CIC/SIC and evacuate/move/shift the vessel from the area.	Duty Supervisor
Master of the vessel	In-Charge of firefighting operation on board vessel	Be ready to take the vessel out of the port as per the instructions of CIC/SIC.	Chief Officer of vessel
		Coordinate with IRT leader and will be responsible for shutting down all cargo operation on board in coordination with terminal In-Charge.	
Terminal Managers	Cargo Work	Shall be responsible of shutting down of cargo operation & coordinating with JNPA and rendering necessary assistance to the SIC by providing additional firefighting & emergency equipment as required.	Assistant Terminal Manager
		Arrange to protect cargo in vicinity from damage.	
		Submits consolidated list of dangerous goods in port – Vessels in port.	
		Coordinates with ship in-charge/C & F agents/stevedores.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Keep the fire –fighting installation in a state of readiness and be in continuous liaise with SIC/CIC.	
Manager (Safety)	Marine Pollution Control Coordinator	Ensure all employees (port and contract) within port shifted to safe locations.	Safety Inspector
Sr. Commandant - CISF	Security and Evacuation	Act as per the CISF Contingency plan.	Dy. Commandant - CISF
		Controls & Directs traffic in the area.	
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
Sr. Manager (PPD)	Civil Coordinator	Assist SIC.	Manager (I, II)

Designated Officer	Role	Duties	Alternate Officer
General Manager (Mechanical & Electrical)	In-charge of Electrical Installation	Arrange for specialized equipment if required as per the instruction of the SIC.	Asst. Engineer
		Take orders from CIC/SIC with regards to power supply and shutdown.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person at the site of the accident.	Alternate Officer
Berth Managers	Traffic Coordinator	Shall prepare vessels to vacate from berth.	Dy. Manager - Berths
		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.	
General Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tank farms in port area.	Manager (Traffic)
		Coordinates with the tank truck contractors.	
		Ensure sufficient number of vehicles is available.	
		Controls traffic in the JNPA area.	
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth and be ready for providing any assistance on site.	Standby Pilot
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for shifting the vessel to the anchorage area.	Sr. Dy. Manager (Marine Engg.)

Scenario 17 - Natural Disaster (Cyclone, Earthquake, Flood, Tsunami)

1. **Precautions:** Continuous weather monitoring, Early warning system.
2. **Impact Zone:** Entire port.
3. **Resources required:** Refer Figure S17.2.

Figure S17.1: Action Flow Chart

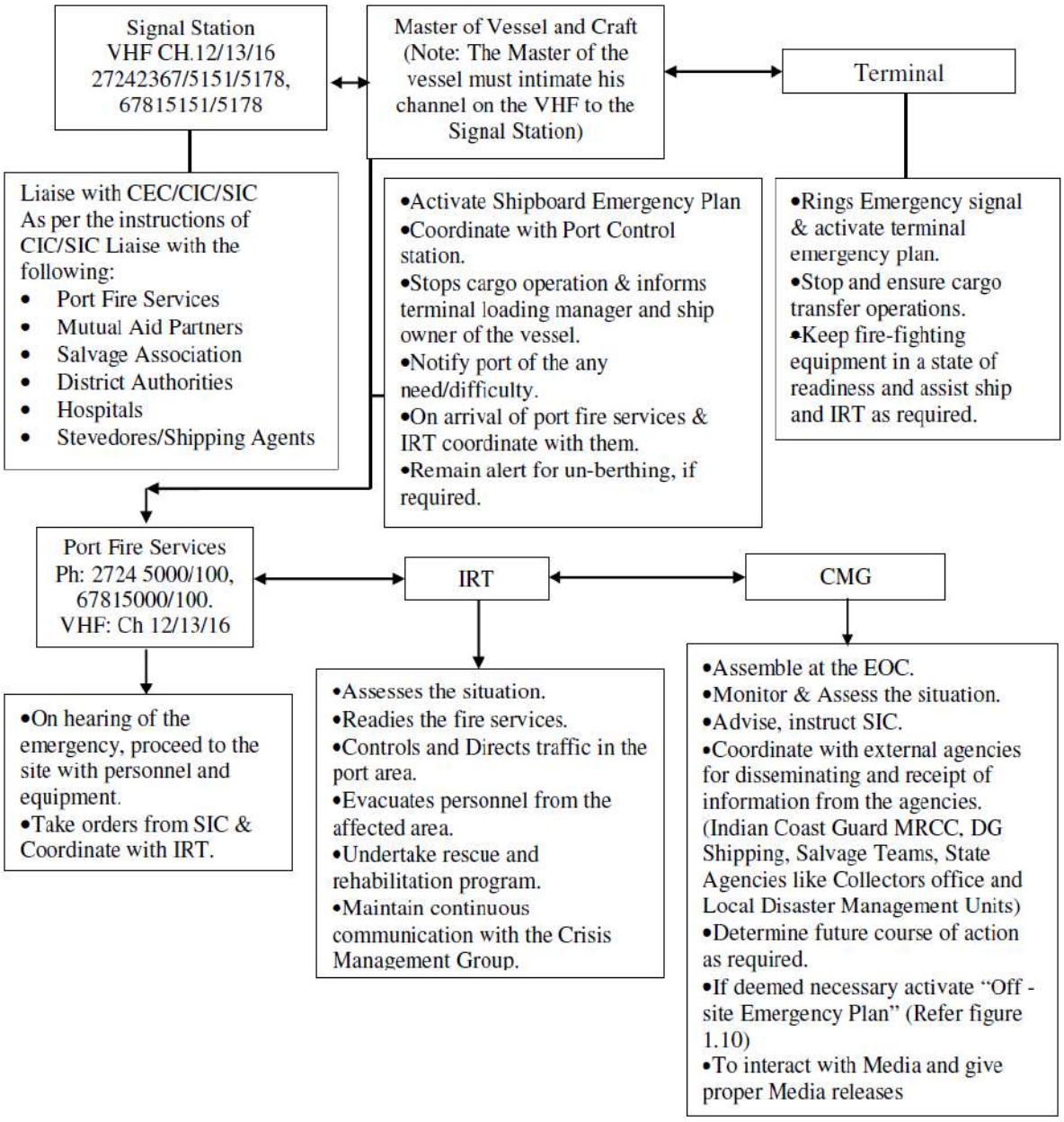
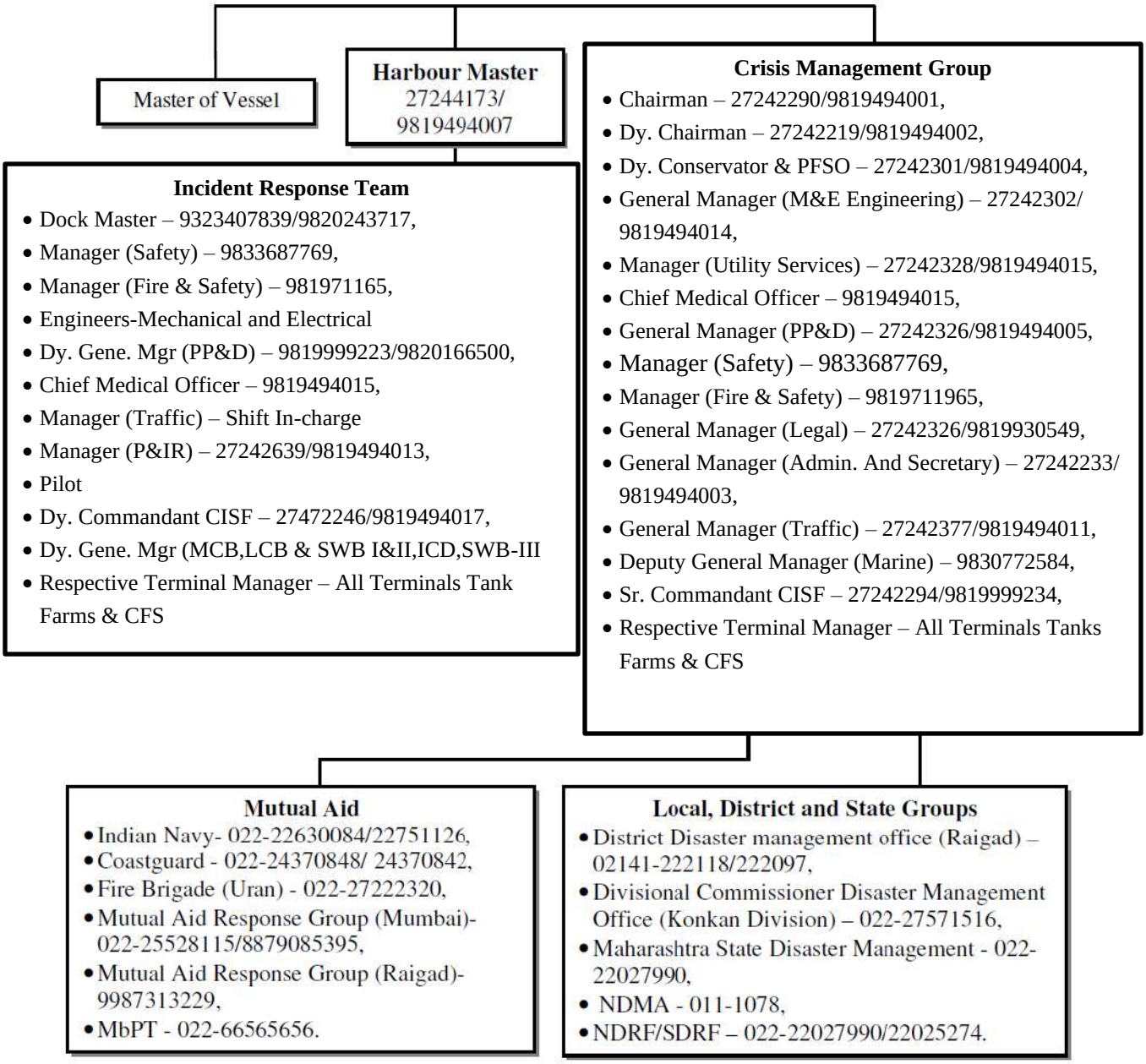


Figure S17.2: Action group



4. Action Plan

A. The Port Control Station

Response Action	Contact
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 9.2.3 and other media. Monitor the weather map either through Internet or Television and record approximate position of the weather and information about its movement as given in the news.	
c. Liaise with Master of the Vessel/Pilot.	
d. Ensure that both IT and Civil telephones, one VHF and one walkie-talkie all are operational in the Port control center. Communication to be maintained on VHF channel-13.	
e. Notify to CIC, SIC and the vessels moving into, through and inside the port. Keep CIC/SIC informed of all the messages received by telephone, VHF sets or by messenger.	• CIC • SIC
f. Notify the other Authorities and stakeholders within Port as per instructions of CIC/SIC.	• Navy • Coastguard • Stakeholders
g. 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 telephones and VHF.	• Terminal Operators
h. Inform the Dock Master/Marine Engineer of any buoys or crafts or any Port installation is seen adrift.	• Dock Master • Marine Engineer
i. Hoist signals or raise alarms, as per the warnings received by the competent agencies for issuing warnings. (for warning signals refer section 9.2.3)	
j. On behalf of Chairman/Dy. Chairman, the control center should liaise with Revenue/Police/Health. Administration/Municipal Corporation for additional assistance.	

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

Response Action	Contact
a. Should raise ships emergency alarm and activate ship board emergency action plan.	
b. Having raised the alarm, the Master will be responsible for taking all immediate steps to safeguard his ship.	
c. The Master will provide the Port Authority with details of the vessel.	• Port Control Station
d. Should follow the instruction of the CIC/SIC and be in continuous liaise with the CIC/SIC/Port control station.	• CIC • SIC • Port Control Station
e. Should be in a state of readiness to take the vessel out of the port.	

C. The terminal personnel should

Response Action	Contact
a. Activate EAP (prepared by the terminal) and informJNPA.	• Port Control Station
b. Shall be responsible of shutting down of cargo operation (as per Terminal SOP) & coordinate with JNPA and Master of the Vessel and rendering necessary assistance to the SIC and vessel by providing emergency equipment as required.	
c. Submit consolidated list of dangerous goods in port – Vessels in port. Make arrangements to protect cargo.	
d. Assist IRT and provide all necessary equipment.	• SIC
e. He will direct operation staff. Coordinate with the ship in-charge/C&F agents/stevedores.	

D. Deputy Conservator & PFSO

Response Action	Contact
a. Activate the DMP.	
b. Establish EOC and be stationed to review & assess possible developments to determine the most necessary course of action.	
c. Give necessary instructions to SIC and Port Control Station & arrange for external aid as necessary.	• SIC • Port Control Station
d. Review the situation and accordingly inform to the Chairman/ Dy. Chairman.	• Chairman • Dy. Chairman
e. Consult with Chairman / Dy. Chairman and decide on clearing of ships as soon as the cyclone is confirmed to pass in close proximity to the Port.	

Response Action	Contact
f. Plan movements of vessels such that the vessels are cleared in shortest possible time.	
g. Coordinate with external agencies/authorities such as Indian Navy and Coastguard.	• Indian Navy • 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.	

E. Duties of IRT

Designated Officer	Role	Duties	Alternate Officer
Harbour Master	Site Incident Controller	During Emergency shall proceed to the scene & communicate & collect all information.	Dock Master
		Take over the charge of control center and ensure the action plan is promulgated as per the instructionsof CIC.	
		Inform and ask Masters to keep their ships ready to proceed to the sea at short notice as per the instruction of CIC.	
		Ensure port control, hoists appropriate storm signal as per the situation.	
		Report the situation to the CIC &the CMG.	
		Keep rescue team ready with rubber boats, Life jackets etc.	
		Inform ships alongside berths to double up their moorings and provide shore gang assistance.	
		Ensure that the hazardous cargoes are shifted out of the port or secured/stored in a safe manner.	
		Ensure that the operations arebrought back to normal after the termination of the emergencyprocedure.	
Dock Master	Port Control Room Coordinator	Shall monitor the communication on VHF/any other communication medium & convey and relay messages on the advice from CIC/SIC.	Duty Supervisor
		Instruct Marine engineers to secure tugs and workboats.	
		He will maintain LOG of events.	
Manager(Fire & Safety)	Fire Coordinator	Shall take orders from the SIC.	Station Officer
		Keep fire tenders and fire-fighting equipment in a state of readiness.	

Designated Officer	Role	Duties	Alternate Officer
		Ensure the Fire tugs is properly manned and secured with double ropes and engines running in idling condition.	
		Responsible for mobilizing fire tenders, men & firefighting equipment to the scene & extend all necessary support.	
		Ensure hazardous cargo out are kept at a sheltered or safe location.	
		The port Fire & Safety Officer will make announcement in the township and the adjoining habitats area indicating the precautionary measures to be taken.	
		Liaise with State Fire brigade for any assistance.	
Manager (Safety)	Marine Pollution Control Coordinator	Ensure workers within perimeter of safety dangerous / chemical tank farms shifted to safer perimeters.	Safety Inspector
		All other workers to move out of port area.	
Sr. Commandant -CISF	Security and Evacuation	Controls & Directs traffic in the area.	Dy. Commandant-CISF
		Shall supervise evacuation of personnel from the scene at the time of emergency.	
		Ensure that all barges / small vessels are directed to go to the sheltered area.	
		The fishing trawlers and fishing crafts to be sent to safer place.	
		Till normality is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.	
		Round the clock patrolling duty shall be introduced along the electric lines to guard against the removal of copper wires which are likely to be grounded during cyclone.	
		A special task force to be set up by the CISF for the rescue operation.	
General Manager (Traffic)	Traffic Coordinator	Submits consolidated list of dangerous goods in port-tank farms in port area.	Manager (Traffic)
		Coordinators with the tank truck contractors.	
		Ensure availability of vehicles and mobilize and dispatch sufficient number of vehicles to the site during emergency.	
		Controls traffic in the JNPA area.	
Chief Manager (PPD)	Civil Coordinator	All types of cranes, forklifts, heavy earth moving equipment to be secured in a safe manner.	Manager(I, II)

Designated Officer	Role	Duties	Alternate Officer
		Keep enough number of cement bags ready as per SIC instructions.	
		Diesel engines for raw water and clean water, all pump house equipment and all generator sets meant for water supply shall be tried out and kept ready.	
		As soon as the contingency plan is made operational all the water tanks should be filled up and standby arrangement for supply of water to be made.	
General Manager (Mechanical &Electrical)	In-charge of Electrical Installation	Shall be responsible for Electrical supply to vital equipment and systems at the berth.	Asst. Engineer
		All Sub Stations, Power Control rooms will be manned round the clock.	
Sr. Dy. Chief Medical Officer	Medical Coordinator	Shall be responsible to organize and keep first aid team with ambulance & necessary medicines to attend to any injured person.	Alternate Officer
Duty Pilot	In-Charge of Pilotage	Shall be ready on site for taking the ship out of berth or will not bring the ship to berth as per the instruction given by CIC/SIC.	Standby Pilot
		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 ships to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.	
		Maintain a close liaison and co- ordination with the Operations In- charge.	
		Take all necessary steps for the safety of the Port crafts.	
		Ensure all other crafts are placed at safe place and properly secured excepting one pilot launch and one stand by launch used for inspection and emergency duties.	
		Ensure all barges will be secured at safe place along with emergency squad will make frequent round (minimum two hourly) to check the safety of Port Crafts.	
		Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.	

Designated Officer	Role	Duties	Alternate Officer
		Inform the signal station immediately in the event any craft is seen adrift or any other Port installation is seen in danger. Arrange an Emergency Maintenance team.	
Deputy General Manager (Marine Engg.)	ME Coordinator	Responsible for organizing tugs for combating the fire and rescue.	Sr. Dy. Manager (Marine Engg.)
		Hire additional craft as necessary.	
Floating Craft		Masters will shift their respective crafts at suitable places as directed by the Harbour Master and will secure them suitably with additional moorings.	
		Masters of respective crafts will be responsible for proper securing and safety.	
		Masters will keep the engines of their crafts ready to proceed at short notice as per the instructions of the Operation In-charge.	
		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.	
		The Floating Crafts shall be in constant touch with Signal Station.	
Workshops		Workshop should be manned continuously and should be ready with all the necessary equipment to attend during emergency.	
Material Management		During cyclonic season sufficient stock of stores like AC 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.	
		All the materials which are likely to get damaged in rain are covered with tarpaulin.	
		Store Supdt. and store keeper along with other staff required to issue materials.	
Data Entry and Storage Cell		Start downloading isobaric internet pictures and reports 6 hourly after Signal No.1 and 3 hourly after signal 3.	
		Give copy to CIC and SIC and they in turn will apprise the Deputy Chairman and Chairman.	

Scenario 18 - Leakage of Radioactive Materials

Operational Priorities

To minimize the health effects of a radiation incident, JNPA will:

- Assess the risk to people and recommend interventions.
- Provide information for release to public.
- Provide technical information about the radiological material released in the incident.
- Identify activities with the potential for a high level of exposure.
- Recommend safety procedures for first responders, including advice on protective gear and exposure limits.
- Assist the on-scene Incident Commander by providing field personnel to monitor the site for radiation levels and monitor first responders for exposure levels.
- Evaluate the long-term health consequences and recommend follow-up actions for environmental decontamination and medical evaluation.

Preparedness for Radiological Dispersal Device

The tasks to be undertaken for preparedness involve the following.:

1. The affected persons and area will have to be monitored for contamination levels.
2. The first responders have to be suitably equipped to measure the radiation levels and have the necessary kit to protect themselves.
3. There will also be a need to monitor a large number of persons after an RDD explosion and handle large amounts of radioactive wastes arising out of change of clothing, showering or washing.
4. A list of the agencies to be contacted by the public in case of a suspected presence of radioactivity will be made available to all citizens.

Response Mechanism

Response measures are those which are taken instantly prior to, and following, a Radiological emergency aimed at limiting injuries, loss of life and damage to property and the environment and rescuing those who are affected or likely to be affected by it.

Activity

- Declare an off-site emergency.
- Activate an offsite emergency control centre.
- Arrange an immediate deployment of various ERTs in affected sector(s).
- Based on the emergency monitoring teams from off-site areas initiate countermeasures (such as sheltering and prophylaxis) of different grades.
- Arrange an evacuation of the public to safer places.
- Activate systems of the State machinery to meet the necessary requirements of the public in the camp till the people are in a position to go back to their homes after the affected areas are cleared and declared safe.
- Deploy QRMTs consisting of physicians, triage officer, nurses and paramedical staff.
- To ensure that necessary arrangements at evacuation/relief centres is made with sufficient availability of:

    - Food,
    - Water,
    - Blankets/Clothing
    - Medicines
    - Lighting
    - Sanitation and hygiene etc.

- To ensure necessary security arrangements for the personals (Emergency responders/relief teams) who are working at Relief Centres and involved in distribution of Relief Materials.
- To ensure that law and order is maintained at evacuation/relief centres and in the affected areas as well.
- Make an arrangement for providing useful, timely, correct, consistent, and appropriate information to the public in the event of a nuclear or radiological emergency.
- Ensure that the information to media/general public about the coordinated response is released in an organized manner.
- Identify and characterise the source and its origin.
- Initiate a quick and reliable monitoring methodology to detect the onset of an accident/emergency condition and assess its magnitude.
- Communicate the situation to fire fighting and medical services, police, civil defence, transport, and other agencies.
- Support decision making on protective measures for the population and the environment.
- If required, distribute iodine tablets at the earliest (iodine prophylaxis).
- Ensure that the actions taken by the various agencies are well coordinated.

- Send prior information (in respect of dos and don'ts) to those likely to be affected by the accident/emergency. These include:

    - Evacuation/temporary relocation of the affected population, if required.
    - Withdrawal and substitution of supplies of food and drinking water (based on actual measurement of contamination found in food and drinking water).
    - Animal husbandry and agriculture department personnel to ensure radiological protection following a nuclear emergency.
    - Initiation of the recovery phase at an appropriate time.

- Perform life-saving rescue and emergency first aid for seriously injured.

    - Remove injured persons as far away as practical from the incident scene, especially in case of fire.
    - If medical attention is needed, assist in arrangements for medical assistance.
    - The medical personnel will be informed that radioactive contamination might exist on the victims and/or their clothing.

- Identify all those who may have been exposed to a possible release of radioactive material.
- Identify those involved with the incident or potentially contaminated by the incident at the scene, except those requiring emergency medical evacuation.
- All individuals will be monitored and decontaminated, if necessary, and cleared after further medical treatment and discharged.
- Record names, addresses, destinations, and telephone numbers of those individuals who cannot be persuaded to stay at the incident scene.
- Prohibit eating, drinking and smoking in the incident area

6. MITIGATION

6.1 FIRE & EXPLOSION RESPONSE PLAN

The JNPA Fire Fighting Service is operated by Fire Service which is headed by Chief Fire Officer is assisted by Dy. CFO, Inspectors and team which operates on an 8 hour shift round the clock.

METHODS OF DEALING WITH DIFFERENT TYPES OF FIRES & LEAKAGE

Fires from minor oil spillage on deck or jetty		Use dry chemical or foam extinguishers or water fog or water spray
Fire from large spillage of oil or burst hose on deck or jetty		Use large dry chemical appliance and follow up with foam or water fog/spray. Cool surrounding area/risks with water spray
Fires from spillage of oil on surrounding waters		Emulsification of oil with water jets or apply foam coverage as appropriate
Ammonia Gas		Use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. from upwind position
Phosphoric/Sulphuric Acid		Dry powder, carbon dioxide (CO_2), water fog or spray
-Electrical Fires -Fire in buildings-canteen		Switch off power-use CO2 or dry chemical extinguishers
Fire in office involving combustible material		Use dry powder fire extinguishers-water spray, Use Breathing apparatus.
LPG AND LNG Fires		Should not be extinguished until source of leakage is under control. Dry chemical is the most effective. Cover affected area with water spray to reduce radiant heat.
Fire in cargo tanks		Use foam or steam smothering.

DEPARTMENTAL ACTION - TANKER ON FIRE AT THE OIL JETTY

DEPT	ACTION
Marine & Vessel	Port Control informs HM and Chief Fire Officer the status on VHF 16/12. Master of the vessel ceases all cargo or bunker operations close the manifold valves, disconnect hoses and consults with HM for unearthing & also ensures the immediate action of the vessels Firefighting squad. If necessary Master may request for additional resources and/ or-evacuation of injured. **PORT CONTROL** Communication Officer informs CFO-DC-HM-DM-TM-Chairman- Dy Chairman, Secretary of the incident. **HM** Assess works together with CFO and Master to ascertain the status and crisis level. HM Informs DC of Central Crisis Management Group the status and Crisis level, places Pilots on Stand by for shifting out vessel- directs firefighting tugs - Keeps mooring crew and launch standby to unberth vessel. **DC** maintains close liaison with HM and monitors progress and strategy of containment and extinguishing.
Fire	CFO ensures that fire tenders are ready at the jetty and takes over control from Jetty Fire Service to extinguish fire
Traffic	TM reconfirms stoppage of cargo operations to HPCL & informs TM to close down the nearby ore handling berth if fire is likely to spread. TM monitors the situation and keeps Chairman informed about the incident.
Elec & Mech Department	EE ensures isolation of the electric power on berth.
CISF	Commdt CISF cordons area .Executes Search and rescue with Fire. Keeps Commdt appraised and requests for additional resources if required.
Medical	Dy CMO keeps ambulance standby by at berth and provides First Aid and burn treatment to the injured.

DEPARTMENTAL ACTION - FIRE AT THE GENERAL CARGO BERTHS

DEPT	ACTION
Marine	Port Control station informs HM and CFO the status on VHF 16/12 and the communication Officer at Port Control station informs CFO-DC-HM-TM-Chairman- Dy Chairman, Secretary of the incident. **HM** activate the On Site Action group to extinguish the fire. HM Informs DC of Central Crisis Management Group the status and Crisis level, places Pilots on Stand by for shifting out vessel- directs firefighting tugs to standby ships side -Keeps mooring crew and launch standby to unberth vessel Fire Service arrives with fire tenders and resources and takes over to extinguish fire and assists in Search and Rescue operation.
Traffic	TM ensures stoppage of cargo operations. TM of On Site Action Group keeps TM informed and obtains authorization to close down the nearby cargo berth if fire is likely to spread. TM monitors the situation and keeps Chairman informed. On termination of the incident, TM monitors the early restoration of the traffic operation.
Elec & Mech Department	EE ensures isolation of the electric power on berth
CISF	Dy Commdt CISF cordons area. Executes Search and rescue with CFO. Keeps Commdt appraised and requests for additional resources if required.
Medical	Dy CMO keeps ambulance standby by at berth and provides First Aid and burn treatment to the injured.

DEPARTMENTAL ACTION - ADMINISTRATION BUILDING FIRE

DEPT	ACTION
Administration	First the discover-Raises Alarm (breaks glass-Uses Fire extinguishers to extinguish fire and Call 102. Dy Secretary will supervise the action. Secretary will be the overall in-charge of the action group. Water should not be used for Electrical Switch Boards or on wiring as soon as an electrical fire is detected first the main switches should be put off. Handicapped persons should be helped to the outlet stairway which is unaffected by fire or smoke**.** Attendance register for the day and other important papers should be collected by the Administrative Officers present and taken along with them. The Sr. most Section Head on each floor will be last to leave the premises and prior this person does so, he will make sure that all the electrical switches are off. After incident is terminated, Secretary arranges alternative office space.
Fire	As soon as the information is reached, the fire personnel will proceed to the floor on fire and will commence extinguishing the fire with the installed water hose and extinguishers. The fire service personnel will assist in transfer of sensitive documents, evacuation and shut down of equipment initiates the search and rescue operations.
Civil Engineering	Dy. CE along with the on-site group survey & assesses the cost to rectify the damage portion of the building.
Elec & Mech Engineering	EE ensures isolation of the electric power to the administrative building.
CISF	Dy. Commdt CISF cordons area .Executes Search and rescue with CFO. Keeps Commdt appraised and requests for additional resources if required.
Medical	Dy CMO of On Site Action Group keeps ambulance standby by off Administration Building. Provides First Aid to the injured.

DEPARTMENTAL ACTION - FIRE AT CARGO STORAGE SHED

DEPT	ACTION
Traffic	Shed I/c raises alarm (breaks glass and uses Fire extinguishers to extinguish fire Call 102(Fire). Puts the Mains switch off and informs Sr. DTM of on-site action Group and TM of Central Disaster Management Group. Shed I/c Mobilizes all manpower in the area surrounding the site to bring the firefighting appliances in the area, to extinguish the fire. The senior most Traffic official on site will mobilize all the work force, labour and cargo handling appliances available in the area. Addl. TM ensures the removal of all the unaffected cargo from the shed to a safe place. with special reference to hazardous cargo. Sr. DTM ensures that the details of types of cargo and quantity of cargo in the shed should be kept ready and given to of Port Fire Service who comes first to the scene of the fire. Dy. TM shall ensure that the labour working inside the shed are assembled for a head count. Fire Service arrives with fire tenders and resources and takes over Fire Fighting & conducts search and rescue assisted by CISF.
HM	HM Informs DC of Central Disaster Management Group the status and Emergency level of the incident & ensures pilots are on Stand by for shifting out vessel opposite the shed if required. Also directs firefighting tugs to spray sheds if required. Keeps mooring crew and launch standby to unberth vessel
Civil Engineering	Addl. CE along with the on-site group survey & assesses the cost to rectify the damage portion of the Cargo storage shed.
E& M Department	EE ensures isolation of the electric power to cargo storage shed.
CISF	Dy. Commdt CISF cordons area .Executes Search and rescue with Fire Service. Keeps Commdt appraised and requests for additional resources if required.
Medical	Dy CMO of On Site Action Group keeps ambulance standby by off Administration Building. Provides First Aid to the injured.

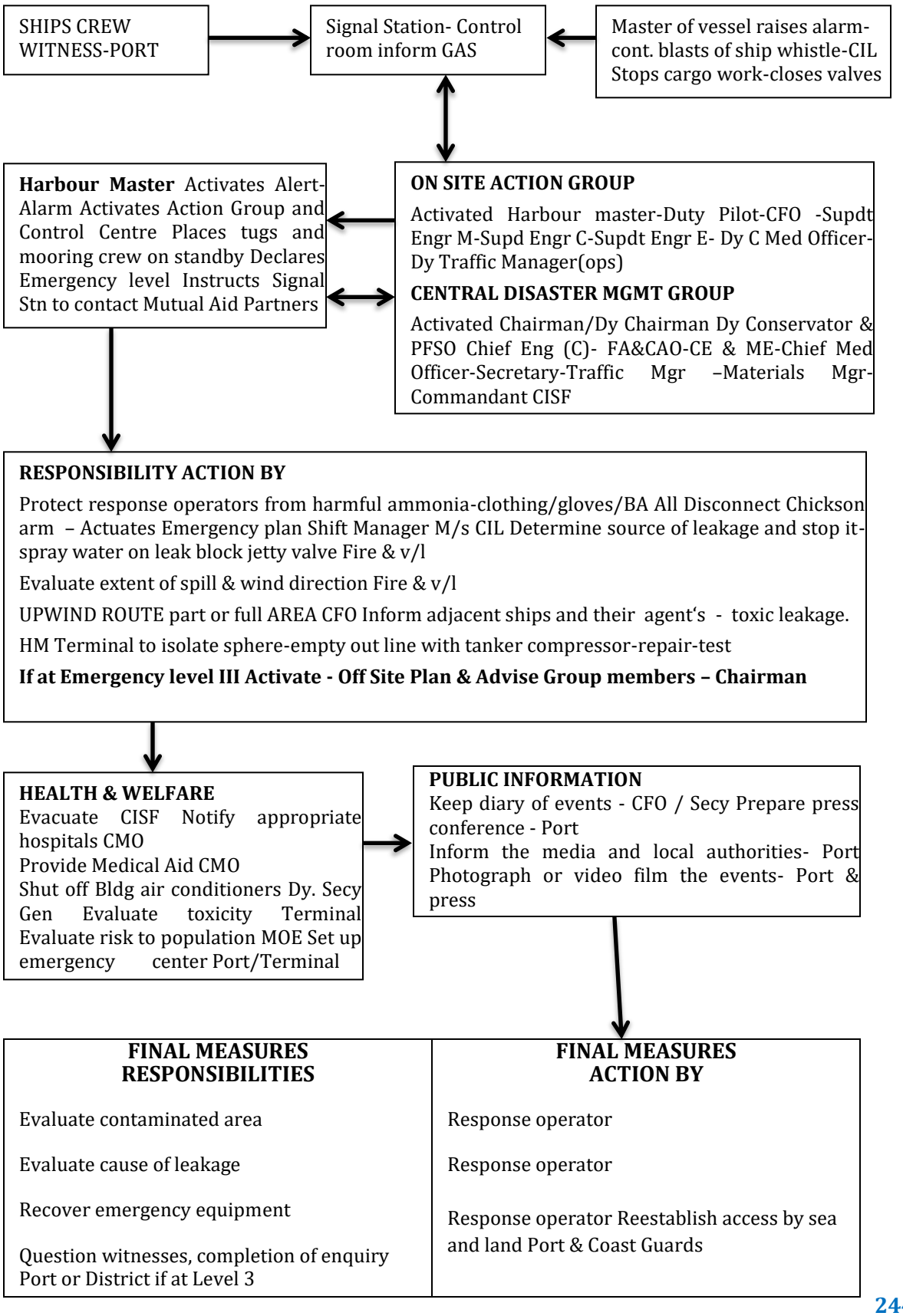
DEPARTMENTAL ACTION - OIL OR CHEMICAL POLLUTION

<table>
<tr><th>DEPT</th><th>ACTION</th></tr>
<tr><td>Marine and Vessel</td><td>Port Control contacts Dy. Conservator & PFSO/ Harbour Master about the incident.
HM Advises DC the level of emergency
Keeps tugs, pilot, mooring boats standby and oil recovery craft, tugs for dispersant. Port Control informs Fishery Department of the pollution
Dy Conservator & PFSO will inform the status to Chairman and ensures that the penalty imposed if the incident is caused by the vessels negligence is in accordance with the Major Port Trust Act. Sends notice to Master holding vessel and owners liable for the incident indicating projected expenses.
The Master of the Vessel will submit the oil Spill report to the Dy Conservator & PFSO signed and stamped with vessels official seal in the following format.
• Name of the Vessel & IMO no
• Name of the Master
• Call Sign/Flag/Year Built/Class
• Port of Registry
• Owners Name, address fax/tel
• Charterers Name, address fax/tel
• Name of P& I Club & Local Corr
• Copy of oil record book
• Date and Time of Spillage
• Cause of Spillage
• Location
• Type and quantity spilled
• Immediate action taken
• Weather conditions</td></tr>
<tr><td>Fire</td><td>Fire Service arrives with fire tender and stands by in case there will be fire.</td></tr>
<tr><td>Traffic</td><td>Addl. TM reconfirms stoppage of cargo operations to tank farms.</td></tr>
</table>

DEPARTMENTAL ACTION - AMMONIA GAS RELEASE

DEPT	ACTION
Marine and Vessel	**A-VESSEL ACTION** Sounds internal alarm & contact Port Control and CFO about the status on VHF 16/12 and initiates the vessel response plan. Ceases all cargo operations and advises the loading master to close all the manifold valves & disconnects hoses and consults with HM for unberthing. **B- PORT CONTROL STATION** Radio Operator informs DC-HM-TM-Comdt CISF-CFO HM appraise DC about the level of the incident and activates the on-site action group and instruct all other vessel at berth to take precautions due to the leakage. Keeps tugs, launches and mooring crew stand by to shift the vessel from the berth.
Fire Service	CFO arrives off berth and positions themselves upwind with suitable protective clothing with face masks, gloves and breathing apparatus and coordinates with the on-site action group.
Traffic	**TM** confirms stoppage of cargo operations HM discusses with the Jetty shift Manager of and CFO and Master to ascertain the status and emergency level, if the level is II or III then informs DC of Central Disaster Management Group.
E&M Department	Ensures adequate lighting near the area and assembly areas
CISF	Commdt CISF cordons off area, and arranges evacuation from upwind site
Medical	Dy CMO of On Site Action Group keeps ambulance ready for medical treatment.
Administration	Secy assists to Chairman to prepare media statement & reports to MOS.
Marine	DC to ensure that the master of the vessel gives details in the format given below and contact the agent of the vessel for compensation if the incident is due to the vessel.
	• Name of the Vessel & IMO no • Name of the Master • Call Sign/Flag/Year Built/Class • Port of Registry • Owners Name, address fax/tel • Charterers Name, address fax/tel • Name of P& I Club & Local Corr • Copy of COFR & oil record book • Date and Time of Spillage • Cause of leakage • Location Quantity leaked

SUMMARY FLOW CHART-CONTINGENCY PLAN AMMONIA GAS LEAKAGE



COLLISION : PORT FLOTILLA AND VESSELS CALLING AT JAWAHARLAL NEHRU PORT

SHIPBOARD-PORT EMERGENCY PLAN	COLLISION	
Action to be taken	**ACTION BY PORT**	**ACTION BY VESSEL**
1. Stop the vessel and take appropriate action. **2.** Sound Emergency Alarm: **3.** Check for possibility of oil pollution		Master
1. Establish communication with other vessel and exchange information **2.** Advise other vessels to keep clear-Hoist NUC Lights - Advise port for assistance **3.** Advises agents of status requests surveyors-Class-P&I- Salvage association- **4.** Secure evidence and maintain adequate records	HM with on-site action group.	
1. Inspect/assess damaged area & in - case of oil leakage determine whether de-berthing of the vessels will increase oil spill rate. **2.** Ascertains oil pollution-ascertains leak source **3.** Harbour master and Master of vessel to inspect vessels **4.** Sounds all bilge, ballast and fuel tanks **5.** Transfer oil from leaking tanks **6.** Effects damage control and temporary repairs to stop oil leakage if any with the assistance of port action group and underwater welding team or salvage group	HM with on-site action group Coast Guard + Salvage efforts	Vessel emergency action group team
1. Provides First Aid	HM + Dy. CMO.	
1. Attend engine room controls and services **2.** Investigate engine room for damages and water ingress **3.** Check steering gear **4.** Reports status of the main engine and auxiliaries to Harbour master	HM	Vessel Engineering team.

FIRE / EXPLOSION

CHECKLIST FOR USE IN EMERGENCY		
SHIPBOARD EMERGENCY PLAN	FIRE / EXPLOSION OFF BERTH	
Action to be considered	**Action taken**	**Responsibility**
IMMEDIATE ACTION Consider sounding Emergency Alarm: Initiate vessel emergency response procedure:	Yes/No	Person discovering incident Officer on duty
INITIAL RESPONSE The CIC should: 1. Instruct Ship Master to raise ship emergency alarm and activate ship board emergency plan. 2. Stop transfer operation (as per SOP). 3. Terminal and Port should be informed of any incident on the ship without delay. 4. Instruct ship to remain prepared to un-berth the ship to the safe area (high sea). 5. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	Yes/No Yes/No Yes/No Yes/No	Ch. Eng./ Officer on duty
SECONDARY RESPONSE The terminal personnel at berth should: 1. First activate EAP by informing the port VTS. 2. Area should be cordoned off. 3. In the event of a fire, Foam or Dry Chemical powder or CO2 should be used for firefighting. 4. Surrounding equipment / installation to be kept cool by water jet from monitors.	Yes/No Yes/No Yes/No Yes/No	Chief Eng. Ch. Off./Deck Duty heads

BUNKER SPILL/LEAKAGE

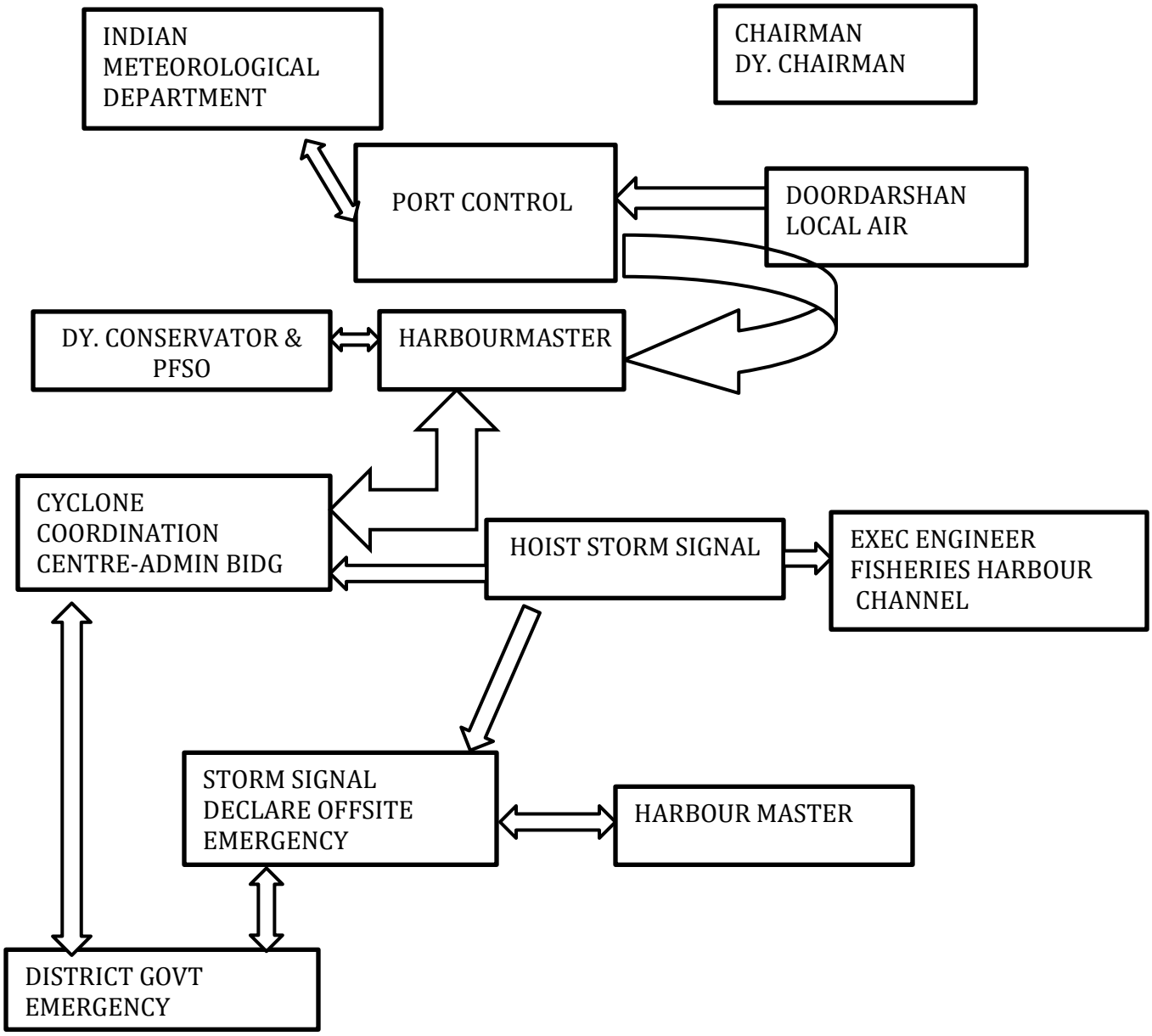
CHECKLIST FOR USE IN EMERGENCY		
SHIPBOARD OIL POLLUTION EMERGENCY PLAN		BUNKER SPILL/LEAKAGE
Action to be considered	**Action taken**	**Responsibility**
IMMEDIATE ACTION Consider sounding Emergency Alarm: Initiate vessel emergency response procedure:	Yes/No	
SECONDARY RESPONSE The CIC should: 1. Stop transfer operation (as per SOP). 2. Terminal should be informed of any incident on the ship without delay. 3. Personnel to remain on standby all throughout the period of unloading operation to disconnect metal arms. 4. Ship to be instructed to remain prepared to un-berth to safe area (high sea). 5. The siren should be continued till the ship is taken to a safe location as per CIC instructions.	 Yes/No Yes/No Yes/No Yes/No Yes/No	Ch. Eng./ Officer on duty
FURTHER RESPONSE The terminal personnel should: 1. First activate Jetty EAP by informing the port VTS. 2. Shut off isolation valve on pipeline at the berth (action as per SOP). 3. Area should be cordoned off. 4. Pour foam on spillage to reduce rate of vaporization. 5. In the event of a fire, Foam or Dry Chemical powder or CO2 should be used for firefighting. 6. Surrounding equipment / installation to be kept cool by water jet from monitors.	 Yes/No Yes/No Yes/No Yes/No Yes/No Yes/No	 Chief Eng. Ch. Off./Deck Duty heads

VESSEL GROUNDING IN PORT- DETAILED ACTION BY PORT

ACTION BY MARINE DEPT	DETAILS OF SPECIFIC ACTION
Master/Pilot	Contacts Port Control and informs position of incident
Port Control	Informs HM, Dy Conservator & PFSO and Coast Guard All vessels arriving and departing Maharashtra will be informed of the incident
Dy. Conservator & PFSO	Informs coast guard for rescue of the grounded vessel.
Harbour Master	Activates the on-site action group and assesses the situation, tide, wind direction, & inform DC. Through the Port Control advises all Pilots to report on duty
Sr. Pilot	Organizes available tugs, launches, and keeps crew stand by and awaits instructions of the HM/Dy Conservator & PFSO
Hydrographic Surveyor	Proceeds by survey launch to vessel and obtains soundings around the vessel by the echo sounder and the hand lead.
Master of grounded vessel	Records soundings of all tanks and also records draft, arrange soundings by hand lead around the vessel. Examines the soundings and draft around the vessel for transfer of bunkers, ballast or shift cargo to refloat vessel. Tow ropes to be kept ready
Master and Harbour Master	Commence preparations for towing operations 2 hours before high tide . Vessel engines to be kept stand by to assist in the refloating operations. Takes all anti oil pollution measures.
Port, Navy or Coast guard & Salvage efforts	Hull leakages to be attended to by underwater welding by the Navy/coast guard or other available diving firms.

SINKING OF VESSEL IN PORT

ACTION BY PORT Marine Dept	DETAILS OF SPECIFIC ACTION	ACTION BY VESSEL
HM	Ensures vessel is cleared of the channel/turning basin or berths to suitable area for normal traffic.	Activates the vessel action group
Port Control	Informs HM, Dy Conservator & PFSO of the accident.	
HM and Pilots	Proceeds to the area with Tugs and conducts Rescue operations.	Lower life boats
Dy Conservator & PFSO	Appraise to the Chairman and Dy Chairman and members of the Central Disaster Management group about the incident.	
HM / Navy / Coast Guard	HM to initiates the rescue operation of the person on board.	



CLASSIFICATION OF TROPICAL DISTURBANCES OVER THE INDIAN SEAS

Classification Of Tropical Disturbances	Speed kmph	Speed knots
Low	< 31 kmph	< 17 knots
Depression	31 – 51	17 – 27
Deep Depression	52 – 62	28 – 33 kts
Cyclone	63 – 87	34 – 47 kts
Severe Cyclone	88 – 117	48 – 63 kts
Very Severe Cyclone	118 – 221	64 – 119 kts
Super Cyclone	222 kmph & above	120 kts & above

6.2 CYCLONE CONTINGENCY PLAN

The Cyclone Contingency Plan will come into force as soon as the storm **warning signal No. 5 or** higher is hoisted or when the Port organization has gathered enough data to **forecast that a cyclone threat is close.**

1. The Cyclone station will come into operation at the Signal Station.
2. The Harbour Master will be in charge of the Cyclone Station.
3. Storm warning signals will be hoisted at the Cyclone Station.
4. HM will inform the Chairman, Dy Chairman and heads of Depts by telephone/Mobile the status of worsening weather conditions and storm signals.
5. A cyclone coordination center will be made functional in the Administrative Building headed by Secretary.
6. The Cyclone Coordination Centre will be in constant touch with Port control and District, Local Administration for rescue and relief operation.
7. All other departments to operate their respective control rooms. Port control, cyclone co- ordination center and control rooms will function round the clock and will be closed only after obtaining the necessary orders from the Chairman.

6.3 MARINE DEPARTMENT

I- HARBOUR MASTER

Under the overall supervision and responsibility of the HM, the specific duties of marine personnel will be as below:

1. He will be responsible for the operation of the Signal Station and will issue necessary standing orders for the purpose.

2. He will keep close liaison with Radar Station, Police Wireless Station, Coast Guard and Ships in Port regarding weather conditions.

3. He will prepare special signals and promulgate them to the Masters of the vessels, dredgers, tugs and any other crafts in Port. He will inform the Masters of all vessels at the berths to double the moorings, put out insurance wires and to keep engine ready to proceed out to sea if situation warrants. Decision regarding sending ships to the anchorage will be taken depending on the strength of the wind likely to be encountered and number of vessels in the Port.

4. He will maintain a close liaison and co-ordination with the Marine Engineering Supt. (MES) for arranging staffs for manning the Port Crafts.

II- PORT CONTROL

1. The staff of Port Control will remain on duty until they are relieved by next shift staff or till alternative arrangements are made or till the storm has passed or as per the HM instruction.

2. Every two hour 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.

3. One Aldis lamp with battery will be kept ready at signal station.

4. The Port Control will maintain a continuous watch on channel 16. Port Control will keep Harbour Master informed of all the messages received by telephone, VHF sets or by messenger.

5. Port Control will inform the Harbour Master of any buoys or crafts are seen adrift or any Port installation is seen or informed to be in danger.
    1. The staff on duty will have sufficient provisions to stay on duty for a period ranging from 24 hours to 48 hours.
    2. Port Control receiving any weather related facsimile report will pass on to the HM.
    3. Continuous watch to be kept on CWDC. On receipt of any warning, the same shall be reported immediately to the cyclone co-ordination center.
    4. Port Control will be responsible to ensure that Weather messages are intimated to the Executive Engineer, in charge of Fishery Harbour on Channel 6 over VHF.

III- TIDAL OBSERVATORY-

The Gauge Clerk will record the range of tides, times and heights of high and low water who will in turn apprise the Dy Conservator & PFSO / HM and or Sr pilot on duty of the actual and predicted tides.

IV- Hydrographic Surveyor /PILOT

The above officers will assist the HM at the Cyclone Station. One Pilot has to be kept standby to proceed on board anywhere in the Port as required.

V- Master Tug (Floatilla)

1. Master Tugs (Flotilla) will detail one shore gang consisting of minimum one Serang, one Tindal and 10 laskars to remain on duty as emergency duty squad unit being relieved by the next shift staff or until Harbour Master instruction.
2. Master Tugs (Flotilla) will take all necessary steps for the safety of the Port crafts and should ensure that all other crafts are placed at safe place and properly secured excepting one pilot launch and one stand by launch used for inspection and emergency duties.
3. He along with emergency squad will make frequent round (minimum two hourly) to check the safety of Port Crafts.
4. Fender and extra lengths of ropes/wires will be kept ready so as to attend to any craft whose moorings may part.
5. Master Tugs (Flotilla) will inform the cyclone station immediately in the event any craft is seen adrift or any other Port installation is seen in danger
6. He will also keep a listening watch on his walkie talkie set for information.

6.4 MASTER OF TUGS / PILOT LAUNCHES AND OTHER LAUNCHES

1. Masters of respective crafts will instruct their staff to remain on board until they are relieved by next shift staff or Sr Duty Pilot releases them from duty.
2. Masters will shift their respective crafts at suitable places as directed by the Harbour Master and will secure them suitably with additional moorings. Masters of respective crafts will be responsible for proper securing and safety.
3. Masters will keep the engines of their crafts ready to proceed at short notice as per the instructions Harbour Master.
4. Extra tenders will be kept ready on board of the Tug for use as required.
5. If any craft is seen adrift or any other port installation is seen in danger, the Master of the crafts will immediately inform the cyclone station.

The cyclone mitigation team shall be headed by Depy. C.E. & Dy C.M.E. with Engineering Supdt ., Dy. CE (Electrical) in the control room.

The Departmental vehicles as well as the hired taxis of the department shall be deployed for the above purpose.

6.5 PRECAUTIONARY MEASURES

1. Cyclone warning signals shall be communicated to all field units from the control room.
2. The field units shall communicate the signal to all the staff of the Divisions.

6.6 GENERAL FUNCTIONS OF FIELD UNITS

1. All the equipment shall be properly secured.
2. Safety of workmen on duty shall be given priority during work
3. Operator‘s cabin doors of all the equipment and vehicles shall be kept shut.
4. Important documents/files/records at site must be stored well above the floor.

Main Control Room:

1. Power should be shut-off, breaker should be made-off and doors should be closed.

Port Electrical Division

1. On receipt of directive from the EE , the power supply of main sub-station to be made off and communication system from control room to the sub-station to be kept operative.
2. Walkie talky handsets must be made available in all the substation for establishing communication
3. Two emergency vehicles should be kept stand-by for attending to various duties.
4. EE will have a temporary advance if required to meet the contingency expenditure.

Marine Engineering Division

1. Engine room entrance doors, sky lights etc. of all the floating crafts to be kept shut.
2. All the heavy equipment and vessels must be secured in sheltered locations and operator‘s cabins must be kept shut.
3. Special care shall be given for securing the crane boom.
4. Marine Engineer Superintendent will have a temporary advance if required to meet contingency expenditure.
5. Crafts are to be manned as per Marine Engineer Suptd.

Harbour Master Division

1. All port tugs and launches are to be secured in a safe place with good mooring ropes.
2. Water tight doors, skylights, exhaust flaps have to be kept shut to avoid ingress of rain water.
3. All the deck openings, sounding pipes, air vents, booby hatches etc. should be shut properly.
4. All the crafts have to be manned as per direction of Harbour Master.
5. Harbour Master shall ensure that vessels are having adequate fuel, fresh water, provisions for at least three days.

6.7 CIVIL ENGINEERING DEPARTMENT

1 - Public Health Division

Executive Engineer, Public Health Division will ensure the following:

1. The staff as per usual shifts is deployed at each of pump house during cyclone.
2. A sufficient quantity of bleaching powder, alum etc. and the water treatment plant is kept ready for water treatment during cyclone period.
3. As soon as the contingency plan is made operational all the water tanks should be filled up and standby arrangement for supply of water to be made with special provision for the hospital.

2 – GM (I & II) Division

The following actions will be taken:

1. The Executive Engineer will post one Asst. Engineer exclusively to look after navigational aids, fenders; transit shed doors and roofs etc. along with necessary staff.
2. The Executive Engineer will deploy one Asst. Engineer along with necessary staff to look after the shore protection wall condition & if any breach is noticed along the side of the shore protection wall, immediate steps should be taken up for its repair.
3. For the above purpose he shall keep ready 3,000 to 4,000 empty cements bags to be used.
4. All measures to be taken to minimize uprooting of trees.

3 - Fishing Harbour

The CE & Administrator (CFH) should take adequate steps to protect the infrastructure of Fishing Harbour before the cyclonic weather.

6.8 TRAFFIC DEPARTMENT

1 - Operation

Deputy Traffic Manager (Operations) will take the following measures:

1. All loading/unloading of cargo operations to be ceased.
2. All the cargoes under Port‘s custody, lying outside and likely to get damaged, will be shifted to Transit Sheds/Ware Houses.
3. Doors of the sheds will be closed and properly secured.
4. He will visit the site and inspect the arrangements.

2 - Railways

Co-ordinate with railways to ensure the following

1. Yard Master personally takes over the charge of yard supervision instead of leaving the same to shift staff.
2. Movement of wagons is stopped when wind speed exceeds the operational limit (70 KM per hour).
3. All the rolling stock on tracks is clamped / chained both in Port area and exchange yard and the locomotives are returned to the Loco Shed.

6.9 ADMINISTRATION DEPARTMENT

1. The Secretary will remain overall in-charge of the Cyclone Coordination Centre.
2. The Secretary shall make a duty roster for the manning of the cyclone coordination center by the officers of Administrative, Finance & Accounts and Materials Management Department.
3. The Co-ordination Centre will keep constant touch with the Local & District Administration for rendering necessary assistance.
4. The port Public Relations Officer will ensure announcement by the mike for precautionary measures to be taken.
5. The Secretary will make necessary arrangement in coordination with the local administration for evacuating people from the low lying area. They will be shifted to relief centers as designated by District Administration.
6. The Secretary will hire basic transport .He will also detail Officers to remain in-charge of various relief centers.

6.10 FINANCE & ACCOUNTS DEPARTMENT

1. All the department may inform the FA&CAO Office the amount of cash required by them so that the same can be kept in advance and can be disbursed by one of the Officers of the Finance & Accounts Department as per need.

6.11 MEDICAL DEPARTMENT

1. The casualty ward is to be manned by one Specialist in addition to the regular Doctors attending.
2. The Ambulance has to be kept standby near the casualty ward.

6.12 MATERIAL MANAGEMENT DIVISION

The Deputy General Manager (Materials) will ensure the following :

1. During cyclonic season sufficient stock of stores like Polythene, J.Hooks, screw hinges, gunny bags, tarpaulins, ropes and wires for Port Crafts, diesel oil, kerosene oil, petromax lamps, torch lights with batteries and bulbs, electrical items etc. are kept.
2. All the materials which are likely to get damaged with rain are covered with tarpaulin.
3. One Stores Supdt., one Store Keeper and the other minimum staff required to issue materials including POL are kept during emergency.

6.13 CENTRAL INDUSTRIAL SECURITY FORCE

The Commandant, CISF will make arrangement for the following**:**

1. To keep extra vigil on the following stores/buildings which are likely to be affected by the cyclone

1. Electrical sub section **2.** Central Stores		**3.** Tanker berths **4.** Cargo Berth **5.** Transit Sheds	**6.** Ware Houses **7.** Administrative Building

2. Till normalcy is restored, arrangement will be made for thorough checks on all out-going vehicles to guard against pilferage.
3. Round the clock patrolling duty shall be introduced along the electric lines to guard against the removal of copper wires which are likely to be grounded during cyclone.
4. A special task force to be set up by the CISF for the rescue operation.

6.14 GENERAL INSTRUCTIONS

1. Assistant Secretaries/Office Superintendents/Head Assistant/ Divisional Accountants will ensure that the doors and windows are properly closed prior to leaving the office
2. All-important files are stored in secure cupboards

6.15 POST CYCLONE DUTIES

1. All the Heads of the Departments are required to assess the damage and submit a detailed report indicating the estimate to the Chairman. For this, a team may be formed comprising Sr. Pilot, Dy Traffic Manager, EE (Elect) EE (Mech) EE(Civil) and assisted by one representative from the Finance Department. The preliminary report is to be submitted within 48 hours and detailed report within four days from the date of normalcy.
2. Hydrographic survey is to be conducted to assess the channel condition and ensure resumption of shipping 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. HM will detail a salvage party headed by the Master Tugs for this purpose.
4. A team of Officers to be nominated by the Administrative Department to supervise the rescue and relief operation and disposal of animal carcasses in coordination with the local and District Administration.
5. Preventive measures for epidemics to be taken by the Medical Department.
6. All the operating systems to be attended urgently and made operational as early as possible on a war footing basis to resume operation.
7. Spot tendering procedure shall be followed for repairs up to Rs.2 lakhs by the concerned Executive Engineers**.**
8. Water supply and electricity to be given priority. The electrical cabling network to be checked area- wise. The inspection team to be decided by the Addl. CE&ME for obtaining clearance to resume power supply.
9. All damaged temporary roofed houses in the port premises will be attended to.
10. The Manager Materials will nominate a team for the procurement and supply of essential materials for repair of various structures and equipment as reported.
11. To assess the progress of repair works, Heads of Depts meeting will be held daily till normalcy is restored.
12. Assistant Secretary /Head Assistant may prepare a list of files if damaged and report to the Heads of Depts.

6.16 FLOODS

DEPT	ACTION
MARINE	Signal Station passes weather message to HM and DC HM places on-site action group alert DC apprises Chairman of weather developments who places Central Disaster Management Group on alert if necessary.
Civil Engg	• Drainage system of the port i.e. inside harbour area & outside harbour area should made cleared. • Trailer mounted portable Diesel pump sets to be made standby with sufficient length of hose pipes. • Sand bags to be used around sensitive areas including water supply Pump stations electric sub stations
Elec & Mech Engg	• All the outside installations and equipment shall be properly secured. • Cyclone field units to be made alert
Administration	To make standby arrangements for transportation to evacuate population in low lying areas to cyclone centers and relief centers & arrange food and water.

6.17 EARTHQUAKE ACTION PLAN

EARTHQUAKE PREDICTIONS

- Frequency of tremors as reported in the newspapers, TV and radio
- Rattling of doors and windows on high storied building
- Dogs and animals in zoo

CHARACTERISTICS-QUAKE

-Magnitude
-Focal depth
-location of quake center
-Rupture length
-Rupture orientation

PROPERTY characteristics

-Distance from focus
-Soil conditions

RELIEF WORK AFTER AN EARTH QUAKE

DEPT	ACTION
Chairman	To contact the District Collector, Relief Commissioner, Army, Navy, Coast guards and seek assistance.
Dy Chairman	To assist the Chairman to assess relief requirements
Administration	Secretary – To arrange for food, shelter and transportation. And assist the Chairman and Dy Chairman for all relief arrangements
Elec & Mech Dept.	CME–To provide and hire if necessary, earthmoving equipment, cranes, forklifts, bull dozers, pneumatic hammers.
Civil Eng Dept.	CE to deploy engineers to direct or guide earth moving equipment and cranes to remove the debris
Traffic	TM to ensure safety of cargo in cargo sheds and at rail siding
Marine	Dy Conservator & PFSO to ensure the safety of Port Marine craft and vessels alongside
CISF	Commandant CISF to organize Search and Rescue of persons trapped under debris.
Fire	To assist in Search and Rescue operation.
Medical	CMO to ensure provide of proper Medical Aid to the injured

If you are outdoors, find a clear spot away from buildings, trees, streetlights, and power lines. Keep lying on the ground and stay there until the shaking stops. Injuries can occur from falling trees, street-lights and power lines, or building debris.

If you are in a vehicle, pull over to a clear location, stop and stay there with your seatbelt fastened until the shaking has stopped. Trees, power lines, poles, street signs, and other overhead items may fall during earthquakes. Stopping will help reduce your risk. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake. Stay indoor until the shaking stops.

6.18 TSUNAMI ACTION PLAN

CHARACTERISTICS- Tsunamis are a series of enormous waves created by an underwater disturbance such as an earthquake, landslide, volcanic eruption, or meteorite. A tsunami can move about 500 miles per hour in the open ocean. Once the wave approaches the shore, it builds in height. The topography of the coastline and the ocean floor will influence the size of the wave. There may be more than one wave and the succeeding one may be larger than the one before. Drowning is the most common cause of death associated with a tsunami.

WARNING/CONFIRMATION

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Met . Station COAST GUARDS

DEPT	ON SITE ACTION GROUP
Marine	HM through Signal Station informs all the ship to evacuate from the berth to open sea. Signal Station keeps in touch with all vessels on VHF
	Harbour Master to move tugs and launches to safe areas or deep water anchorages Crew to wear life jackets
Administration	Dy. Secy to arrange transport to evacuate to safer inland areas
Traffic	Dy.TM ensures stoppage of all cargo operations of vessels.
Civil Engineering Department	Addl CE to ensure sand bags is kept ready.
Elec & Mech Department	Addl. CE&ME to ensure proper secure of the cargo handling equipment and the shore cranes.

	CENTRAL DISASTER MANAGEMENT GROUP
Chairman	Activates Central Disaster Management Group
Marine	DC to apprise the group leader of the Central Disaster Management Group of any developments and early warning Systems.
Administration	Secretary to keep in constant touch with state Govt.

6.19 BOMB THREATS

DECISION ELEMENTS	OBJECTIVE
-History of threats-local-national -Prevailing conditions of strikes, Industrial tension, political issues	To avoid any loss to lives and property To eliminate panic To be prepared for the safe handling/disposal of a bomb

Dept	Action
CISF Security	**1-**Commdt CISF reports that Bomb Threat received by staff/outsider
	2-Recomends emergency classification II or III to chairman
	3-Requisitions of fire tender and ambulances and positioning them at a safe distance from the threatened or suspected area.
	4-Ensures evacuation of the workmen working inside the port area, if the threat is inside the prohibited area.
	5-Requisitions of BDDS(Bomb Detection & Disposal Squad) from Police Dept.

Checklists-Questions to Ask Bomb Threat Caller

- Threat received in writing telephone
- On phone keep caller on line as long as possible
- Ask colleague to inform security to trace call-tape recorder
- Ask for bomb location? time of detonation?
  What type of a bomb? How does it look?
  How do you know so much about bombs?
- Advise caller of the loss of innocent lives as a consequence of a bomb detonation could he live with this guilt for the rest of his life
  Whom does he represent? Why is he doing this?
- Background Noises music, airport, railway factory tel. booth Residence-to trace place of call
- Check voice characteristics; Male Female Voice Quality-Calm excited Anger
- Age Accent-local out of state foreign disguised
- Speech Impediment stammer slow educated laughing deliberate familiar

6.20 STATE OF WAR

DEPT	ACTION
PRESIDENT & PM	DECLARATION OF WAR
CHAIRMAN	1. TO ACTIVATE CENTRAL DISASTER MANAGEMENT GROUP AND ON SITE ACTION GROUP 2. CONTACT AND COORDINATE WITH CISF, INDIAN NAVY, COAST GUARDS & INDIAN ARMY.
CISF	COMMANDANT CISF Implements blackout in port
MARINE	HM- 1. Ensures all vessels at anchorage to observe blackout 2. No night movements **PORT CONTROL** The Sr. Pilot ensures proper following of the Naval Instructions to inbound vessels.
TRAFFIC	DTM ensures shut down of all cargo operations after sunset. Ensure workers within perimeter of dangerous/chemical tank farms shifted to safer perimeters All other workers to move out of port prohibited area during night.
ELEC & MECH Dept.	**CME to** ensure in keeping essential services working during day and night.
MEDICAL	**Deputy Chief Medical Officer** to ensure ambulances and first aid staff kept in readiness on 24 hour basis
FIRE	ON ALERT TO ASSIST CISF

6.21 LOCAL STRIKE PLAN

Strike Contingency:

Major Ports represent a critically important asset of India's national economy. The working of ports & harbours requires certain key/essential services to be maintained. Ministry of Defense have issued a directive of contingency planning for Port's strike which has been communicated to the Port Trusts in Ministry of Transport, Department of Surface Transport (Ports Wing)'s letter No. PW/PTS-19/84 dated 1.7.1986. As per this directive the Armed Forces may be requested to render assistance as required by the Port authorities after the following conditions have been fulfilled:-

a) The strike is declared illegal by the Central Government.
b) All other avenues for making alternative arrangements have been fully explored by the Central Government and not found practicable.
c) The situation created as a result of the strike is so serious as to adversely affect the national interest.
d) A Gazette Notification is issued by the Ministry of Defense invoking sub-section (I) of Section 2 of the Armed Forces (Emergency Duties) Act, 1947 declaring services in the affected Port or Ports as essential.
e) Normally, the assistance will be limited to the resources of the local Naval Officer In-Charge.

Envisaged Tasks :

Navigation:

The shipping operation will be carried out from 0600 to 1800 hrs. VTMS/ Port Control will operate as the Control Room and will be manned by the HM/ Pilot.HM Office may be used as alternative. Pilotage duties will be done by the Pilots. Deputy Conservator & PFSO will remain over all in-charge of the operation.

The manpower requirement for the Floating Crafts & Marine Site Office will be as follows:-

Hired Tugs (2 nos)	Full complement
Pilot Launch	Normal complement
Mooring Launch	Normal complement
Standby Pilot Launch	
Standby Mooring Launch	

Employees those are not interested for taking part in the strike and willing for working during that period will be provided required protection

The areas where assistance of navy would be required as per the directive of the Ministry of defense are enumerated as follows:

- Maintenance of pilot services/pilotage.
- Berthing, unberthing, mooring and unmooring of vessels.
- Manning and operation of pilot launches, mooring boats, tugs and other auxiliary crafts.
- Operation of Port Signal Stations.
- The manpower requirement for this purpose is as follows :-

Floating Crafts & Marine Site Office:

CISF provide security & transport to Port Trust Pilots to carry out Pilotage of vessels. Hired tugs to be secured at safe berth with adequate protection to crew.
The tug and pilot launch will work in general shift and Mooring Launch in three shifts. All vessels should be properly locked to avoid sabotage.

Security of Port Trust Installations, Cargo & Personnel:

As per the directive, the State Police/CISF must ensure the security of the Port Trust property & personnel involved in rendering assistance.

The CISF shall ensure:

- Security of Port property, cargo and personnel.
- Security of personnel involved in rendering assistance.
- Firefighting services of the Port Trust.

6.22 ATTACK USING CHEMICAL WEAPONS

This SOP lays down the sequence of actions to be taken by different agencies of the Government in response to an attack using Chemical Weapons. The SOP also lays down an institutional mechanism in unambiguous terms with the Central/State/ District administration functioning on a trigger mechanism basis.

Preparedness Stage

The preparedness stage will include following actions to be taken by the concerned Ministry/ Departments and organizations of the Central and State Governments.

1. Formation and training of Specialist Response Teams.
2. Awareness generation among the public in vulnerable areas has to be undertaken as a part of awareness generation for disaster management.
3. The State Police will be the first responder to any incident. It will, therefore be necessary to ensure that they are appropriately trained in the do's and don'ts, of a chemical weapon attack.
4. The SOP envisages Incident Command teams with officers designated as incident Commanders under whose supervision the Specialist Response Teams will function.
5. The Incident Command Teams will function under the overall guidelines / directions of the District Magistrate of the Commissioner of Police. All Agencies of the Government will make available resources as required by the District Magistrate/ Commissioner of Police.
6. Each identified hospital will maintain adequate stocks of medicines, including essential antidotes such as atropine, PAM chloride, amyl nitrate, sodium nitrate and sodium thiosulphate.

Response Phase

- The Head of the Specialist Response Team will mobilize his team including the medical unit at the hospital and reach the site of incident and report to the Incident Commander.
- The Incident Commander will take will decisions regarding management of situation/ deployment of manpower. All relevant agencies including Quick Response Teams

(QRTs)/ Quick Medical Response Team (QMRTs) will provide manpower and material resources as required to the Incident Commander.

The Incident Commander will :-

i) Cordon off the area and restrict entry into the cordoned area except the designated response personnel.
ii) Arrange to provide directions and instructions to the population on the public address system.
iii) Use the Detection Team to identify all hazardous substances and the conditions prevailing.
iv) Designate a staging area where all resources will report.
v) Designate sites for setting up of decontamination centers.
vi) Designate locations for triage and emergency treatment.

- The detection/ assessment team of SRTs will enter the area and determine the sources/chemicals, mark contaminated areas, designate hot, warm and cold zones and will monitor the entire decontamination process.
- The rescue and evacuation team of SRTs will evacuate the affected people.
- Decontamination sites will be set up on the periphery of the cordoned area.
- The medical units will set up triage and emergency treatment centers.
- Those affected will be taken to the triage area. Those requiring immediate medical assistance will be rushed at once to the hospital without waiting for decontamination. Those patients who can be decontaminated before being sent to hospitals will be decontaminated. The third category will be those who can be allowed to leave for the safe area after decontamination.

Recovery Phase

The Incident Commander will take steps to :-

i) Decontaminate the area, equipment, vehicles and dispose of left over contaminants,
ii) Handover evidence to concerned authorities.
iii) The Incident Commander will confirm to the District/State Administration/ Government through Unified Commander that the site of attack has been sanitized and normal activity may resume in the affected area.
iv) Feedback/after action reports will be given by the following agencies to CMG of MHA through the State Government :-

a. Unified Commander
b. Incident Commander
c. Police
d. Ministry of Health

SIZE-UP AND EVALUATE THE SITUATION

- Cordon off the area in consultation with the safety officer and restrict entry to the affected area.
- Arrange to provide directions and instructions to the population on the public address system.
- To the extent possible, simultaneously identify all hazardous substances or conditions present.

SET UP THE COMMAND POST AND STAGING AREA

1. Command post is a location where persons having the authority to command and persons necessary to support the process, are brought together and provided with necessary facilities. An information officer should also be stationed at the command post. Shifting wind direction, new information, requirement for better facilities, problems with communications, need for additional space, or inability to provide security for the command post initially selected could all be reasons for relocation for the command post.
2. A staging area is often near to but separate from the command post. It is a marked area where responding personnel report with their equipment or apparatus to await direction. Specialist teams, fire, police, medical or other personnel are directed to the staging area.
3. The person in charge of a particular team will report to the command post to make his or her equipment and expertise known, provide information, or standby for instructions.

SITE SECURITY AND CONTROL

- Limit the number of emergency response personnel at the site to those who are actively performing emergency operations.
- Designate, hot, warm and cold zones and accordingly identify:-

(a) Evacuation routes and procedures
(b) Places for decontamination corridors/station, if required.
(c) Place for rapid treatment center.
(d) Level of protection required for the responders.

RESCUE OPERATIONS

1. Evacuate victims and arrange immediate first-aid.
2. Decontaminate the victims, if required, using the appropriate dry/wet method.
3. Isolate casualties, prioritize treatment as per triage level.
4. A back up team shall standby with equipment ready to provide assistance of rescue.
5. Transport casualties to designated hospitals.
6. Request additional assets if required.

CONTAMINATION CONTROL

1. Identify the need and suitable protocol for the decontamination of personnel, equipment and area.
2. Monitor for the completeness of the decontamination process.
3. Re-designate the hot, warm and cold zones if required.
4. Neutralize the source of contamination.

RECOVER AND RESTORE

1. Remove left over items.
2. Complete contamination survey.
3. Hand over evidence to police.

TRANSITION BRIEFING

1. Prepare briefing for the unified command.
2. The emergency response team will work in appropriate protective gear as advised by the Safety Officer.

SPECIFIC PROCEDURES FOR SPECIALIST EMERGENCY RESPONSE TEAMS

The teams shall adhere to all safety norms while carrying out their role. Proper protective gear as advised by the safety officer should be donned. The duration for which the protective clothing is be worn will be determined by the physiological status of the wearer. In case of unbearable thermal stress, the wearer should be advised to retreat to the cold zone. The team in protective gear should be preferably rotated. The canister should be replaced if there is any resistance in breathing and gas mask should be checked for face seal before entering the contaminated area. The role of the specialists and certain other specific procedures are enumerated below:-

1. Detection Team

1. Mainly responsible for the hazard identification and confirmation, neutralization of the source of contamination and other tasks assigned by the Incident Commander.
2. The team should recognize any unusual smell, pools or puddles of liquids or droplets on water surfaces, dead animal or birds, munitions or their debris; and locate the source of contamination.
3. On site detection methods using detection devices detailed in the list of equipment should be resorted to.
4. Off-site laboratory analysis using instrumental methods can be requested in case of ambiguities in detection.
5. The samples (soil, water, air, contaminated belongings etc.) should be preserved and handed over for crime investigation at a later stage.

2. Decontamination Team

1. Contamination control, decontamination of personnel, equipment and area and any other tasks assigned by the Incident Commander. The responsibilities/ procedures to be followed by this team are:

a) Setting up of corridors and stations for victims should be rapid.
b) The run-off water used for decontamination should be monitored for completeness and preferably lead to a sewerage.
c) The contamination survey should be carried out prior to restoring the site for normal operations.

3. Rescue and Evacuation Team

Mainly responsible for rescuing and evacuating the victims and any other tasks assigned by the Incident Commander. The responsibilities/ procedures to be observed by the team are as follows :-

a) Provide directions to the public through the information officer to control panic.
b) Warn them from walking into hot zone.
c) Guide the public to the exit route/ treatment as appropriate.
d) Evacuate any trapped casualties.
e) Transport casualties to designated hospitals.
f) Assist the medical team

4. Medical Team

The team shall be responsible for providing first aid and treatment to the extent possible to the victims at the incident site. If required the team shall also assist the doctors in the designated hospitals where the victims are transported. Certain specific procedures for the team are as listed below:-

a) Develop treatment plans for ambulatory and non-ambulatory victims.
b) Ascertain the triage level of the victim with respect to respiration, pulse and neurological status.
c) Decide dry/ wet decontamination procedures for the victim.
d) Set-up treatment center for providing first aid and treatment to the extent.
e) Reassure and relocate the psychological casualties.
f) Help in preservation of evidence.

6.23 ATTACK USING BIOLOGICAL AGENTS

The Standard Operating Procedures (SOP) lays down in concise form the steps required to be taken to respond effectively to an attack using biological agents. The SOP lays down the sequence of action to be taken by different agencies in response to usage of biological agents by terrorist groups.

1. The Ministries/ Departments/ Organizations concerned with the SOP at the National level will be as under:-

- National Disaster Management Authority
- Ministry of Home Affairs
- Ministry of Health and Family Welfare
- Ministry of External Affairs
- Department of Bio-Technology
- Ministry of Defense
- Ministry of Information & Broadcasting

2. The organization concerned at the State level will be as under :-

- State Disaster Management Authority (SDMA)
- District Magistrate/ Commissioner of Police.
- Health services.
- Public Health Engineering Department.
- Transport Services.
- Director, Agriculture
- Director, Animal Husbandry & Dairying

PREPAREDNESS STAGE

Potential Target Areas

An assessment will be carried out of the potential target areas. The preparedness measures will focus on these target cities/ areas.

Surveillance

- A system for collecting, maintaining and characterizing information and samples concerning naturally occurring organism capable of being used as biological agents with or without genetic modifications will be put in place. A Plan of Action will be drawn up to assess the requirements, the strategy and steps for putting the System in place.

- The Integrated Diseases Surveillance program (IDSP) will cover the identified Cities / target areas in the first phase.

- The ISDP and existing network of laboratories will be used for sample collection and Characterizations of agents of identified diseases during suspected outbreaks.

Objectives

- To establish a decentralized system of surveillance for communicable and non-communicable diseases so that timely and effective public health actions can be initiated in response to health challenges in the country at the State and National level.
- To improve the efficiency of the existing surveillance activities of disease control programs and facilitate sharing of relevant information with the health administration, community and other stakeholders so as to detect disease trends over time and evaluate control strategies.
- Introducing a quality assurance system for assessing and improving the quality of laboratory data.
- The laboratory support will be strengthened and the available system will be integrated well with the State and District surveillance programme. The Specific roles of the various laboratories at PHCs, District and State levels will be defined.
- Technology and infrastructure for performing essential diagnostic tests at the District level, particularly microbiology cultures, bio-safely management and quality assurance would be given special attention.

Notification

Necessary legal provisions/amendments to existing provision would be made to notify any unusual syndrome or incidence of usual syndrome in unusual numbers. Linkages would be established with the disaster management authorities, identified nodal agencies in health sector and surveillance program for rapid epidemiological interventions.

Rapid Response Teams (RRTs)

1. The State Government will set up a minimum of two (2) Rapid Response Teams. The RRTs will comprise of at least one expert each in the field of Epidemiology; Public Health, Microbiology, Clinical medicine and Entomology.

2. Two RRTs will be set up at National level.

3. These RRTs will be given additional training in the potential agents likely to be used for bioterrorism, epidemiological investigation and their medical management.

Quarantine and Isolation

The Centre/ States/ Local Authorities will prepare quarantine regulations supported by requisite legal provisions for enactments in their areas of jurisdiction. Quarantine and isolation protocols would be drawn up to support such regulations. Necessary Quarantine/ Isolations facilities would also be created.

Monitoring

1. At the District level, the CMO will review the surveillance reports, advise the District Magistrate/ Commissioner of police about a bio-terrorist attack; identify the areas/ people/ communities affected as well as any quarantine requirements.

2. The Director Health Services of the State will monitor and advise the Health Secretary on surveillance reports received from the different districts.

3. All hospitals/ dispensaries in the target area whether public or private will have reporting obligations for any clinical signs/ symptoms/ epidemiological diseases.

NOTIFICATION OF PHASE

1. As soon as the surveillance mechanism indicates the incidence of a disease in increasing numbers pointing to a possible bio-terrorism attack, the following steps will be taken :-

(i) The CMO will inform the District Magistrate/ Commissioner of Police.
(ii) The District Magistrate will alert all the relevant agencies of the Government.
(iii) The RRT would be mobilized for epidemiological investigation.

2. Standard case definitions would be circulated to the health functionaries through the official media.

3. The Centre/ State/ District Authorities would reiterate through print and visual media for all health institutions and professionals in Government and Private Sectors to notify the disease.

4. The quarantine and isolation protocols would be enforced.

5. Hospitals and Laboratories would be alerted for managing the clinical cases from the notified disease agent.

RESPONSE PHASE

1. Rapid Response Teams of the State/ District will investigate the causes of outbreak/ increased incidence of the disease and collect pathological samples and send it to the identified State/ National laboratories for testing.
2. Hospitals to be informed of the incident and to be alerted for receiving the patients and their treatment.
3. If necessary, tented hospitals to be set up for treatment of patients. Doctors/ paramedical staff to be requisitioned from neighboring districts.
4. Measures to control the spread of infection/ quarantine measures to be instituted.
5. As soon as the pathogen is identified and treatment protocol received, it shall be disseminated to all identified hospitals/ clinics in the public/ private sectors of the District/ State.
6. SOP for laboratory testing for pathogen will be drawn up by the identified laboratory and will be circulated to the hospital laboratories/ other laboratories in the affected area.
7. Reagents for diagnosing the identified pathogen will be distributed to the designated hospitals and the District laboratories.
8. Medicines/ Drugs identified for treatment will be procured/ requisitioned and distributed to the designated hospitals.
9. Public to be taken into confidence to prevent panic. A list of do's and don'ts will be circulated through the print/ electronic media.
10. All contaminated clothing / equipment etc will be carefully disposed of by incineration.
11. Any attack involving use of biological agents responsible for causing diseases in human beings will also have an impact on animal health in the affected areas. An impact assessment will be made by a team of experts.

RESTORATION PHASE

The damage done to public health utilities and the essential items utilized during the response phase will be replenished.

1. Public advisories will be issued regarding restoration of normalcy.

2. The District and the State RRTs will compile the data and analyze it to identify the deficiencies experienced in the implementation of the response measures. The necessary modifications will then be incorporated in the contingency plan for future action.

6.24 ATTACKS INVOLVING USE OF RADIOACTIVE MATERIALS

Operational Priorities

To minimize the health effects of a radiation incident, JNPA will:

- Assess the risk to people and recommend interventions.
- Provide information for release to public.
- Provide technical information about the radiological material released in the incident.
- Identify activities with the potential for a high level of exposure.
- Recommend safety procedures for first responders, including advice on protective gear and exposure limits.
- Assist the on-scene Incident Commander by providing field personnel to monitor the site for radiation levels and monitor first responders for exposure levels.
- Evaluate the long-term health consequences and recommend follow-up actions for environmental decontamination and medical evaluation.

Preparedness for Radiological Dispersal Device

The tasks to be undertaken for preparedness involve the following.:

1. The affected persons and area will have to be monitored for contamination levels.
2. The first responders have to be suitably equipped to measure the radiation levels and have the necessary kit to protect themselves.
3. There will also be a need to monitor a large number of persons after an RDD explosion and handle large amounts of radioactive wastes arising out of change of clothing, showering or washing.
4. A list of the agencies to be contacted by the public in case of a suspected presence of radioactivity will be made available to all citizens.

Response Mechanism

Response measures are those which are taken instantly prior to, and following, a Radiological emergency aimed at limiting injuries, loss of life and damage to property and the environment and rescuing those who are affected or likely to be affected by it.

Activity

- Declare an off-site emergency.
- Activate an offsite emergency control centre.
- Arrange an immediate deployment of various ERTs in affected sector(s).
- Based on the emergency monitoring teams from off-site areas initiate countermeasures (such as sheltering and prophylaxis) of different grades.
- Arrange an evacuation of the public to safer places.
- Activate systems of the State machinery to meet the necessary requirements of the public in the camp till the people are in a position to go back to their homes after the affected areas are cleared and declared safe.
- Deploy QRMTs consisting of physicians, triage officer, nurses and paramedical staff.
- To ensure that necessary arrangements at evacuation/relief centres is made with sufficient availability of:

    - Food,
    - Water,
    - Blankets/Clothing
    - Medicines
    - Lighting
    - Sanitation and hygiene etc.

- To ensure necessary security arrangements for the personals (Emergency responders/relief teams) who are working at Relief Centres and involved in distribution of Relief Materials.
- To ensure that law and order is maintained at evacuation/relief centres and in the affected areas as well.
- Make an arrangement for providing useful, timely, correct, consistent, and appropriate information to the public in the event of a nuclear or radiological emergency.
- Ensure that the information to media/general public about the coordinated response is released in an organized manner.
- Identify and characterise the source and its origin.
- Initiate a quick and reliable monitoring methodology to detect the onset of an accident/emergency condition and assess its magnitude.
- Communicate the situation to fire fighting and medical services, police, civil defence, transport, and other agencies.
- Support decision making on protective measures for the population and the environment.
- If required, distribute iodine tablets at the earliest (iodine prophylaxis).
- Ensure that the actions taken by the various agencies are well coordinated.

- Send prior information (in respect of dos and don'ts) to those likely to be affected by the accident/emergency. These include:

    - Evacuation/temporary relocation of the affected population, if required.
    - Withdrawal and substitution of supplies of food and drinking water (based on actual measurement of contamination found in food and drinking water).
    - Animal husbandry and agriculture department personnel to ensure radiological protection following a nuclear emergency.
    - Initiation of the recovery phase at an appropriate time.

- Perform life-saving rescue and emergency first aid for seriously injured.

    - Remove injured persons as far away as practical from the incident scene, especially in case of fire.
    - If medical attention is needed, assist in arrangements for medical assistance.
    - The medical personnel will be informed that radioactive contamination might exist on the victims and/or their clothing.

- Identify all those who may have been exposed to a possible release of radioactive material.
- Identify those involved with the incident or potentially contaminated by the incident at the scene, except those requiring emergency medical evacuation.
- All individuals will be monitored and decontaminated, if necessary, and cleared after further medical treatment and discharged.
- Record names, addresses, destinations, and telephone numbers of those individuals who cannot be persuaded to stay at the incident scene.
- Prohibit eating, drinking and smoking in the incident area

6.25 ATTACKS USING NUCLEAR WEAPONS

This SOP lays down the specific actions required on the part of JNPA along with various Ministries/Departments/Organizations and State Government to deal with the aftermath of a nuclear attack.

1. The Ministries/Departments/Organizations concerned with these SOPs at national level will be as under:-

- Ministry of Home Affairs-Nodal agency
- Ministry of Defence
- Department of Atomic Energy
- Ministry of Health
- Department of Telecommunication
- Director General Civil defence
- Intelligence Agencies – DIA, NSE, IB and NTFO
- Ministry of Information
- Ministry of Urban Development
- Ministry of Petroleum & Natural Gas
- Department of Drinking Water Supply
- Doordarshan /All India Radio/ARC/ CPWD
- Ministry of Agriculture.
- Department of Animal Husbandry
- Ministry of Consumer Affairs.

2. The organizations concerned at the state level will be as under:-

- State Disaster Management Authority (SDMA)
- District Magistrate/Commissioner of Police
- Police/Fire and Civil Defence Services
- Health Services
- Transport Department
- Public works
- Agriculture
- Food & Civil Supplies.

CONCEPT OF OPERATIONS

The following three stages are envisaged:-

(a) Preparedness stage (peace time) – CODE GREEN.

This will include all actions that have to be taken during peace time by various agencies to ensure that the response plans are in a state of preparedness. This will include documentation, having equipment in place, exercises, drills, Training programs, awareness programs, purchase of equipment establishment of command and control systems etc.

(b) Precautionary stage – CODE YELLOW.

This is a stage which could be considered as a deviation from normal relations due to rising tensions with an adversary. The functions in this stage will need to be carried out by various agencies in order to enable movement from a stage of preparedness to the preparedness to the precautionary stage on the presumption that there could be an imminent unclear attack. The precautionary stage will be declared by the Government.

(c) Post –unclear attack stage- CODE BLACK.

This will cover all actions which are to be taken once a nuclear attack has been confirmed.

PREPAREDNESS STAGE: CODE GREEN

Potential Targets

Identification and review of potential targets will be undertaken by MOD in association with intelligence agencies and a list of such targets will be maintained.

Database to be maintained for areas in and around targeted region with detailed information on-

i. Maps/Roadmaps of potential targets.
ii. Important places of shelter which will include schools, community centres, location (with strength) of medical and paramedical staff, number of beds in the hospitals, inventory of emergency services (fire, police and transport).
iii. Related satellite based aerial imageries of target areas.

The monitoring equipment and personal protective gear will be sanctioned and procured in advance for the emergency response and for other medical/civil defence personnel involved in rescue, evacuation and decontamination.

UAVs to be procured and kept in readiness with Emergency Response Teams.

Engineering Teams for restoration of power and communication links to be identified in satellite towns.

Raise Auxiliary Fire services on a large scale.

Identify/create sufficient water sources for firefighting in potential target area.

Medical preparedness

1. Hospitals to be identified and capabilities built up therein for providing specialized medical facilities.
2. All identified hospitals to have Disaster Management Manual including SOP for steps to be taken following a nuclear attack.
3. Earmarking and organization of static and mobile first aid posts and mobile field hospitals and training of the Doctors/Paramedics in these teams.
4. A data-base of the doctors and paramedics including the medical practitioners in private sector in the vicinity of the target areas to be developed for each target area.
5. Identification of sources (manufactures/wholesalers) for all appropriate types of medicines.
6. Procurement of minimum quantity of medicines.
7. A mechanism to rotate the medicine stocks by consumption and regular replenishment of the stock.
8. Construct/Identify shelters for Local Command Post/Civil Defence Teams/Depots/Emergency Response Teams both in target and satellite towns.
9. Procurement of adequate number of wireless and storage of these sets out-side the targeted region in appropriate sage shelters.
10. Designate appropriate grounds for housing evacuees outside the target areas covering all directions.
11. Locating/creating water sources near the identified premises.
12. Identification of stores for procurement/requisitioning of tents, shamans, tin sheets, emergency sanitation and mobile diesel generating sets and entering into per-contracts to be reviewed every year.
13. Identify towns/places far from the target area from where uncontaminated food stock/perishables can be drawn in the event of a nuclear attack. Transport arrangements/rates to be tied up and reviewed every two years.
14. Establishment of linkages between NGOs, Civil Defence, Government Organizations and other volunteers for adequate arrangements for clothing, for men, women and children and its dispatch to civil defence centres located in the satellite towns outside the targeted region.

Transportation

1. Identification of transport vehicles both in public and private sectors.
2. Sources of POL to be identified in periphery towns with arrangements for augmentation of supply within a short time.
3. Contingency plan for restoration of power supply within the shortest possible time.

Mock drills/Exercises

1. Mock drills/exercises will be carried out for each fact of preparedness. Mock drills will be carried out for, in particular:-

    a. Rescue and evacuation-with ERTs/SAPs/Civil Defence Teams /Route Clearing Teams working together. This will also cover transport.
    b. Decontamination.
    c. Setting up relief camps, first aid posts mobile hospitals

PRECAUTIONARY STAGE: CODE YELLOW

The declaration of the precautionary stage will trigger off the following sequence of actions:

1. All teams mentioned in preparedness stage to be called up.
2. Civil Defence volunteers to be called to the assembly points for briefing.
3. Personnel from IMD, DOS, DAE, ARC/NTFO and DRDO to man the national/State monitoring centres.
4. All intelligence inputs to be provided to National and State command posts.
5. Engineering units/route clearing units to be mobilized and kept on standby for route clearing/clearing up radioactive debris, and restoration of power/communication links.
6. Mobile laboratories for sampling foodstuff/water to be activated.
7. Medical teams to be kept in readiness
8. Potassium Iodide tablets to be supplied to potential target areas.
9. Doordarshan, Media (visual & print) to intensify their awareness campaign. Civil Defence to provide necessary material.
10. Pamphlets/posters highlighting important do's and don'ts to be disseminated to the population in the potential target areas simultaneously ensuring that it does not result in panic or exodus of population.
11. The command and control structures to be shifted to the Emergency Command Centres
12. Arrangements to be made for disposal of very large quantities of radioactive waste material. This could be in the form of large tanks for storing the contaminated water, plastic bags for holding contaminated clothes and arrangements for disposal of contaminated bodies/carcass.
13. Establishment of decontamination centres with adequate arrangements for disposal of contaminated water.

14. Government and public sector vehicles to be mobilized except those which are involved in emergency services.
15. Private transport to be requisitioned for evacuation/transport of food and supplies etc.
16. Private medical practitioners to notified to be on standby
17. Potassium Iodate Tablets to be distributed to the public with the instructions to take one tablet per day for two weeks immediately after a nuclear attack.
18. Requisitioning of tents/shamianas, tin-sheets, emergency sanitation, mobile diesel generating sets and its dispatch to the District Command Centres.

POST NUCLEAR ATTACK: CODE BLACK

As soon as a nuclear attack takes place, following actions will be taken:-

1. Monitoring teams located to assess impact and advise the command Authority regarding the extent of damage, level of radiation hazards etc.
2. UAVs with monitoring equipment/sensor/video to scan the area.
3. Yield of the bomb to be assessed by a team of DAE/DOS/NRSA/IMD/ARC/NTFO /DDRO etc. based in the National command Centre.
4. Radioactive cloud to be tracked continuously and wherever possible, fallout to be monitored and measured.
5. Assessment teams from Emergency Response Battalions to move to the affected areas and assess radiation levels for earmarking areas in which search and rescue teams can operate-as also levels of protection required for each area.
6. Road clearance teams to be deployed for road clearance to facilitate evacuations.
7. All emergency response personnel to be administered potassium iodate tablets.
8. Decontamination centres to be activated
9. Camps to be established. Evacuated population which does not have any injuries will be decontaminated and housed in the camps
10. Persons who are injured to be evacuated and brought to the first aid posts where they will be decontaminated.
11. Information Centres to be activated.
12. People in the affected areas to be advised regarding precaution to be taken with regard to consumption of foodstuff and water.
13. Mobile sampling units to sample foodstuff and water in satellite towns ion a continuous basis.
14. Core monitoring team at National COC/State EOC comprising of DAE/NRSA/DRDO/IMD/DOS to continue assessment and updating of the situation, based on the latest information, and advise the command authority.

HANDLING OF CLASS 1 PRODUCTS

IMDG Class 1 – Explosives

Overview

Explosives are designated as IMDG Class 1. Within IMDG Class 1, there are six Divisions. Within the Divisions, compatibility groups are assigned to define which explosive can be safely stowed and transported together.

The numbers and letters in the classification system relate to the sensitivity, mass explosion hazard and projectile hazard of a particular type of explosive. Typical commercial blasting type explosives are classified as Division 1.1 Compatibility Group D (commonly depicted as 1.1 D); detonators are typically of 1.1B or 1.4B; display fireworks generally fall under a 1.3G or 1.4G classification and shop goods varieties of fireworks are usually classified as 1.4S explosives.

Safety distances to be maintained whilst transporting or handling explosives vary according to their classification, and are based on the distance required to prevent property damage or injury should the total quantity of explosives detonate (see Section 13.1.6 below).

Critical points to note towards Dangerous Goods are:

- The limits for explosives in port apply to and are inclusive of transit cargo;
- Notification of IMDG Class 1 onboard should be submitted to JNPA at the earliest practicable opportunity, and in all circumstances at least 48 hours prior to the vessel entering port waters;
- Contact the terminal operator and ensure that they have all the necessary documentation and contact details likewise at the earliest practicable opportunity, and not less than 48 hours prior to the vessel berthing.

Explosive Quantity

All references to explosive quantity are references to Net Explosive Quantity (NEQ) which is the actual quantity of explosive in the cargo excluding all packaging materials and non-explosive components.

The maximum quantity of explosives permitted onboard a vessel using without securing special permission from JNPA is shown in Table 33.

Table 33 Maximum Quantity of Explosives Permitted on Vessel Without Special Permission

IMDG Class 1 Division	Separation Distance To Protected Place	NEQ Permitted Onboard (kilograms)
Class 1.1	10 meters	25
Class 1.2	10 meters	10
Class 1.3	10 meters	2,000
Class 1.4	10 meters	85,000
Class 1.5	10 meters	25
Class 1.6	10 meters	25

Special Permission for Excess Quantities of Explosives

On a case-by-case basis vessels may be granted consent permission to enter port carrying explosives in excess of the quantities shown in Table 33. This is strictly subject to securing special permission from JNPA, which will include compliance with the conditions outlined below. Such permission must be requested not less than 5 working days prior to the vessel entering port waters.

Under no circumstances must individual terminal operators or port managers issue any form of direction or guidance to shipping companies, or their agents, in respect of whether an individual vessel carrying excess quantities of explosives may, or may not, be granted permission to berth by JNPA.

Berth Designation and Marking

Explosives must only be handled at a designated berth(s). When designating an explosives berth, terminal or berth operators must take due account of:

a) The total quantity, type and class of explosives to be transported or handled;
b) The method of packaging, containment and stowage of the explosives;
c) The total quantity, type and classification of other Dangerous Goods on the vessel;
d) The geography of the port and the location of the berth within the port area;
e) Its proximity to:

  1) Protected places,
  2) Other vessels;
  3) Other berths;
  4) Main roads;
  5) The construction of the berth;

f) The type and availability of transport for the immediate removal of explosives from the berth;

g) The immediate availability of adequate fire-fighting resources at the berth;
h) Re-routing of land or waterborne traffic;.
i) Proximity to tanks and pipelines; and
j) Each berth designated for the handling of explosives must be provided with markings that extend at least 15 metres from the immediate handling area.

Safety Requirements

The following safety requirements apply to the handling and transport of explosives in JNPA:

1. Explosives must not be unloaded from a vessel unless the means of transport, by which they are to be removed from the port area, are on the terminal or berth and ready to receive them.
2. Explosives must not be handled during the hours of darkness.
3. Explosives of Divisions other than 1.4 must be taken directly to or from a vessel, and in no circumstances be held on a berth for more than 2 hours.
4. Explosives of Division 1.4 should be taken directly to or from a vessel, and in no circumstances be held on a berth for more than 12 hours.
5. Explosives must be unloaded as soon as reasonably practicable (within 2 hours of the vessel being secure at the berth).
6. Explosives (excluding Division 1.4) must not be brought to a berth for loading onto a vessel unless the vessel is ready to receive them.
7. Explosives of Division 1.4 must not be brought to a berth for loading onto a vessel unless the vessel is ready to receive them within 12 hours of berthing. In no circumstances are the goods to be held on a berth for more than a total of 12 hours.
8. The handling of explosives, once commenced, must proceed without delay or interruption, except during an electrical storm. Operations must be suspended during the storm and not resumed until it has passed.
9. Explosives must not be handled unless they have been classified in accordance with the IMDG Code.
10. The vessel must depart from the port area within 2 hours of completion of loading of explosives (excluding Division 1.4).
11. A vehicle must leave the port area as soon as possible on completion of being loaded with explosives (excluding Division 1.4) and in all circumstances within 2 hours of the explosive being unloaded from the vessel.
12. On completion of a vehicle being loaded with explosives of Division 1.4, it must leave the port area as soon as possible and within 12 hours of the explosive being unloaded from the vessel.

13. Where more than 100kg of explosives (other than Division 1.4) are to be loaded or unloaded in the port area, a customer's representative who has immediate access to specialist advice in the case of an emergency, must be contactable by phone and be immediately available while the explosives are being loaded and / or unloaded. The phone contact to the customer representative must be verified prior to commencement of the loading / unloading of the vessel and/or vehicle. The customer's representative role should not involve a command or control position in an incident.
14. Emergency Procedures for the terminal or berth, developed in conjunction with JNPA and the emergency services, must be in place before any explosives are handled.
15. All non-essential persons are excluded from the immediate handling area, taking into account the separation distances.
16. A traffic management plan for the terminal or berth must be in place for road vehicles carrying explosives.
17. Road vehicles carrying explosives must be at least 100 meters apart while waiting to load a vessel and/or leaving the port area.
18. Whilst explosives are being handled, ignition sources must not be permitted in or near handling areas. Smoking must be strictly prohibited on the vessel and on the berth (except in safe areas). Notices must be displayed on the vessel and on the berth bearing the words DANGER-NO SMOKING-NO NAKED LIGHTS.
19. Adequate and appropriate firefighting facilities and water must be immediately available on the vessel and fire hoses on it laid out ready for use (not applicable to Division 1.4 explosives).
20. Vessel and shore personnel must receive prior instruction regarding the hazards, handling methods and emergency procedures for explosives.
21. No bunkering of a vessel must take place whilst explosives are being handled (excluding Division 1.4).
22. Repairs involving hot work are prohibited on the vessel or on the berth whilst explosives (excluding Division 1.4) are being transported or handled.
23. Repairs involving engine repairs resulting in the vessel being immobilised are prohibited whilst explosives are onboard the vessel (excluding Division 1.4).
24. If emulsion precursors are handled on the same vessel or in the same area as explosives, then the total quantity of these materials must be considered as IMDG Class 1 and the relevant separation distances must apply.
25. Explosives must be segregated from incompatible cargoes, combustibles and other Dangerous Goods at all times.
26. The engines and ancillary equipment of the vessel must be kept ready at all times, so that the vessel can leave the berth at short notice.

Separation Distances

The separation distances from protected places, including the accommodation blocks of vessels (other than the vessel handling explosives) specified in Table 34 below are to be maintained at all times whilst handling explosives in JNPA.

Table 34 Explosives Separation Distances

Net Explosive Quantity (kg)	Separation Distance (Meters) IMDG Class 1 Division			
	1.1, 1.5, 1.6	1.2	1.3	1.4
25	10	50	10	10
50	25	50	10	10
100	33	50	10	10
200	52	52	10	10
300	68	68	10	10
400	82	82	10	10
500	95	95	10	10
1000	150	150	10	10
1500	191	191	10	10
2000	240	210	10	10
2500	257	220	87	10
3000	284	225	92	10
4000	350	235	105	10
5000	380	245	110	10
7500	424	265	125	10
10000	480	280	140	10
15000	546	300	158	10
20000	610	320	175	10
25000	650	340	186	10
30000	689	340	199	10
40000	762	360	218	10
50000	820	375	240	20
75000	940	400	273	20
100000	1040	410	300	20
150000	1300	410	375	20
200000	1400	410	405	20

Radio or Radar Transmitting Equipment

Only radio or radar transmitting equipment approved for this purpose may be used within 50 metres of any handling operation involving explosives.

The terminal or berth operator must satisfy itself through inspection that arrangements are in place to prevent the inadvertent operation of any fixed radio and radar installations on the vessel during the handling of explosives.

Vehicle Operations

Any vehicles used for the handling of explosives must be:

a. Powered using:

    1. Electricity;
    2. Liquid petroleum gas; or
    3. A diesel engine;

b. Fitted with spark arresters, as appropriate;
c. Inspected prior to use; and
d. Attended at all times while in a cargo compartment or storage area.

Temperature-Controlled Explosives

Where temperature-controlled explosives are to be handled, suitable facilities must be provided to maintain the required temperature. These facilities must be provided with suitable back up to ensure no single-point failure leads to a loss of temperature control of the explosives CTU.

Damaged Packages

Where a explosives CTU, or its seal, appears to be damaged, that CTU must be set aside for examination and repair or other safe disposal.

Should explosives be spilled or escape from a CTU, the spillage must be immediately collected by a competent person and suitable arrangements made for repacking or disposal.

The terminal or berth operator must ensure any incident involving explosives is immediately reported to:

a. Dy. Conservator and Fire Officer 1 - JNPA
b. The relevant authorities.

HANDLING OF CLASS 7 PRODUCTS

IMDG Class 7 – Radioactive Substances

Overview

Any material with a specific activity greater than 70 kBq/kg is declared radioactive.

The International Atomic Energy Agency (IAEA) Regulations for the Safe Transport of Radioactive Materials specify requirements for packages and freight containers for radioactive substances. No radioactive substances may be brought into a port area unless they conform to these requirements.

All radioactive materials are dangerous because they emit invisible radiation that may damage body tissue. This damage arises either from external irradiation or from internal irradiation following the intake of radioactive material into the body. The degree of hazard presented by radioactive materials varies significantly, being a function of the type of material, its specific activity and the duration of exposure.

Limits

Limitations on the quantities of packaged radioactive substances that may be handled at JNPA are very dependent on the type of material and how it is packed. Time restrictions relating to the keeping of radioactive substances in a port area are also applicable depending on the specifics of the material.

Basic Safety Requirements

All precautions must be taken to avoid unnecessary exposure of persons to radioactive substances e.g. persons should be instructed to withdraw to a distance of 5 metres from any CTUs unless required for the handling operation. Cargo operations must be arranged so that persons spend minimal time close to the radioactive substances. Lifting apparatus used to handle CTUs should utilise spreader bars or other means to prevent the possibility of tines puncturing the containers.

Employment of Young Persons

No person under 18 years of age must be employed in the handling of CTUs containing radioactive substances of Class 7 Category II or III, as defined in the IMDG Code, or remain in their vicinity for significant periods.

Damage, Spillage and Leakage

In the event of damage to a CTU containing radioactive substances, the terminal or berth operator must:

a) Take all practicable steps to avoid contact with, or inhalation of, the radioactive substances;
b) Immediately inform JNPA and all other relevant authorities;
c) Ensure the spillage is immediately cleaned up by properly equipped and trained persons; and
d) Ensure unauthorised persons are not allowed to return to the incident

7. ENSURING BUSINESS CONTINUITY OF THE PORT

Given the importance ports hold for the regional and national economy, it is a good management practice to carry out the necessary activities so that JNPA is able to ensure the continuity of its operations. The strategical position that JNPA occupies in case of a large scale disaster, in order to reach coastal communities, is also a compelling reason to develop those activities.

In order to be able to have a proper business continuity management system, it is necessary to have appropriate business continuity plans and means for ensure that people involved have the necessary skills to meet the assigned responsibilities and authorities, i.e. everyone is prepared to do what they should do, as well as the means to ensure a continuous improvement; this includes training and drills to verify the subsequent execution of the plans.

Requirements to the port management

For development and implementation of business continuity plans, with the tasks involved, it is necessary to have a well-defined leadership from the port authority.

It is recommended that the role of the team is not limited to the development of business continuity plans, but also reach the maintenance and updating of the system continuity. This means that must be assigned company resources permanently for this purpose.

Overview of port BCM procedures

To implement a business continuity system, the following activities should be undertaken:

1. Establishing necessary policies to ensure the commitment of the company with respect to the BCMS. In particular, the continuity policy should be in line with the context of the port, so the system responds to the expectations of the stakeholders.
2. Appraisal of the context of the port regarding the occurrence of a natural disaster (or any disruptive event); this considers analysis of the impact that could have the disruption on the port business and the assessment of the risks that may produce a disruption of the operations.
3. Analysis and selection of business continuity strategies appropriate to mitigate the identified risks and to achieve fast recovery of port operations; these strategies include actions to be undertaken before the occurrence of a disaster, as well as actions to be undertaken after the disaster.
4. Development of plans; which includes the documentation of the selected continuity strategies as well as the planning for training and improvement.
5. Implementation of preliminary measures to prepare for the identified risks and to train people involved.

Business Continuity Plan core elements

- Business continuity planning team: Identifies the team members and contact information for the creation and maintenance of the BC plan. This can also reference the departments consulted or involved in its creation.
- Context of the port: Identifies key elements that provide a description of the port: who the customers are, type and volume of cargo, related companies, type of infrastructure and machinery, strategies and policies.
- Continuity policy: Shows the commitment of the organization for creating, maintain, testing and implementing the plan/system.
- Business impact analysis: Identifies processes needed to maintain critical functions during a disruptive action, such a natural disaster, as well as how long each process can be suspended before the impacts on the port become unacceptable. Resources needed to recover are also outlined.
- Risk analysis: Identifies and assesses the risks to which it is subjected the port, shows the evaluation of the fragility of the operational resources of the port, as well as the fragility of the operation of the port. Also indicates the predicted recovery time of the port operations for each disruptive scenario.
- Business continuity strategies and program: Strategies for mitigation that will help the port to lessen and / or prepare for the impact on their operations from disruptive actions. Also strategies for helping the port recover from disruptive actions and return to normal operations.
- Plan Training, Drills & Maintenance

Significance of the BCM Policy

Establishment of a BCMS should be considered of strategic importance for the port; therefore, top management, as well as other relevant management roles throughout the port community, should actively participate and commit to this system activities and demonstrate their leadership during the process.

Implementing a BCMS involves every part of the organization, and is a process usually conducted by a team comprising staffs appointed by top management (the “business continuity team”), for which resource allocation and vesting responsibilities is essential. Therefore, it is essential that every member entity of the port community recognizes the importance of the team, and provides the required support in the activities of the team. The persons in top management are the ones called to motivate members of the port community to contribute to the active and effective mobilization of the BCMS.

Considering all above, the business continuity policy should:

- **i)** be adopted by resolution of port community with the endorsement of the Management
- **ii)** state those key elements for the organization, be appropriate to the purpose of the port
- **iii)** provide a framework for setting business continuity objectives
- **iv)** identify a necessary commitment to meet stakeholder's requirements, and
- **v)** obtain a commitment of the community members to continual improvement of the BCMS.

7.1 PORT RISK HAZARDOUS PRODUCTS STORAGE FACILITIES

EQUIPMENT LIST

1. EMERGENCY CONTROL CENTRE

1.1 PORT CONTROL ROOM SHALL BE EMERGENCY CONTROL CENTRE

1.2 EQUIPMENTS: It is equipped with the following:

- Port water line to be backed with alternate supply.
- Automatic display name, address, telephone numbers of any incoming call once the Emergency Control Centre number is dialed, the same thing should be registered on the computer
- Flip up of maps & which:
  - ☞ shows First Aid locations
  - ☞ shows terminals storing toxic chemicals and terminals storing flammable chemicals
  - ☞ gives transportation map depicting transportation route for hazardous cargo by road and rail tankers
  - ☞ Assembly points, fire hydrant

ALTERNATE CONTROL ROOMS: JNPA have chosen to have a secondary control room which is Chamber of General Manager (Admn.) & Secy. located in the Administration building

1.3 LOGBOOKS: Control room will maintain the log books

1.4 EMERGENCY CONTROL ROOM EQUIPMENTS

Sr.	Equipment	Nos.
1.	Emergency lights and torches	6
2.	Radio	1
3.	Computer	1

Sr.	Equipment	Nos.
4.	Printer	1
5.	Telephone-one for in; other for outgoing calls	2
6.	White board and colored marker pens	1
7.	Flip charts	1
8.	Portable PA Sets	2
9.	Walkie talkies	6
10.	Binoculars	1
11.	Copy of EAP	2
12.	Table-seating	1
13.	Tables-for equipment	4
14.	Chairs	10

2. EMERGENCY EQUIPMENTS & FACILITIES

2.1 RESOURCES FOR COMBATING OIL SPILL

JN Port

Sr.	Items	Quantity	Weight / Dimensions
1	Oil spill Dispersant kept on board tugs and in stock	5300 liters	2800 liters on board tugs 2500 liters in stock
2	Oil absorbent pads	30 nos. 100 nos.	40 x 50 cms each 15'' x 19'' each
3	Oil absorbent pillows	05 nos. 100 nos	30 x 50 cms each 18'' x 18'' each
4	Oil absorbent socks	15 nos. 105 nos	08 x 120 cms each 3'' x 8'' each
5	Saw dust	2500 kgs.	50 bags of 50 kg. each

Bharat Petroleum Corporation Ltd. (Operator of Liquid Cargo Handling Berths under BOT)

Sr.	Items	Quantity / Capacity
1.	Oil Boom	240 meters
2.	Oil Dispersant Spray system	02 nos.
3.	Oil sorbent pillows	200 nos.

Nhava Sheva International Container Terminal (DP World)

Sr.	Items	Quantity	Weight / Dimensions
1.	Saw dust	20 bags	10 kg each bag
2.	Oil absorbent pads	20 packets x 10 each	50 cm x 50 cm

Sr.	Items	Quantity	Weight / Dimensions
3.	Oil boom	12 pieces	3” dia. x 8 feet
4.	Long handle deck brushes, heavy duty	4 pieces	40 cm brush length
5.	Long handle cane booms, suitable for liquid	4 pieces	
6.	Hand booms suitable for liquids	2 pieces	
7.	Long handle shovel (Non spark)	4 pieces	
8.	Hand held Plastic scoops	4 pieces	
9.	Plastic bags (Heavy Duty)	250 nos.	
10.	Empty oil drums with lids	4 nos.	200 lilts
11.	Oil spill chemical dispersant	5 drums	20 lilts
12.	Oil resistant gloves	4 pairs	
13.	Fire extinguishers 9 lit foam type	2 nos.	
14.	Plastic buckets, 10 lilts	4 nos.	
15.	Plastic funnels	4 nos.	
16.	Rags, General Use	20 kg.	
17.	Sawdust Bags	296 bags	10 Kg
18.	Sand Bags	60 bags	50 Kg
19.	Scoop	12 pieces	
20.	Eye Protective Goggles	10 pieces	
21.	Rubber Hand Gloves	12 pieces	
22.	Oil Spill Containment Boom	12 pieces	
23.	Long Handle Coir Broom	12 pieces	
24.	Absorbent Pads	100 pieces	18" x 16"
25.	Dust Masks	50 pieces	
26.	Shovel	10 pieces	
27.	Cotton Bags	02 nos.	
28.	empty drums (200 Liter)	03 nos.	

APM Terminals

Sr.	Description	Quantity	Weight / Dimensions
1.	Oil Absorbent Socks	6 boxes (6 pieces per box)	7.6 cm x 244cm
2.	Oil Absorbent Pillow	2 boxes (16 pieces per box)	18" x 18"
3.	Oil Absorbent Pads	2 boxes (32 pieces per box)	9" x 9"
4.	Booms	9 bales (4 per bale)	(8" x 10")
5.	Perforated Rolls	6 bales (1 per bale)	46 cm x 38 cm

Sr.	Description	Quantity	Weight / Dimensions
6.	Sheets	2 bales (100 Sheets per bale)	38 cm x 48cm
7.	Sweep – sorbent roll, bonded to a P.P. Rope	2 bales (1 per bale)	30.5m x 48 cm

2.2 PORT FIRE FIGHTING RESOURCES

Fire Fighting Equipment	Nos.	Capacity & Specifications	Location
Fire Water Tender	2	Water Tank : 6000 liter.	Fire station
Fire Foam Tender	1	Water Tank : 3000 liter., Foam Tank : 800 liter. CO2 Fire Extinguisher 22.5 kg. X 2 DCP Fire Extinguisher 70 kg. X 2	Fire station
Multipurpose Fire Tender	1	Water Tank : 3000 liter., Foam Tank : 800 liter. CO2 Fire Extinguisher 22.5 kg. X 4 DCP Ship 500 kg.	Fire station
HAZMAT cum Emergency Response Tender	1	Equipped to deal with hazmat emergency and rescue operation	Fire Station
Water pumps Main PumpsDiesel Pump	4 1	Electrical operated (273 m3/hr) Diesel engine (273 m3/hr)	Pump House
Water reservoir	1	1638 m3	Fire station
Fire Hydrants	20		Utility Area (Auto Garage, Work Shop, Main Stores)
Breathing Apparatus Sets	23	Compressed Air-used for 45min	Fire station
PVC Chemical handling suits	10		Fire station
Fire Proximity Suits	4	Aluminized	Fire station
Fire Entry Suit	2		Fire station
Hand Set (Walkie Talkie)	2		Fire Station

2.3 PORTABLE FIRE EXTINGUISHERS

Types of Extinguishers	Numbers
Dry Chemical Powder (DCP)– 5kg	47
Dry Chemical Powder (DCP)–10kg	50
Dry Chemical Powder (DCP)– 22.5kg	9
ABC Powder Type – 2kg	32

Types of Extinguishers	Numbers
ABC Powder Type – 5kg	38
CO2 Type – 3 kg	241
CO2 Type – 4.5 kg	161
CO2 Type – 6.5 kg	75
Water CO2 Type – 9 liters	259
CO2 Type – 2 kg	02

2.4 EQUIPMENT AND MATERIALS INVENTORY

The following equipment and materials will be available with Site Incident Controller: (Terminal Shift In Charge offices & Port Control room)

Sr. No.	Equipment / Material
1.	Copy of EMERGENCY ACTION PLAN
2.	List of personnel
3.	Residence telephone numbers of key Port personnel
4.	Basic facility data and drawings
5.	VHF radio with battery
6.	Laminated "SITE INCIDENT COORDINATOR" sign to be done
7.	Current telephone directories
8.	Message book (with duplicate copy pages)
9.	Clipboards (3)
10.	Tables (3)
11.	Steno tables (2)
12.	Pens (12)
13.	Pencils (12)
14.	Felt tip indelible marker Black (2), Red (2)
15.	Trash bags - large (1 box)
16.	Duct tape
17.	First Aid Kit
18.	AM/FM radio & "AA-cell" batteries (3)
19.	Spare batteries "AA-cell" batteries (9) "D-cell" batteries (8)

7.2 JAWAHARLAL NEHRU PORT AUTHORITY – AREA VULNERABILITY & THREAT MATRIX

X=slightly vulnerable: xx=moderately vulnerable: xxx=highly vulnerable

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
Vessel Movement										
Approach Channel	xx				x	x	x	x		X
Coal Berths	x	x	x	x	x	x	x	x	x	x
Oil Tanker Berth	x	x	xx	x	x	x	x	x	x	x
LNG Berth	x	x	xxx	xx	x	xx	x	x	x	x
Fertilizer Berth	x	x	x	x	x	x	x	x	x	x
Boat Train Pier	x	x	x		x	x	x	x	x	x
Gen Cargo Berths	x	x	x		x	x	x	x	x	x
Cargo Transfer										
Oil pipe lines			xx		xx	xx	xx	x	x	x
Ammonia/ph.acid			xx	xx	xx	xx	xx	x	x	x
pipeline										
Trucks/Mobile eqmt			x		x	x	x	x	x	x
Train tracks-Roads						x			x	x
Cranes & Ship Loaders						x	x	x	x	x
Bulk cargo conveyor system						x	x	x	x	x
SERVICES	------	----	------	-----	------	------	------	------	-----	----
Control gates			x			xx		x	x	x
Emergency Generators			x			x	x	x	x	x
Electric Substations			x			x	x	x	x	x

Threats Vulnerable Areas	Vessel Accidents Collision Grounding Fire Explosion	Land Transport Personnel; Accident Rail Road	Fire & Explosion Manifold Pipeline	Toxic Gas Leakage Pipeline Manifold	Pollution Oil Chemical	Terrorism Bomb War Arson Cyber	Technical Failures Power, Transport Communication Infrastructure	Occupational Accidents Strikes	Cyclone - Floods	Tsunami Earth Quake
Train siding Locos, Wagons,			x			x	x	x	x	x
Signal station- Electronic means commn			x			x	x	x	x	x
Fire station 1 & 2			x			x	x	x	x	x
Port tugs, crafts, dredger	x	x	x		x	x	x	x	x	x
ADMINISTRATION	------	----	------	-----	------	------	------	------	-----	----
Administration Building & Parking			x	x		x	x	x	x	x
Customs Area & Weigh Bridge			x	x		x	x	x	x	x
Port officers & CISF Quarters			x	x		x			x	x

EVENT SCENARIOS -JAWAHARLAL NEHRU PORT AUTHORITY

Probability-Low-once every 10-50yrs: moderate=once every 2-10yrs; High=once annually
Impact/Preparedness/Risk Threat 0=Very Low 1=Low 2=moderate 3=High

EVENT/ SCENARIO SPECTRUM	Early warning	Probability of Occurrence	Duration Impact	Impact on property	Impact on people	Time to Restore Facilities	RISK THREAT
Cyclone	96h-12h	Low	N/A	1	**1**	N/A	Moderate
Floods	96h-12h	Low	N/A	**1**	**1**	N/A	Low
Earthquake/Tsunami	5-8h	**low**	**N/A**	**1**	**1**	N/A	Low
V/L Accident							
Collision	< 1min	Low	<1hr	0	0	4 h	Low
Grounding	< 1min	Low	2-4hr	0	0	4 h	Low
Fire/Explosion	< 1min	Low	0.5-12h	1-2	1-2	12-96h	Moderate
Transport Accident							
Rail	< 1min	Mod	< 1min	0	1	6-48h	Low
Road Accident	< 1min	Mod	< 1min	0	1	<1h	Low
Pollution-							
Gas Release-Ammonia	< 1min	Low	1-24h	0.1	2	2-30d	Low
Phos /sulph acid spill	< 1min	Low	1-12h	0.1	1	2-4d	Low
Oil Spill	< 30min	Low	1-12h	1	1	1-2d	Low
Fire-Admin Building	< 10min	Low	1-72 h	1	1	12-96h	Low
Parking/Gates	< 1min	Low	1-12h	0	1	12-96h	Low
Function Failure							
Elec sub station	< 1min	Low	1-24h	0	0	12-48h	Low
Emergency Generator	< 1min	Low	1-24h	0	0	12-48h	Low
Pipelines failure	< 1min	Low	1-24h	0	0	12-48h	Low
Evacuation routes	< 1min	Low	1-24h	0	0.2	12-48h	Low
Fire Alarm failure	< 1min	Low	1-24h	0	0	12-48h	Low
Fire station failure	< 1h	Low	1-24h	0	0	12-48h	Low
Water system	< 1h	Low	1-24h	0	0	12-48h	Low

EVENT/ SCENARIO SPECTRUM	Early warning	Probability of Occurrence	Duration Impact	Impact on property	Impact on people	Time to Restore Facilities	RISK THREAT
Communications	< 1h	Low	1-24h	0	0	12-48h	Low
Medical facilities	< 1d	Low	1-24h	0	0	12-48h	Low
Sewerage failure	< 1h	Low	1-24h	0	0	12-48h	Low
Human related							
Labour Action/Strike	24h	mod	<24h	0	0	12-48h	Moderate
Civil disturbance	< 1d	mod	<24h	0	0	12-48h	Moderate
Terrorism & War							
State of War	<7 d	Low	>7d	0	3	>48h	Moderate
Bomb Threat	< 3h	Low	1-96h	0	1	>48h	Moderate
Hostage Threat	< 3h	Low	1-96h	0	0.5	>48h	Moderate
Mass Casualty	< 3	Low	1-96h	0	1	>48h	Moderate

8. MONITORING

MONITORING OF HAZARDS AND THREATS

Control strategy

Various control strategies can be as follows:

1. Compliance with Legislative and Statutory obligations,
2. Oil Spill Contingency Plan (OSCP),
3. Disaster Management Plan (DMP),
4. Standard Operating Procedures (SOPs),
5. Incident Action Plan (IAP),
6. Training and awareness,
7. Drills and Exercise,
8. Incident report and analysis,
9. Safety committee meetings,
10. Periodic Maintenance and Inspections,
11. Security Plan,
12. Ensuring that operators have sufficient information and training on safe industry practices including
    a. Storage and handling of dangerous goods,
    b. OHS compliance,
    c. Management accountability,
    d. Audits.
13. Speed limits for vehicles,
14. Regular testing of plans, procedures and personnel.

Control of hazards

- Following Standard Operating Procedures,
- Safety briefings,
- Equipment surveys and inspections,
- CCTV coverage,
- Permits to work/operate,
- Aids to Navigation,
- Proper communication,
- Oil/Chemical Spill response/combat equipment,
- Firefighting equipment,
- Use of appropriate Personal Protective Equipment.

Monitoring of hazards

For control of vessel movements within the port, two-way communication facility between port personnel ashore and vessels using the harbour is in place.

Also, a number of other methods are used to monitor the movement of traffic within port areas including:

- Visual observation,
- Basic radar surveillance,
- VTS assisted automatic tracking,
- Closed circuit television (CCTV),
- Automatic Identification System (AIS).

A person managing traffic movements in a port has the option to utilize the following means to communicate with vessels:

- Visual signalling equipment (signal lights, shapes, etc.),
- Loudhailer equipment,
- Telephones (fixed and mobile),
- VHF radio,
- Email.

In port, communications links are needed in addition to links provided for communication with calling vessels, e.g:

- VHF communications with tugs, pilot and other harbour crafts,
- Computer networks, and
- Personal mobile phones.

Monitoring Performance

Regular inspections of all port operations should be carried out by the Port Health & Safety Executive and members of the management team. The purpose of the inspection is to ensure compliance with the Ports Safety management system, the effectiveness of the management system and compliance with all Health & Safety statutory regulations.

The performance of all Port operations will be measured by a combination of both proactive and reactive measures including the following:

Proactive

- Periodic Audits,
- Reviews,
- Safety Inspections,
- Safety Committee Meetings.

Reactive

- Accident/ Incident/ Near Miss Reporting,
- Incident Investigation of the above.

The above activities shall be monitored on a regular basis to ensure that the operating procedures documented within the Health & Safety Management System are functioning correctly. From these findings, the Port will evaluate performance and identify improvements to be made to operational procedures and resources.

9. RECOVERY

9.1 GUIDELINES FOR ASSESSMENT OF TIME TO RESTORE JAWAHARLAL NEHRU PORT TO NORMAL OPERATIONAL CAPABILITY

An analysis of past incidents and time taken for restoration of the port to operational status is a useful tool- however the interpretation of the data results will require modifications in line with the intensity/duration of the current incident and steps and resources used to mitigate the effects pre to post cyclone. The following is a guideline

NATURE OF RESTORATION TO PORT UNITS	DEPTS & RESOURCES USED	RESTORATION
Administrative building damage	Roads & Bldg division	1-3 days
Power Supply – restore sub stations	Port Elec Divn	<2 days
Damage to tugs – floating craft	CME Dept.	2-18 days
Sunk/grounded vessels-	Salvage Efforts	1-3 weeks
Hydrographic survey channels/berths	Hydrographic Surveyor	1-3 weeks
Damaged buoys- shifting of buoys	DC-HM-Harbour works Divn I & II	4 days
Oil. Chemical Storage Tanks	Tank farms to check integrity	2 days
Road blockades-clear debris-fallen trees	Roads & Bldg dept	1 week
Repair damaged roads	Roads & Bldg dept	<1 week
Injury & infection-medical treatment	Medical Department	1 week
Flooding & stagnant water - clean drains	Public Health Divn (Civil)	3 days
Fishing harbour-survey-damaged trawlers	Fishing Harbour Divn	1-2 weeks
Civil works –sea wall- Jetty-fenders-	CE/Harbour works Divn	1 week
Electrical & mech works	Elect. & Mech. Department	1 week
Pipeline –manifolds-isolation valves	Exe. Engr, DM Divn	2 days
Spillage of chemical-Petroleum Oil products	DC-Salvage Team-Coast Guards	4 days
Damage to Mobile cranes	CME	<1 week
Checking of transit sheds, ware houses	Traffic department	3 days
Checking of quarters of port employees	CE Dept.	3 weeks
Checking and rectification of drinking water	CE Dept.	2 days

Rehabilitation

The emergency would continue till all fires have been extinguished with no risk of re-ignition. Even then, care is essential whilst entering the affected area. The Inspectorate of Factories or other agencies may wish to initiate an inquiry and should be consulted regarding the collection of evidence before it is disturbed.

Re-entering procedures

After an emergency, it shall be ensured that there is no chance of failure of equipment that can lead to leakage, and all source of sparks are extinguished and that structural supports are fixed additionally as required. The area should be absolutely safe to work. Only when these are ensured after that persons be allowed to enter the affected area.

Emergency shutdown procedures

Shutdown procedures are simple possibilities of knock effects elsewhere are remote as Port operations are not inter-linked. These are directed at fire control. In addition, to that process shutdown features are simple. Attempts to shut off all pumps, electric motors, water pumps etc. shall be made during emergency, appropriate valves shut and spills prevented from spreading.

The valves/pumps etc. shall be closed by persons nearest to the site or whose name exist in the fire organization chart.

Action off site

The off-site actions in the event of a major emergency are described in the offsite emergency plan. These include assisting the district authorities in any control work, rescue efforts technical guidance and providing the maximum resources possible for ensuring against loss of fire and property damage.

As the offsite efforts would be led by district authorities, Jawaharlal Nehru Port Authority would render all help and assistance and work under the guidance of the district authority.

Cleanup procedure

The oil collected in the bonded enclosure in the event of a major tank leak shall be skimmed off and re-pumped into the respective product tank. In case of spillage outside the bonded area, no waste oil should be allowed to travel away with the storm water as drain gates will be shut off. Accumulated oil in any sewers shall be pumped through portable pumps into the tanks. In addition, since the Port store acidic and alkaline materials, there is need of neutralization similar clean up.

It is not expected that any of the oils reach out into the ground water system and there by causes the need for extensive spill cleanup procedures.

Procedures for testing and updating plan

Any changes to the plan can and must be made from time to time to keep the same updated at all times. Such changes must be authorized by the Port in-charge the and the changes recorded and notified to all concerned staff.

Assembly Points

Assembly point is situated near the security cabin and entry gate. All the Port personnel should report at the assembly point and gather the information about actual place of fire and get the instructions.

9.2 RESPONSIBILITY FOR TERMINATING THE RESPONSE

The decision to terminate a response is taken by the CIC in consultation with the JNPA CHAIRMAN or CMG.

CONDITIONS FOR TERMINATION

Marine Response Operations 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 ready until **shoreline response** operations have been completed.

Shoreline Response Operations should be terminated when:

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

Shoreline clean-up operations may be terminated only upon the instruction of the **MPCB/Coastguard.**

Land Spill Response Operations should be terminated when:

- Oil/Chemical has been recovered to the extent possible,
- Area has been declared “Risk or Hazardous” free.
- Source of leakage is stopped and the condition of the area is safe for operation.

Land spill clean-up operations may be terminated only upon the instruction of the **MPCB and PNGRB.**

Fire Extinguishing operation should be terminated when:

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

Response action can also be terminated as per the Warning signals given by the agencies**.**

9.3 STAND-DOWN PROCEDURES

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.
- Ensure that all equipment is returned to the owner.

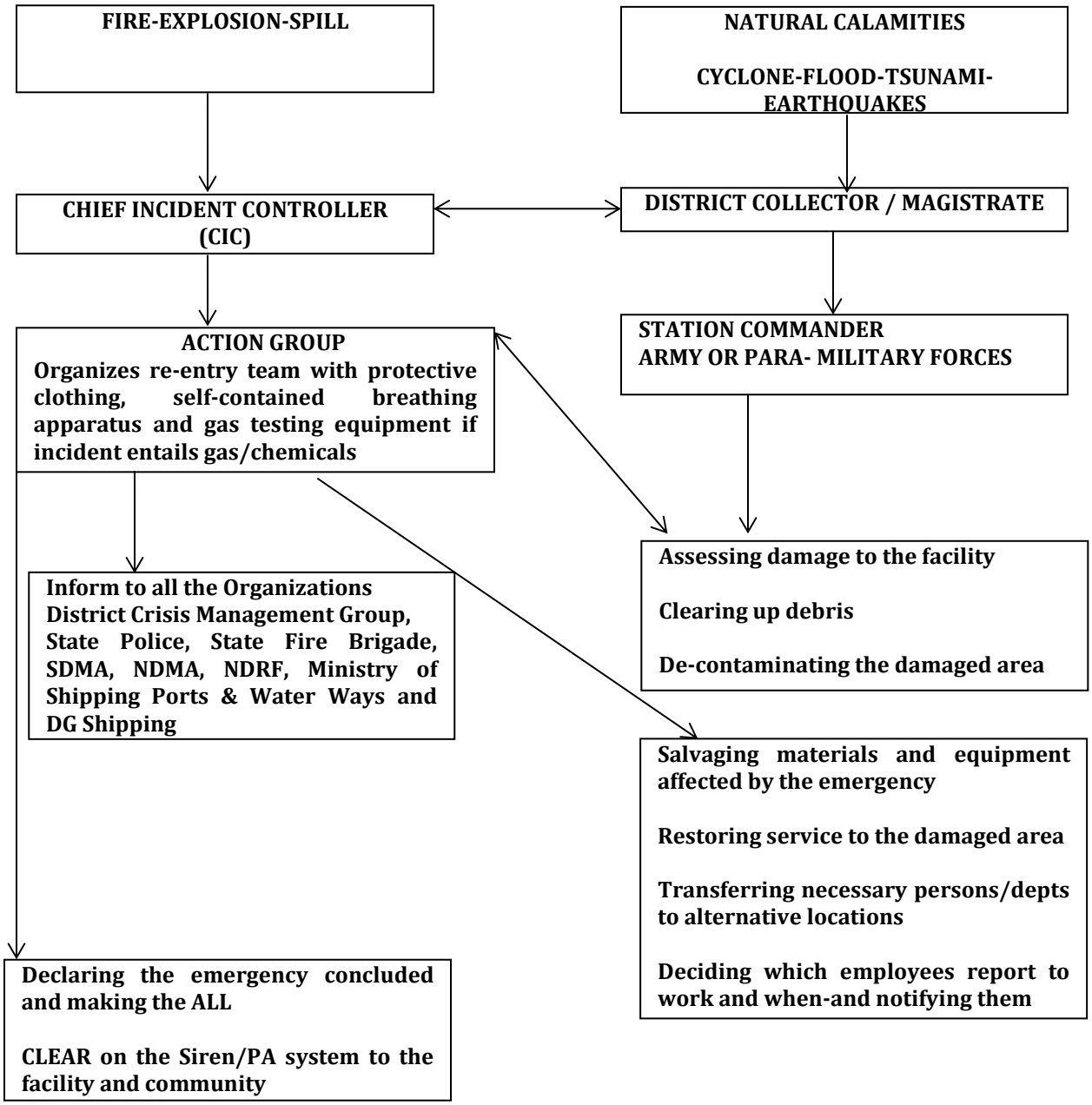
Debrief

The SIC may hold a post-spill 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).
- Damage in terms of life, injury and loss of property should be assessed.
- Any other issues required to be communicated.

Incident Report

The Chairman/Dy. Chairman of JNPA, COMDIS-6 and relevant authority may request the preparation of an Incident Report. This should follow the debrief outline or other format as specified.



DE-ACTIVATION OF THE PLAN-RECOVERY-RESTORATION

Note: *-For natural calamities etc. at the District level-the District collector or District magistrate will make the necessary initiative through the paramilitary group. The Port Chairman or CIC may also request Para-military personnel to assist when the accidents have originated at the port premises.*

Specific procedures for recovering from an emergency and re-entering the facility can hardly be provided, since they will have to be determined on a case by case basis, depending on the type of accident and the severity of the damage suffered. However, provision would be made for the following:

1. Inspecting the damaged area
2. Declaring the emergency concluded and making the "all clear" known to the facility employees and the community
3. Deciding which employees would report to work and notifying them Beginning an investigation into the causes of the emergency
4. Assessing the damage to the facility
5. Transferring necessary operations to alternative locations
6. Decontaminating the damaged area
7. Restoring services to the damaged area
8. Clearing up the debris
9. Salvaging material and equipment affected by the emergency
10. Restoring the parts of the facility affected by the emergency
11. Determining responsibilities and instituting possible insurance and damage claims.

9.4 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.

APPENDIX A
TERMS AND DEFINITIONS

On-Site Plans address incidents originating within the port area whereas
Off-Site Plans address incidents originating outside the port area but affecting the port operations or from port to outside
Risk is defined as the chance of an adverse event occurring in some period of time or in a specific circumstance, in the process of engaging in an activity
A hazard is a phenomenon which may cause disruption to persons and their infrastructure; and is an undesirable outcome in the process of engaging in an activity
Disaster - An event which can cause immense damage and disruption to the (Port and its) infrastructure causing loss to lives and property;
An **Emergency is** a serious sudden situation or occurrence that happens unexpectedly and demands immediate action to correct or to protect lives and/or property.
A Crisis is an unstable situation of extreme danger. and may lead to the following elements;
- Surprise- -Rapid flow of events-Lack of or insufficient information-Internal conflict-confusion
Disaster Management is a set of actions and processes designed to lessen disastrous effects before, during and after a disaster.
Preparedness are those measures undertaken in advance to ensure that individuals and agencies will be ready to react, such as emergency plans, logistical support and resource, inventories, and emergency information & communications systems
Response - Those measures undertaken immediately after a disastrous or hazardous event has occurred and for a limited period of time thereafter, primarily to save human life, property, treating the injured, prevent further injury and other forms of property loss and to mitigate disruption. They include response plan activation, declaration and communication of emergency to the concerned potential population and facilities at risk, opening and staffing of emergency operation centres, mobilization of resources, issuance of warnings and directions and provision of aid.
Mitigation - Those measures and activities aimed at reducing or eliminating hazards or lessening the impact of the event.
Prevention - Mitigation of hazard effects through public education, early warning or detection systems, safety systems, building and land-use codes and regulation,
Recovery - Those measures undertaken to restore normal conditions. The time frame for recovery begins as soon as a reduction in critical response activities permits the re-allocation of resources and could include physical restoration and reconstruction.

APPENDIX B
INTERNAL ACTION PLAN IN CASE OF CYCLONE/FLOODS/TSUNAMI OTHER NATURAL CALAMITIES

In order to tackle natural calamities above mentioned, the following plan of action is to be adopted.

On receipt of warning on cyclone / floods/ Tsunami / other natural calamities from the State Government authority / Indian Metrological Department / Cyclone warning centre, the Port Control / Shipping Assistant shall immediately inform to the Harbour Master who is the site incident controller. The Harbour Master shall get such message confirmed from the above sources and apprise the Dy. Conservator & PFSO (Chief incident controller). The Dy. Conservator & PFSO depending on intensity shall apprise the Chairman/ Dy. Chairman accordingly. If storm signal 7 is hoisted, the Dy. Conservator & PFSO in consultation with Chairman / Dy. Chairman the action plan as stipulated hereunder shall be put into operation.

The Dy. Conservator & PFSO shall inform all the HODs and Harbour Master to take action as per the plan. Harbour Master will inform the emergency control centre (Shipping Asst.,), who shall inform the Fire control and Traffic control to take action as per action plan.

To tackle natural calamities there are two groups viz., (1) Crisis Management Group (2) Action Group. Crisis Management Group consists of Chairman (Chief Emergency controller), Dy. Chairman, Dy. Conservator & PFSO (Chief Incident controller), other HODs, Sr. Commandant, CISF. The Chairman / Dy. Chairman convenes an emergency core group meeting after receipt of the emergency call, review, operational preparedness and mobilize resources to tackle the emergency. Liaises with District Administration, if required to get additional assistance.

Action Group consists of Harbour Master (site incident controller), Fire Officer, Executive Engineers (Civil, Electrical, Electronics, Mechanical), D.T.M. , Dy. CMO and Dy. Commandant, CISF. Make assessment of the situation and inform to the emergency control centre to get additional assistance if required. After the meeting the action group members proceeds to their respective allotted location to tackle the situation.

CONTACT DETAILS

TELEPHONE LISTS (OTHER EMERGENCY ORGANIZATIONS AND THE PORT EMERGENCY PHONE NUMBERS ARE AS FOLLOWS).

JAWAHARLAL NEHRU PORT AUTHORITY

Name of Authority	Contact Number		
	JNPA Office	RC Office, Mumbai	Residence / Mobile
Chairman	27244001 / 67814001 27242290 (Direct)	22832458	9819494001
Dy. Chairman	27244011 / 67814011 27242219 (Direct)	22045372	9819494002
Dy. Conservator	27244171 / 67814171 27242301 (Direct)	---	9819494004
General Manager (Traffic)	27244191 / 67814191 27242377 (Direct)	---	27472661 / 9819494011
General Manager (M & E Engineering)	27244181 / 67814181 27242302 (Direct)	---	27564505 / 9819494014
General Manager (Finance)	27244081 / 67814081 27242241 (Direct)	---	9769769100
General Manager (Administration) & Secretary	27244021 / 67814021 27242233 (Direct)	---	9819494003
General Manager (Port Planning & Development)	27244156 / 67814156 27242326 (Direct)	---	9819494005
Chief Medical Officer		---	
Harbour Master	24274173 / 67814173 27242334 (Direct)	---	27710513 / 9819494007
Sr. Dy. Chief Medical Officer	27472665	--	27472980 / 9819494015
Sr. Manager (P& IR)	27244023 / 67814023 27242639 (Direct)	---	27472314 / 9819494013
Manager (Finance) - I	27244087	---	25205241/ 9867385341
Dock Master - I	27245175 / 67815175	---	9323407839
Dock Master - II	27245175 / 67815175	---	9820243717
Manager (Main Container Berth)	27245003 / 67815003	---	9819999226
Manager (Liquid Cargo Berths & NSDT)	27244191 / 67814191 27242377 (Direct)	---	27719349 / 9819494010
Manager (Utility Services)	27244196 / 67814196 27242328 (Direct)	---	27743137 / 9819494015
Manager (ICD & NSDT)	27245005 / 67815005	---	9820160457

Name of Authority	Contact Number		
	JNPA Office	RC Office, Mumbai	Residence / Mobile
Manager (Port Equipment Maintenance)-I	27245001 / 67815001	---	9819494918
Manager (Materials)	27244198 / 67814198	---	9819999227
Manager (C&C) & MR	27244699 / 67814699	---	9819999227
Manager (Marine Engineering)	27245166 / 67815166	---	09830772584
Manager (Legal)	27244068 / 67814068 27242326 (Direct)	---	9819930549
Manager (Admn.)	27244025 / 67814025	---	9820618326
Manager (Estate) (Shri U.K Sharma)	27244066 / 67814066	---	9819999231
Manager (PP&D) – I (Shri SSP Patil)	27244160 / 67814160	---	9819999223
Manager (PP&D) – II (Shri N.A. Deshpande)	27244158 / 67814158	---	9920166500
Manager (PP&D) – III (Ms. Y. Bhat)	27244159 / 67814159	---	9819042609
Manager (MS)	27244138 / 67814138 27242317 (Direct)	---	9833673162
Dy. Manager (MS)	27244038 / 67814038		9820864080
Sr. Commandant (CISF)	27244216 / 67814216 27242294 (Direct)	---	9819999234
Dy. Commandant (CISF)	27244222 / 67814222	---	27472246 / 9819494017
Asstt. Commandant (CISF)	27244222 / 67814222	---	27472323
Asstt. Commandant (CISF)	27244682 / 67814682	---	9757090291
CISF Line Township	27472275 / 27472356	---	---
Manager (Safety) & (MC & PC)	27245205 / 67815205	---	9833687769
Manager (Fire & Safety)	27245173 / 67815173	---	9819711965
Master Unit Sub Station (MUSS), JNPA	27244691 / 67814691 27869496 (Direct)	---	---
Shift In-Charge (CT)	27245013 / 67815013	---	---
CISF Control Station	27244545 / 67814545 27242354 (Direct)	---	---
Central Gate Complex – CISF	27244682 / 67814682 27242354 (Direct)	---	---
North Gate Complex – CISF	27245195 / 67815195 24272362 (Direct)	---	---
South Gate Complex – CISF (ODC Gate)	27274681 / 67814681	---	---
Admn. Building Reception – CISF	27244218 / 67814218	---	---

Name of Authority	Contact Number		
	JNPA Office	RC Office, Mumbai	Residence / Mobile
JNP Hospital	27473568 / 67813568 24743560 / 67813560	---	---
Ambulance Room – Shift Office	27245200 / 67815200	---	---
Fire Station	27245000 / 67815000 27245100 / 67815100	---	---
Port Control Station	27245151 / 67815151 27245178 / 67815178 27242367 (Direct)	---	Marine VHF Channel No. 13
JNPA Township Main Gate	27243570 / 67813570	---	---
JNPA Pump House	27245179 / 67815179	---	---
NSFT			
Safety Officer	---	---	86507040848
OPS SDM	---	---	8657895582
BMCTPL			
Dy. Manager, Security	---	---	9920717038
Dy. Manager, Safety	---	---	7780222207
D.P. World			
HSE Head	---	---	7299977154
Shift Suptd.	---	---	9930405199
GTI			
Shift Manager	---	---	9653283831
HSSE Executive	---	---	9821816048
BPCL			
Safety Officer	---	---	9008713924
OPS Officer	---	---	9874806175

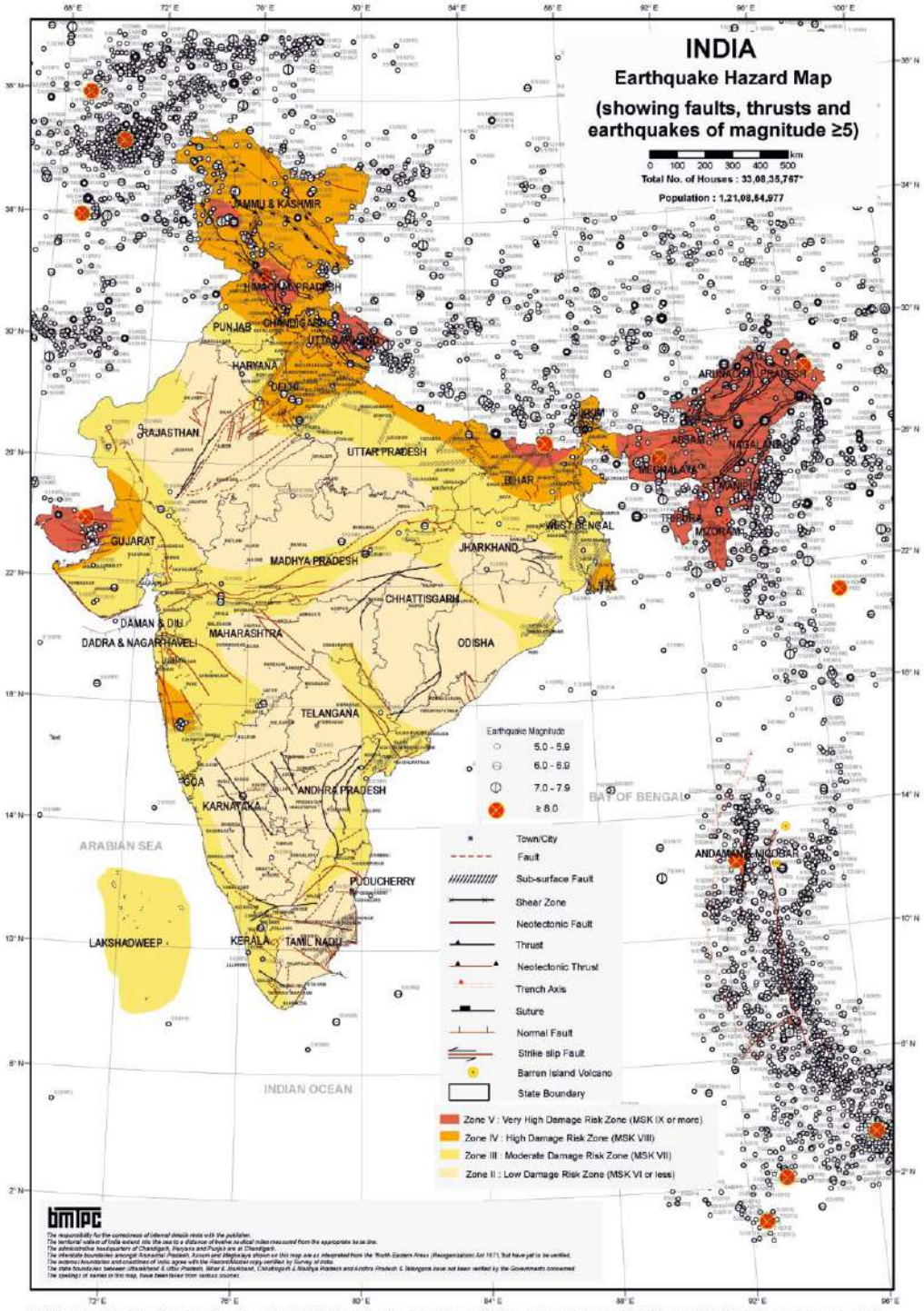
GOVERNMENT SERVICES

Name of Authority & Address	Telephone Number
Dy. Director, Inspectorate Dock Safety,Operation Service Centre, 3rd Floor, Opp. GPO, P.D. Mello Road, Mumbai – 400 038.	2269 2180 Direct 2262 4321 ext.3511/ 3558 Fax No. - 2261 3391
Asstt. Director, Inspectorate Dock Safety,	27245099
POC Ground Floor, Canteen Building,JNPA, Navi Mumbai - 400707	9028807870
Director General, Factory Advice Service & Labour Institute, Central Labour Institute, N.S.Mankikar Marg, Sion, Mumbai – 400 022.	2409 2203 Fax No. - 407 1986
Member Secretary, Maharashtra Pollution Control Board, Mumbai	22659107, 22614348/92345, Fax No. - 22612320
Regional Officer, MPCB, CBD, Navi Mumbai.	27572739, 27572940

Name of Authority & Address	Telephone Number
Chief Controller of Explosives A Block CGO Complex Fifth floor,Seminary Hills Nagpur – 440006	(0712)2510248
Joint Chief Controller of Explosives	27575946, 27575946,
A-1 and A-2 Wing, 5th Floor, C.G.O. Complex, CBD	27564941
Belapur, Navi Mumbai – 400614	
Directorate of Industrial Safety and Health	2494 2230
District Collector, Raigad, Alibag.	95 – 0245 – 222001
Dy. District Collector Raigad, Alibag	95 – 0245 – 222081
Home Guard, Raigad, Alibag	95 – 0245 – 222012
Municipal Commissioner, Navi Mumbai CBD, Belapur, Navi Mumbai	27571095
MSEB, Uran	27222235 ext. 400
Municipal Commissioner, Thane	25336523
District Collector, Thane	25344041
Tahsildar, Uran, Raigad	27222352
Health & Medical	
Civil Surgeon, Raigad, Alibag	95 – 0245 – 222157
Chief Medical Office, Thane Municipal Corporation	25347784
Health Officer, Raigad, Alibag	95 – 0245 – 222077
Asst. Medical Officer, Navi Mumbai Municipal Corporation	27573781, 27573028
Civil Surgeon, Thane	25341541
Health Officer, Thane	25369682
Doctor on Duty	
L.T.M.G. Hospital, Sion, Mumbai	24076381 / 24072737
J.J. Hospital, Byculla, Mumbai	23760943 / 23735555
KEM Hospital, Parel, Mumbai	24136051
G.T. Hospital, Mumbai	22621464
Indira Gandhi General Hospital, Uran (Municipal)	27222233
Civil Hospital, Thane	25342582
Sir M. Yusuf Seamen Welfare Foundation, Nhava, Tal-Uran, Raigad	24938740
MGM Hospital, CBD, Belapur, Navi Mumbai	27570219
Nanavati Hospital, Mumbai	26182255
Transport	
Depot Manager, S.T. Depot, Uran Naka, Uran	27222333
S.T. Controller, S.T. Depot, Thane	25331892 / 25331893
Depot Manager, S.T. Depot, Panvel	27452701
Controller, Navi Mumbai Municipal Transportation, CBD, Belapur	27655561 / 27801895

Name of Authority & Address	Telephone Number
Civil Defense	
Director of Civil Defense, Mumbai	22843667
Addl. Controller of Civil Defense, Mumbai	22611928
Dy. Controller of Civil Defense, Uran.	27222343
Home Guard, Alibag	(0245) – 222012
Fire Services	
Nad, Karanja, Uran	27222520
Sheva	27242265
MSEB, Bodakvira, Uran	27222235
ONGC, Uran	222916035, 27234444-46
ONGC, Nhava	27211100
Fire & Emergency Response Centre, Rabale	27680207, 27680208
Vashi, Navi Mumbai	27660101
CBD, Belapur, Navi Mumbai	27572111
Nerul	27707101
Kalamboli	27420138
Panvel	27452337
Wagle Estate, Thane	25323547, 25323577
Thane City	25331399, 25366401, 25401589
ONGC, Panvel	27486030/6660, 27453673
Mumbai	23076111, 23086181/101
Mumbra	25352424
Mumbai Port Trust	22614321 (Extn. 2260/2261)
Police	
District Superintendent of Police, Raigad, Alibag	(0245) – 222093
Police Commissioner, Thane	25344499
Police Commissioner, Navi MumbaiCBD, Belapur, Navi Mumbai	27684860
Asst. Commissioner (Traffic Police) Navi MumbaiCBD, Belapur, Navi Mumbai	27684860, 27576282
Police Control Room, Mumbai	2620111, 22621855/ 100
Police Control Room, Raigad	(0245) – 222100
Police Station, Sheva, Uran	2724 2264
Water Supply	
Water Supply Station, JNPA	27242243
Supdt. Engineer, MWSSB, Thane	25427855
Executive Engineer, MWSSB, Panvel	27453632

APPENDIX C
IMPORTANT MAPS

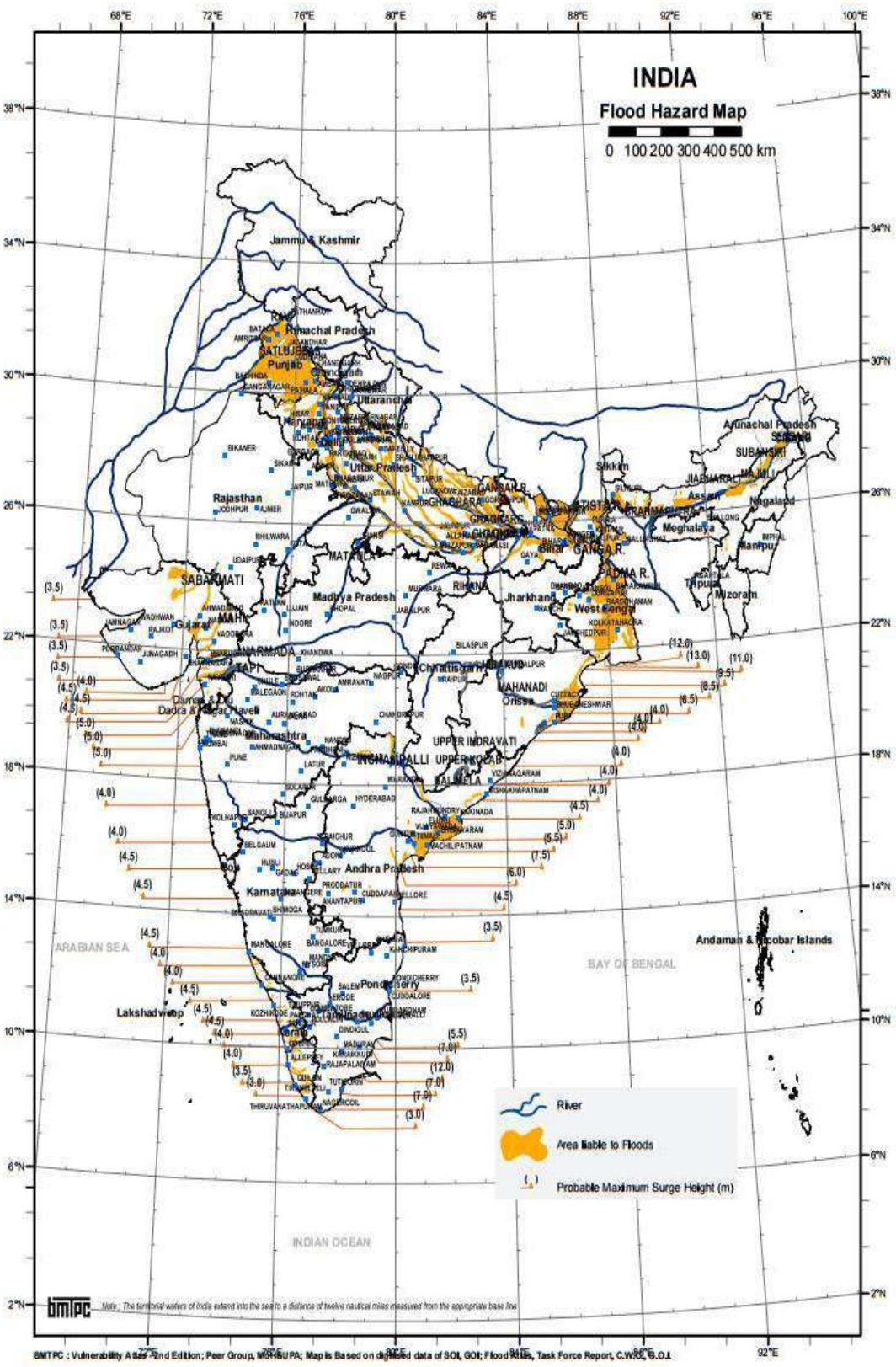


BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

EARTHQUAKE HAZARD MAP

BMTPC : Vulnerability Atlas- 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code: 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

WIND HAZARD MAP



FLOOD HAZARD MAP

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI;Thunderstorm data from IMD. Disclaimer: The maps are solely for thematic presentation.

THUNDERSTORM INCIDENCE MAP

APPENDIX D
LIST OF REFERENCE & LINKS

The Disaster Management Act, 2005:

https://ndma.gov.im/images/ndma-pdf/DM act2005.pdf

National Disaster Management Plan, 2016:

https://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf

National Disaster Management Plan, DRAFT 2018:

https://ndma.gov.in/images/pdf/NDMA-2018-Revised-Draft-1-2018OCT16-A.pdf

Post 2016 Global Framework

https://europa.eu/capacity4dev/dev-policy/document/outcome-document-post-2015-special-event-25-september-2013

PM Modi outlines point Agenda for Disaster Risk Reduction

https:/pib.nic.in/newsite/printRelease.aspx/relid=156233

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