Earthquake Resistant and Building Construction

Unit:-6

Disaster Management

* Some Important terms used in Disaster Management :-

1.) Disaster :- "A disaster can be defined as an occurrence either nature or manmade that causes human suffering and creates human needs that victims cannot alleviate without assistance."

Types of Disaster :- 1.) Natural Disasters
2.) Man made Disasters.

1.) Natural Disasters :- These are primary natural disasters :-
Earthquake, floods, Cyclone, Tsunami, Drought

2.) Man Made Disasters :- These are mostly caused due to certain human activities.
Nuclear leaks, chemical leaks, Deforestation.

2.) Risk :- Risk is a measure of the expected loss due to hazardous event of a particular magnitude occuring in a given area over a specific time period.

- The level of risk depends upon :-
  a) Nature of hazard.
  b) Vulnerability of the elements which are affected
  c) Economic value of those elements.

3) Vulnerability :- It is defined as the "extent to which a community, structure, service and or geographic area is likely to be damaged or disrupted by the impact of particular hazard on account of their nature, construction and proximity to hazardous terrain or a disaster prone area.

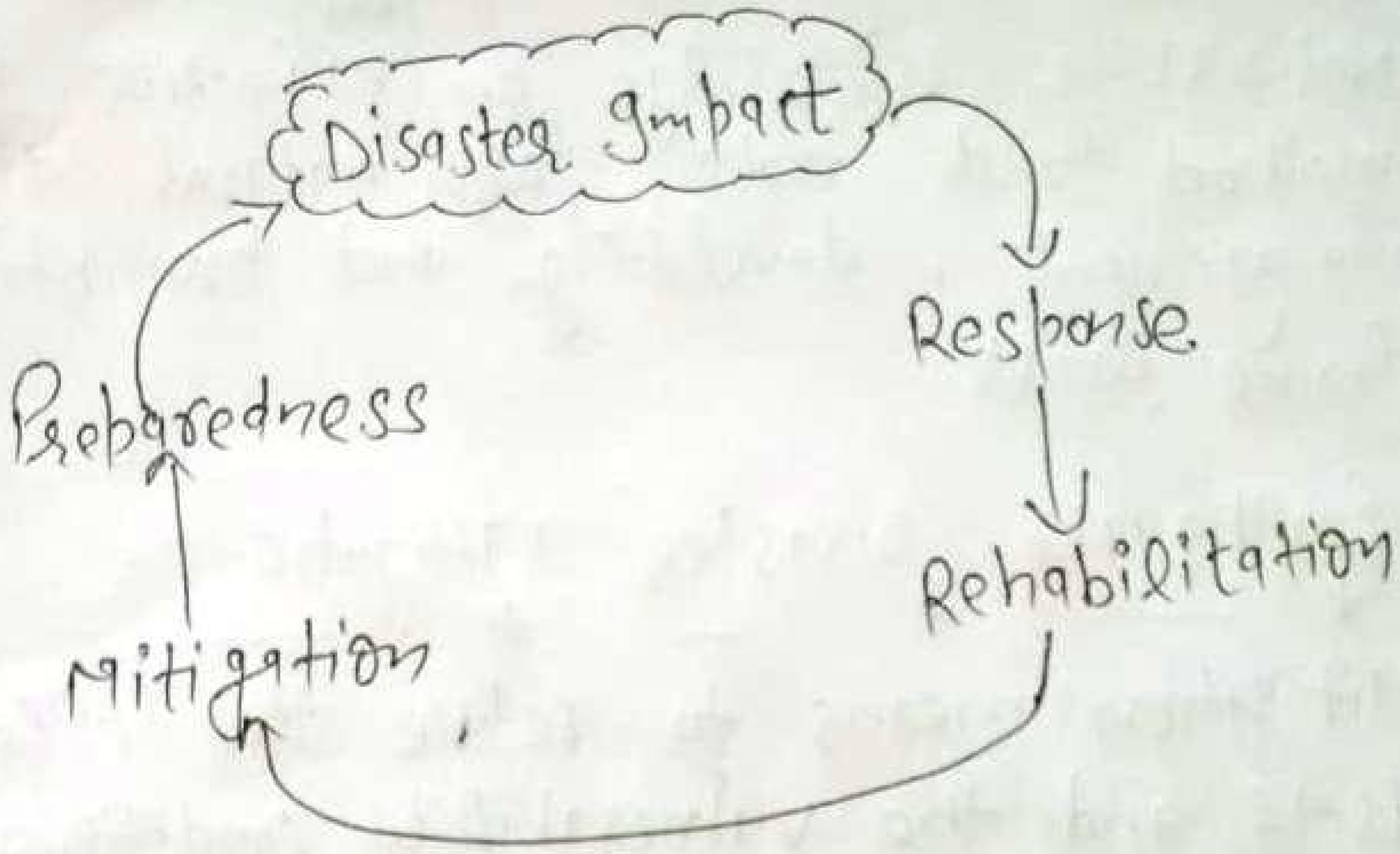
4.) Hazards :- It is defined as the "phenomenon that poses a threat to people, structures or economic assets and which may lead to a disaster.

Disaster Risk = Hazard x Vulnerability.

* Disaster Management :- Effectively and efficiently managing a disaster situation is known as Disaster Management.

All the three phases of disaster management are

1.) Pre Disaster phase
2.) Emergency phase
3) Post Disaster phase



Disaster Management cycle

* Disaster Risk Management :- The disaster risk management may be defined as the sustainable reduction programme of natural disaster risk in some of the most hazard prone area.

* The four main objectives of this programme are :-

1.) National capacity building support to the Ministry of home affairs.

2.) Environment building, education, awareness programs and strengthening the capacity at all levels in natural disaster risk management and sustainable recovery.

3.) Multi hazard preparedness, response and mitigation plans for the programme at state, district

block and village/ward levels.

4) Networking knowledge on effective approaches, method and tools for natural disaster risk management, developing and promoting policy frame work.

* Earthquake Disaster Mitigation:-

Mitigation means to reduce the effect of hazard itself and the vulnerability conditions, Mitigation also includes reducing physical, economical and social vulnerability.

Physical Vulnerability:- is related to building, infrastructure, agriculture etc.

Social Vulnerability:- is related to socially marginalized groups such as women, elderly, physically challenged etc.

Economic Vulnerability:- means that the poor people who have a very little to open up with any disasters as it completely destroys whatever they have in possession (like land, buildings, cattle etc)

(*viii*) Providing temporary shelter for the affected people.

6.6 DISASTER RESCUE

Immediately after the earthquake (i.e. disasters), the rescue operation starts which includes the retrieval of human bodies and live stock, live or dead trapped under the debris. For successful rescue operation help from the organization live Army, Rapid action Force, Civil Defense, NGO's etc which have sufficient number of trained personals for similar types of jobs is needed.

Every citizen group needs to formulate plans for assisting on all aspects of relief work taking into consideration the needs of the locality. For example if the neighbourhood has a lot of buildings close together, then there should be plans for directing the fire engines and ambulances so that they can reach the affected sites as soon as possible. But some simple plans and arrangement can be made as under :

(*a*) Rescue Mission (Search operation) : The main objective is to rescue and attend to the casualities and save precious lives. The members of the team should be skilled enough to provide aid, how to move in a disaster struck area, how to recover and dispose of the bodies and to distribute the relief materials.

The team of volunteers should be physically and mentally strong. They should belong to both sexes and of 18 years and above age. They should be able to communicate and motivate each other. In nutshell, they should be able to cope with the situation. For search operation ;

(*i*) Draw volunteers from the citizen group to form barricades at a safe distance around the affected site so that people don't impede the rescue team.

(6)

(*ii*) Keep a list of neighbourhood hospitals ready so that affected people can be transported there in case the official help is delayed.

(*iii*) Also keep a list of 24 hour Chemists in the area.

(*iv*) To deal with a possible shortage of ambulances, keep vehicles ready to take people to hospitals.

(*v*) Inquire fire fighting crew or official relief workers if they need any specific help.

(*vi*) Chalk up a plan for a rescue operation for your building in case of a fire.

(*vii*) Make sure that the citizen groups have a ready supply of powerful torches.

(*b*) Medical assistance :

(*i*) Keep the First Aid kits ready.

(*ii*) Keep the list of the names, addresses and telephone numbers of all doctors in the area so that they can be contacted to provide immediate treatment and first aid.

(*iii*) Make sure that the neighbourhood hospitals are stocked up well in their blood banks with non-infected safe blood.

(*c*) Controlling panic :

(*i*) Setup a call centre where relatives and friends of the affected people can call up to get information. Make sure these call centers have the names of the victim and phone numbers of the hospitals they have been taken to.

(*ii*) Contact a local cable operator so that the call centre number can be published on the television. Also contact the police station with the number so that they can route the inquiry calls to the centre.

(*iii*) Put up board in the area to release accurate information about the situation so as to prevent panic and rumors from spreading like wild fire.

(*iv*) In case of an out break, consult doctors so as to give accurate information about medicines and hospital numbers on these boards.

(*d*) Important Information about fire fighting :

(*i*) A high rise building is the one over 24 meters and with more than eight floors.

(*ii*) The width of the fire engine is 4.5 meters at least.

(*iii*) Equipment needed : Sprinklers, hydrants, pipes, and smoke detectors etc.

(e) Survival Kits : Always keep ready at home survival kits containing :

(*i*) Dry food, like biscuits

(*ii*) Bottled purified water

(*iii*) Essential medicines

(*iv*) First Aid Kit

(*v*) At least 2 functional torches

(*vi*) Blanket

(*vii*) Personal hygiene products etc.

MANAGEMENT COMMITTEE

ling "National Crisis Management Committee"

ster Management "Control room"

area.

6.8 PSYCHOLOGY OF RESCUE

Disasters leave people shocked and stunned, not only at their economic loss but also psychological loss.

Post Traumatic Stress Disorder (PTSD) is the severe psychological problem that results from disaster. The person suffering from PTSD show the following symptoms :

1. The immediate reaction is of disorientation i.e. people take some time to understand the full meaning of what the disaster has done to them.
2. They may experience physical reactions like change in sleeping and eating pattern, increased heart beat and blood pressure etc.
3. Commonly experienced emotional reactions are irritability, fear, anger, helplessness, hoplessness etc.
4. Guilt feeling of having survived while someone else in the family dies.
5. Brings loss of memory, poor concentration and attention and worries.
6. Withdrawal from social interactions, frequent arguments, conflicts etc are commonly experienced.

The most important in the work of rescue is to understand the psychology of rescue. Those who are shocked and frighten must be given comfort. With proper counseling, psychiatric treatment, social help and rehabilitation, PTSD can be remedied atleast upto a level where the victim can be motivated and helped to start life a fresh.

6.9 RESCUE WORKERS

For successful rescue operation help from the organizations like Army, Rapid Action Forces, Civil Defence, Non Government Organization etc is necessary.

Rescue workers must have sufficient number of trained personnel's for similar type of job are required. Volunteers from various fronts must be brought together and given training and mock rehersals to meet up the demand of disaster management.

Immediately after the earthquake, the rescue operation starts, which includes the search and retrieval of human bodies and live stock, live or dead trapped under the debris.

Rescue workers may plan a strategy for efficient working so that loss can be minimized. Rescue workers can help in :

(*a*) Search and rescue work
(*b*) Giving First Aid
(*c*) Distribution of relief material
(*d*) Rehabilitation.

6.10 RESCUE PLAN

Rescue plans (*or rescue planning*) may help the rescue workers to work more efficiently. A planning team may be formed to examine the unique working strategy to formulate earthquake planning considerations. Following points must be taken into consideration in rescue planning :

1. Damage assessment : For such hazardous disasters it is essential for the emergency response personnel to take immediate action to gather the first hand assessment information. This information is required to judge the severity and extent of losses. Based upon the gathered information, the decision makers will plan the rescue operation.

Ground and aerial surveys are conducted to collect the information regarding the losses and key facilities left over, undamaged.

2. Search and Rescue : Removal of injured and trapped persons from collapsed buildings, administering the first aid facilities and assisting the injured persons to the hospitals are done under search and rescue operations.

With the help of damage assessment information facilities, prone areas are identified and priority for conducting these operations are decided.

3. Access control : This deals with control of access to area until it is safe. Only the persons involved in rescue work be allowed to enter the affected area.

4. Debris clearance : Major consequences associated with an earthquake are the collapse of building, other structures and landslides. In metropolitan cities, the buildings are high rising and closely spaced, therefore, if a major earthquake strikes, it will lead to collapse of buildings leading to people trapped in debris. The trapped people needs immediate assistance.

5. Evacuation : Immediately after an earthquake, people need to be evacuated from the structures which have been damaged or are likely to receive more damage when hit by one or more after shocks.

The rescue plans are implemented in steps. The most important part in rescue planning is to save the lives of people. Rescue planning can minimize the losses.

6. Demolition of unsafe structures : After earthquakes, inspection of buildings and other structures is done to determine whether it is safe to use or not. Structures which are causing threat to public safety are demolished.

7. Repair of utility services : Restoration and repair of damaged electrical power, water supply, sewer, telephone is done so as to minimize the effect of disaster.

8. Rescue by steps : Rescue work must be undertaken in steps. Priority should be given to those areas where people are trapped under debris or seriously injured. Such persons need immediate assistance. Children, woman, elderly, physically challenged people must be given preference.

6.11 RESCUE EQUIPMENT

In rescue works, a large number of equipments are required for safe and smooth escape of the affected people. Rescue equipment may include the followings ;

1. Plan of the affected area
2. **Cranes :** to lift heavy debris
3. **Buldozers :** to drive away the debris
4. **Ropes :** to bring out the trapped people
5. **Ladders :** for the safe exit from the affected buildings
6. **Fire extinguishers :** to extinguish fire and evacuate the trapped people
7. **Oxygen cylinders :** for people trapped under debris
8. **Medical Kit (First Aid) :** for immediate assistance
9. **Pneumatic drills :** to make holes in the pile of debris
10. **Powerful torches :** to work even in night
11. **Dog squads :** for search and rescue operations
12. **Generator sets :** for emergency flood lights and other relief work
13. **Ambulances :** for meeting up the causalities and taking them to relief camps.
14. **Stretchers :** to take the injured for medical assistance
15. **Communication system :** should be kept ready like wireless radio communication, Amateur (HAM) radio, satellite based communication systems.
16. **Helmets** to protect from falling objects.

6.12 SAFETY IN RESCUE OPERATIONS

After the calamity (disaster) has taken place the rescue operations are carried out for the affected area and people. But it becomes very important to take special care in rescue operations. To make the rescue operations safe, it is necessary that only those people be involved who have undergone specialized training for disaster management. Unskilled persons or panic gripped people may worsen the situation further.

To make the rescue operations safe, it is necessary to follow certain guidelines as follows :

1. Stay cool and do not panic.
2. Plan a strategy for the rescue operations as unplanned work may lead to tragedy.
3. Do not enter the affected buildings as it may lead to accidents.
4. Safety helmets be used for evacuation of people can be minimized.
5. Turn off the electricity and piped gas supply so that conditions may not worsen.
6. In case of fire, summon the fire brigade for help.
7. If some people have been injured seriously, do not try to move them unless it is a must and call the medical rescue team.

...not delay evacuation, if needed.

6.13 DEBRIS CLEARANCE

One of the major fatal part associated with an earthquake is the collapse of buildings, other structures and land slides. In seconds, the concrete jungle is razed to piles of debris. Many hundred to thousands of people could be trapped, which needs immediate assistance.

The identification of the affected area, removal and disposal of rubble, landslide, wreckage and other material which blocks or hamper the performance of emergency response functions like search and rescue operations. Debris removal function should be undertaken simultaneously with rescue work and on priority basis.

A suitable site should be selected, preferably a low lying area, where the debris can be dumped without any effect of the adjoining areas. Roads and other utility may be kept free earlier so that, a free passage be provided for rescue works.

Debris clearance activities may include :

(*a*) Demolition and other activities to clear the obstructed roads.
(*b*) Repair work or temporary arrangement of roads and bridges.
(*c*) Construction of emergency access roads.
(*d*) Demolition of unsafe structures.

6.14 CASUALITY MANAGEMENT

Casuality management is a specialized area and plays a vital role in post disaster activities. After major earthquake (disaster), the casuality takes place in large number, to manage the people receiving minor injuries and major injuries comes under casuality management. Separate area must be prepared to give medical relief to injured ones and hospitalization of the serious ones should be taken simultaneously with the relief and rescue operations.

Special arrangements should be made by developing hospitals (medical relief camps) at suitable sites with the help of experts and equipments from unaffected areas. The arrival point is the entrance to the casuality receiving area. There should be one clearly marked road for in coming traffic (ambulances) and other clearly marked road for outgoing traffic so that there is no chaos.

The casualities needing immediate care will be sent to emergency treatement station. The emergency treatment care provides assistance to the immediate and minimal casualities.

Utmost care should be taken to maintain hygine so that epedemic breakdown can be prevented.

6.15 REHABILITATION

(*a*) **Reconstruction of houses :** Component of rehabilitation program evolves around the reconstruction of damaged houses and villages. The reconstruction of houses/villages should be done keeping in mind the followings :

1. It should suit the local traditional system of living.
2. It should suit the local traditional facilities necessary to fulfil the daily needs of the people.
3. It should be strong enough to with stand future earthquake if any.
4. The relocation of villages should be avoided as it may create other problems and require more finances.
5. All the relocated villages should include all the basic facilities like panchayat ghar, schools, community and health centres etc.

(*b*) **Economic Rehabilitation :** The economic rehabilitation includes the provisions for replacement/reconstruction of losses suffered by the persons in their economic activities. Under this program, the help should be provided to :

1. farmers to buy seeds, agricultural equipments including bullocks etc.
2. those operating small shops or any other business to restart these activities.

(c) Social Rehabilitation : The social rehabilitation programme include the provision of social facilities and activities to address the needs of women and children affected by the earthquake. The various items covered under social rehabilitation are :

1. Shelters for destitute women and female children, orphans and the handicapped persons.
2. Development of psychiatry units for proper and trauma management.
3. Economic rehabilitation to assist women to become economically independent.