Chapter -5

DISASTER MANAGEMENT

5.1 Introduction

Disaster Management is a multi-disciplinary subject with a pro-active approach.

The thrust is on vulnerability reduction to all types of hazards, be it natural or man-made. This is not an easy task to achieve, keeping in view the vast population and the multiple natural hazards to which this country is exposed. In a nutshell disaster management is a comprehensive integrated program of mitigation, preparedness and management. However, if we are firm in our conviction and resolve that the Government and the people of this country are not prepared to pay the price in terms of massive casualties and economic losses, the task, though difficult, is achievable and we shall achieve it.With a massive awareness generation campaign and building up of capabilities as well as institutionalization of the entire mechanism through a techno legal and techno financial framework, we are gradually moving in the direction of sustainable development.

Our vision 2020 is to build a safer and secure India through sustained collective effort, synergy of national capacities and people's participation. What looks a dream today will be transformed into reality in the next two decades. This is our goal and we shall strive to achieve this goal with a missionary zeal. The path ahead, which looks difficult today, will become a lot easier as we move along together.

What is a Disaster ?

(i) A Disaster is an unusual occurrence characterized by sudden calamity, causing great material and human damage, loss and distress.

(ii) A complete definition of disaster may be an event, concentrated in time and space, which threatens the society, or its subdivision, with major unwanted consequences. It is caused as a result of collapse of precautions which had hitherto been accepted as adequate.

TYPES OF DISASTER

Generally, disasters are of two types – Natural and Man-made.

Man-made disasters are events which, either intentionally or by accident cause severe threats to public health and well-being. Because their occurrence is unpredictable, man-made disasters pose an especially challenging threat that must be dealt with through vigilance, proper preparedness and response.

A natural disaster is the effect of a natural hazard (e.g. flood, tornado, hurricane, volcanic eruption, earthquake, or landslide) that affects the environment, and leads to financial, environmental and/or human losses. The resulting loss depends on the capacity of the population to support or resist the disaster, and their resilience. This understanding is concentrated in the formulation: "disasters occur when hazards meet vulnerability." A natural hazard will hence never result in a natural disaster in areas without vulnerability, e.g. strong earthquakes in uninhabited areas.

5.2 Management of Train Accident

Phases of disaster management

Phase-I (Golden Hour)

In the period immediately after the accident where grievous injuries to passengers, loss of property etc. takes place, action has to be taken on war footing to render definite medical care which gives relief to affected persons and also help them to overcome the trauma. This first one hour period is known as the **Golden Hour.**

During this **Golden Hour** period, efforts should be made to render every possible medical aid to the injured.

Phase-II (Arrival of Crack Team)

On reaching at accident site, the crack team shall perform following activities: -

- Extrication/removal of injured passengers from the coach.
- First Aid to the injured.
- Relieve panic and create re-assurance among passengers

Phase-III (Site Organisation)

For the site organisation to cater for

1. Medical relief camp
2. Security of luggage
3. Clue preservation
4. Relief rescue and restoration
5. Coordination with civil and press
6. Liaison with control
7. Communication- STD phones, Walkie-talkies, mobiles, PA System etc.
8. Lighting arrangements
9. Commercial-information booth, Arrangement of Tea, Food and Water.
10. Evacuation of passengers, payment of ex-gratia etc.

Special Task Teams

- Medical Relief and transportation of injured to hospitals.
- Commercial and RPF Security of luggage, parcels and Railway property
- Operating Liaison with control and arranging logistics including shunting.
- Extreme care must be exercised while tackling damaged coaches. Cold cutting equipments should be used on coaches containing passengers so as to avoid burns to passengers by use of flame cutting.

Handling of dead/injured

- Dead bodies should be handled with care and respect.
- Cover dead bodies with white shrouds.
- Expeditious issue of death certificates.
- List of dead and injured must be passed on to control and disaster management cell from time to time.
- A photographer should take coloured photographs of the dead and injured.
- Availability of free food, drinking water, tea, etc.
- Correct picture to media
- Press and other media should be given correct picture timely.

Phase-IV (Handling injured Passengers)

Phase-IV mainly refers to dealing with injured passengers. Following action must be planned:

- Relief trains clearing injured or stranded passengers must get overriding priority.
- Road vehicles can also be arranged for stranded passengers.
- List of injured, hospital-wise, should be conveyed to all concerned and displayed at prominent locations.
- Ex-gratia payment should be arranged.

Phase-V (Restoration of Traffic)

Restoration operation should be planned and acted upon without affecting the relief operations. Restoration of passenger services gives a senses of normalcy, besides providing means to relatives/dependents of victims to visit them and attend to them.

Do's

- Arrange to protect the adjacent line/lines and then the affected line.
- Send information through the quickest means.
- Take action to save lives/render first-aid.
- Call for doctors and volunteers on the train, seek their assistance.
- Seek assistance of Railwaymen on the train for attending to the injured and for other relief operations.
- Make a quick assessment of the assistance needed and advice control or nearest Station Master.
- Arrange protection of belongings of the passengers and railway property through RPF, GRP and other railway staff.

Don't's

- Lose patience.
- Ignore the safety aspects.
- Manipulate the control charts.
- Argue with the station staff.

PASSENGER CARE

General

- Providing assistance to passengers and their relatives/dependents is of utmost importance in helping them relieve their misery.
- Injured passengers and their relatives/dependents are to be treated with utmost courtesy and sympathy so as to alleviate their trauma and discomfort.

Provide factual information to public with regard to accident.

convey any other information which is of use to passengers.

Convey specific information which is of use to relatives/dependents of dead and Injured passengers.

5.3 Disaster Management in Air Accidents

To Survive an airplane crash or emergency landing is possible. While the news usually reports on catastrophic loss of life as a result of an airplane crash. Most of these emergency landings or minor crashes are survivable if passengers remain calm and follow directions. To survive an airplane crash, pay close attention to the safety speech by the cabin staff.

- Review the safety card provided by the airline.
- Look around the plane to orient yourself. Count the number of rows to the exit .
- Make sure your seat belt is tightly fastened across the lap, and leave it fastened throughout the flight.
- Few common sense precautions to increase the ability to survive an airplane crash - Wear long sleeved cotton garments and sensible shoes.
- Have a jacket or blanket ready in case the airplane crash occurs in a cold area.
- When the cabin staff indicate that an airplane crash or emergency landing is going to occur, follow their directions closely.
- Make sure that your luggage is properly stowed, and that no sharp objects are in your pockets.
- Assume the crash position by bracing your hands on the seat in front of you and tucking your head against the chest.
- Brace your feet firmly on the floor of the aircraft, and hold the crash position until the airplane has come to a complete stop.

- An airplane crash is often accompanied by smoke and fire. The smoke can be very toxic,so it is important to protect your lungs.
- Put your oxygen mask on before helping other passengers. When evacuating or moving in a smoke filled aircraft, protect your airway with a damp cloth over your nose and mouth.
- When the airplane stops moving, start evacuating. Leave your belongings behind.
- Remain calm, and assist other passengers if they need help.
- Move towards the nearest exit and check to make sure that conditions are safe before going outside.
- If the airplane crash has occurred in water, inflate your life vest after you exit the plane, and get rid of your shoes and heavy garments to make it easier to swim.
- If the airplane crash is on dry land, exit the plane safely and wait for rescue team to arrive.

Knowledge Check

In the last few years, there has been an increased incidence of civil disasters; the spectrum of possible catastrophes has also dramatically increased as a result of an increasing technologically sophisticated society. Disaster preparedness plans must encompass the possibility of nuclear accidents, hotel and high-rise fires, terrorist attacks, aviation accidents, bomb blasts, riots and industrial explosions as well as natural calamities such as floods, epidemics drought and cyclone's

The emphasis of medical management shifts from individualised treatment to standardised therapy for disaster victims with the aim of providing maximum benefit to a maximum number of salvageable patients.

During the last 10 years varied terrorist activities have become increasingly common as expressions of the opinions of extreme political groups, especially in India.

Transportation is of vital importance when coping with such disasters. Ambulances must be requisitioned for transporting the seriously injured to hospitals. This delay at times resulted in late initiation of the management of a few patients. During the bomb blasts, rapidly growing crowds consisting of curious bystanders and over-enthusiastic paramedical and medical personnel occasionally hampered a rapid triage.

Triage System

Triage (French: sorting) means categorization and distribution of casualties, which establishes priorities and proper location of treatment. The triage must be carried out at the disaster site as well as in the hospital.

Three factors are essential to an efficient triage system: identification, communication and transport.

1. Identification: Casualty categorization not only includes initial evaluation of the injuries but assigns a value to the injury - relative to the mass casualty situation. Patients were classified according to their therapy needs viz. 1) requiring only outpatient treatment. 2) requiring indoor admission and expectant treatment, 3) needing immediate exploration and 4) capable of tolerating delayed treatment. Sections for each group were temporarily created. Subsequently, these patients were managed effectively by different groups of doctors.
2. Communication: The communication system though sub-optimal, was useful in rapid notification of all the necessary support groups. There was no effective communication between the disaster site, transport vehicles and referral facilities such as the hospitals.
3. Transport: For transporting patients to operation theatres and wards.
4. Provision for temporary morgue facilities. Photographs of the deceased were displayed on the Notice Board. A relatives' guidance cell in front of the Emergency Room, efficiently managed
5. Reduction in mortality and morbidity in mass disaster can be achieved only by a well organized, concise but flexible pre-disaster situations, to avoid potential chaos at such situations. The need to develop such a plan in order to accurately assess the magnitude of the disaster and make provision for sufficient trained personnel and logistic support to meet the demands of the mass disaster.
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7. Communication is a major bottleneck in case of any major disaster particularly when the traditional network system already in force brakes down. In order to strengthen communications, it has been decided that police network (POLNET) will also be used for disaster management.

8. For emergency communication, mobile satellite based units which can be transported to the site of the disaster are being procured. This provides for a dedicated communication system for disaster management with built in redundancies.

Besides the satellite, communication and education can play a proactive role in mitigation through awareness about the types of disaster and as to how prevention measures can be taken up.

Which agencies need to be involved ?

- Police
- Fire
- Ambulance
- Hospitals
- Clinics
- Doctors
- Red Cross
- Blood Banks
- Marine operations (are there bodies of water?)
- Coast guard
- Department of transportation
- Departments of environment (if there is clean-up involved)
- Airlines
- Rail companies
- Local transit companies
- Bus companies (in case of evacuation)

Disaster Management is a comprehensive, integrated program of mitigation, preparedness, response, and recovery for emergencies/disasters (all-hazards) of any kind. No public or private entity is immune to disasters and no single segment of society can meet the complex needs of a major emergency or disaster on its own. **"No man is an island, entire of itself;** every man is a piece of the continent, a part of the main." When disaster strikes,

the community is clearly divided into only two entities; those who need help and those who can provide help. In its simplest form, the bottom line of Disaster Management is **helping people help people!**

5.4 Disaster Management in Drought

Drought is a temporary reduction in water or moisture availability significantly below the normal or expected amount for a specific period. This condition occours either due to inadequacy of rainfall, or lack or irrigation facilities, under-exploitation or deficient availability for meeting the normal crop requirements in the context of the agro-climatic conditions prevailing in any particular area. This has been scientifically computed as Moisture index (M I). There is a drought in jaisalmer (Rajasthan) (Average rainfall 200 mm) if rainfall is not sufficient to grow grass an paltry coarse-grains, whereas in Bolangir or Koraput (Orissa-rainfall above 1000 mm) there is a drought if there is not enough rainfall for bringing the paddy crop to maturity

- Close monitoring of the emerging drought scenario so as to develop an advance warning system
- Relief measures required for providing immediate succour to the affected population and the upkeep of the cattle wealth, and if possible to integrate it with long term objectives and
- Hammering out an alternative crop strategy for maximum possible retrieval of the Kharif crop and a better ensuing Rabi crop.

Since drought prediction methods are at a very nascent stage, IMD (Indian metrological department) has made efforts to provide a long range forecast of monsoon rainfall. In 1988, a parametric power regression model was developed on the basis of global and

regional meteorological and oceanic parameters (physically related monsoon and rainfall) for estimating the monsoon rainfall of India. The model is successful in estimating the correct nature of monsoon and can be utilized for drought mitigation planning. IMD carries out rainfall monitoring unto district level on a real time basis. All this helps in estimating the drought conditions over any particular region.

5.5 Disaster Management in Cyclone

Cyclones in India generally strike the East Coast; some of the Arabian Sea Cyclones strike the west coast of India as well mainly the Gujarat and North Maharashtra coast. Out of the storms that develop in the Bay of Bengal, over 58 percent approach or cross the east coast in October and November.

Possible Risk Reduction Measures

a) Risk Assessment

The evaluation of risk for a tropical cyclone is a relatively straightforward process. A hazard map should be prepared for any given year. The following information could be used to estimate the probability of storms of cyclones of various intersections that may strike different parts of the county.

1. Analyses of climatologically records to determine how often tropical cyclones have struck- their intensities and locations.
2. History of wind strengths, frequencies, height and location of storm surges frequencies of flooding.
3. Information about tropical cyclone occurrences in the past 50-100 years over the ocean adjoining the part of the country in question.

b) An Integrated Warning/Response System

Specific preparedness measures to counter the impact of tropical cyclones may be classified into two categories:

1. Those of long term or seasonal nature, which need to be planned, implemented and operationally tested and co-coordinated by means of simulation exercise well before a seasonal threat commences. Among these are pre-season co-ordination meetings at headquarters, district and local levels, at which operational contingency plans are reviewed and amended, training and community preparedness programs conducted and community lifelines.

2. Those of a short-term nature, which relate to a state of readiness to cut in once a contemporary cyclone threat is announced. Among these are domestic, vocational and animal husbandry arrangements to safeguard the survival, property assets and livelihoods of individual families and communities.

c) Public Warning System

The three main objectives in a tropical cyclone warning are:

1. To alert the people to the danger by announcing the existence of a threat due to a cyclone.

2. To identify the areas where people will be actively threatened by cyclone and where communities should monitor further warning announcements, and

3. To call the people to action by recommending specific preparedness activities, which may be part of, and integrated warning/response plan to protect vulnerable resources.

d) Cyclone Warning Organizations

- Area Cyclone Warning Centre (ACWC's) at Kolkata, Chennai and Mumbai
- Cyclone Warning Centres (CWC's) at Bhuvaneswar, Vishakhapatanam and Ahmedabad.
- Cyclone Warning Dissemination Systems: Satellite based communication system for transmission of warnings. 250 sets have been installed in cyclone prone areas of east and west coast.
- National Data bouy Program: 12 buoys deployed in northern Indian Ocean for meteorological and oceanographic data
- MST (Mesosphere, Stratosphere, Troposphere) Radar installed at Thirupati.

POST DISASTER ASSISTANCE

The initial response by local authorities could include:

- Evacuation
- Emergency shelter
- Search and rescue
- Medical assistance
- Provision of short term food and water
- Water purification
- Epidemiological surveillance
- Provision of temporary lodging
- Reopening of roads
- Reestablishment of communications networks and contact with remote areas
- Debris clearance
- Disaster assessment
- Provision of seeds for replant

5.6 Disaster Management in Floods

Floods are the most common natural disasters. They are usually caused by heavy rainstorms that overflow bodies of water or gather on certain sections of land. Floodwater can gather slowly or quickly, as in a flash flood.

Flash flooding is the most dangerous type of flooding. This occurs when a man-made structure, like a dam or levee, collapses from too much water.

Flood effects can be local, impacting a neighborhood or community, or very large, affecting entire river basins and multiple states.

However, all floods are not alike. Some floods develop slowly, sometimes over a period of days. But flash floods can develop quickly, sometimes in just a few minutes and without

any visible signs of rain. Flash floods often have a dangerous wall of roaring water that carries rocks, mud, and other debris and can sweep away most things in its path. Overland flooding occurs outside a defined river or stream, such as when a levee is breached, but still can be destructive. Flooding can also occur when a dam breaks, producing effects similar to flash floods.

Be aware of flood hazards no matter where one lives, but especially if one lives in a low-lying area, near water or downstream from a dam

One will not always have warning that a flood is coming. Pay attention to one's local radio or TV stations. They will let one know if there's a flood watch or warning in one's area. Before a flood happens, make sure one is ready:

- Do NOT keep valuable items and appliances in one's basement. They could get ruined during a flood.
- Have flood insurance.
- Make sure one's fuse box (or main breaker) and utility meters are raised above the flood level in one'shome. Water and electricity don't mix. (If one're not sure what one'sflood level is, check with one's local building official, city engineer, or planning and zoning administrator.)
- When floods happen, here's what one should do:
- Go to higher ground immediately.
- Do NOT try to drive through water, even if it's not moving. Even the car can easily get swept away.

During a Flood

One has to leave home, remember

- Do not walk through moving water. Six inches of moving water can make one fall. If one has to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in the front.
- Do not drive into flooded areas. If floodwaters rise around the car, abandon the car and move to higher ground if one can do so safely. The vehicle can be quickly swept away.

Driving Flood Facts

The following are important points to remember when driving in flood conditions:

- Six inches of water will reach the bottom of most passenger cars causing loss of control and possible stalling.
- A foot of water will float many vehicles.
- Two feet of rushing water can carry away most vehicles including sport utility vehicles (SUV's) and pick-ups.

After a Flood

The following are guidelines for the period following a flood:

- Listen for news reports to learn whether the community's water supply is safe to drink.
- Avoid floodwaters; water may be contaminated by oil, gasoline, or raw sewage. Water may also be electrically charged from underground or downed power lines.
- Avoid moving water.
- Be aware of areas where floodwaters have receded. Roads may have weakened and could collapse under the weight of a car.
- Stay away from downed power lines, and report them to the power company.
- Return home only when authorities indicate it is safe.
- Stay out of any building if it is surrounded by floodwaters.
- Use extreme caution when entering buildings; there may be hidden damage, particularly in foundations.
- Service damaged septic tanks, cesspools, pits, and leaching systems as soon as possible. Damaged sewage systems are serious health hazards.

Clean and disinfect everything that got wet. Mud left from floodwater can contain sewage and chemicals

5.7 Disaster Management in Earthquakes

One of the most frightening and destructive phenomena of nature is a severe earthquake and its terrible aftereffects. An earthquake is a sudden movement of the earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the earth, as the huge plates that form the earth's surface slowly move over, under, and past each other. Sometimes, the movement is gradual. At other times, the plates are locked together, unable to release

the accumulating energy. When the accumulated energy grows strong enough, the plates break free. If the earthquake occurs in a populated area, it may cause many deaths and injuries and extensive property damage.

An earthquake is when the Earth suddenly shakes. This is caused when rocks beneath the Earth's surface move and break.

Earthquakes happen without warning. They can happen any time of day, at any point during the year. Almost all states in the country can experience earthquakes, both small and big. Sometimes an earthquake will be so small one can barely feel it. Other times an earthquake will cause the ground to shake so much that buildings and bridges collapse. Fires, landslides, avalanches, and flash flooding might even happen.

Stay alert for aftershocks, which are smaller earthquakes that follow the main one. Aftershocks could happen within a few hours of the main earthquake, or they could happen weeks or months later.

What should one do?

One will never have warning that an earthquake is coming. If one lives in an area that has a lot of earthquakes, make sure that one and one's house are prepared:

- Secure cupboards and bookcases to the wall using bolts. Also try to keep heavy objects on lower shelves so they won't fall on one during an earthquake.
- Make sure one's water heater is secured to a wall. That way, it won't fall during an earthquake and hurt someone or start a fire.
- Make sure that one's home is bolted to one's foundation. Although this might be expensive, it could save one from a lot of damage to one'shouse during an earthquake
- Do NOT go outside. One could get hurt from falling glass or parts of buildings. If one is outside, stay away from buildings and power lines.
- Take cover under a desk, table, or other large and stable piece of furniture. Hold on to it. Or stand in a doorway and brace oneself.

- Stay away from windows, heavy furniture, appliances, mirrors, pictures, and anything else that could fall and hurt one. Also stay away from fireplaces. One could lose one'sbalance and hurt oneself on the fire.
- If one is driving when an earthquake happens, stop the car if it's safe. Stay inside one'scar until the earthquake stops, and don't drive near bridges or tunnels. Try not to stop by power lines, light posts, signs, or trees. These could fall and hurt one.
- Stay alert for falling objects. Most people get injured by falling objects during an earthquake, not by the shaking itself.
- Do NOT use matches, lighters, or candles. If there is a broken gas line, one could spark a fire or explosion.
- Do NOT use elevators. There might be a power outage due to the earthquake, and one could get stuck in the elevator.

During an Earthquake

Minimize one'smovements during an earthquake to a few steps to a nearby safe place. Stay indoors until the shaking has stopped and one are sure exiting is safe.

If one is	Then:
1. Indoors	• Take cover under a sturdy desk, table, or bench or against an inside wall, and hold on. If there isn't a table or desk near one, cover one's face and head with one's arms and crouch in an inside corner of the building. • Stay away from glass, windows, outside doors and walls, and anything that could fall, such as lighting fixtures or furniture. • Stay in bed - if one are there when the earthquake strikes - hold on and protect one'shead with a pillow, unless one are under a heavy light fixture that could fall. In that case, move to the nearest safe place. • Use a doorway for shelter only if it is in close proximity to one and if one know it is a strongly supported, loadbearing doorway.

	• Stay inside until shaking stops and it is safe to go outside. Most injuries during earthquakes occur when people are hit by falling objects when entering into or exiting from buildings. • Be aware that the electricity may go out or the sprinkler systems or fire alarms may turn on. • DO NOT use the elevators.
2. Outdoors	• Stay there. • Move away from buildings, streetlights, and utility wires.
3. While moving	• Stop as quickly as safety permits and stay in the vehicle. Avoid stopping vehicle near or under buildings, trees, overpasses, and utility wires. • Proceed cautiously once the earthquake has stopped, watching for road and bridge damage.
4. Trapped under debris	• Do not light a match. • Do not move about or kick up dust. • Cover one's mouth with a handkerchief or clothing. • Tap on a pipe or wall so rescuers can locate one. Use a whistle if one is available. Shout only as a last resort - shouting can cause one to inhale dangerous amounts of dust.

EMERGENCY ACTION PRINCIPLES

Survey the scene

Is it safe?

↓

Conduct a primary survey

Check for unresponsiveness

Airway **B**reathing **C**irculation (ABCs)

↓

Phone Emergency Medical Services

↓

Do a secondary survey

Interview | Vital Signs | Head – to- Toe Exam