Disaster Management
Assignment : 2

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Earthquakes come with no warnings- It's because stronger earthquakes rupture over a much broader area, and propagation takes time.As a result, there is more time for warnings.You might not get any warning if you're directly adjacent to the epicentre.About a second after the P waves, the epicenter begins to shake.

Early warning systems for earthquakes do not predict earthquakes.Instead, they detect ground motion as soon as an earthquake begins and send out alerts as soon as a tremor is imminent, giving people vital seconds to prepare.

Tom Heaton, a seismologist at Caltech, released the first study on earthquake early warning systems, which are networks of ground-based sensors that broadcast alerts to users when the earth begins to tremor, in 1985.

While seismic waves travel at only a few miles per second, electronic alerts from the epicenter region can be sent almost instantly. Such systems, such as ShakeAlert on the West Coast of the United States, work on the principle that while seismic waves travel at only a few miles per second, electronic alerts from the epicenter region can be sent almost instantly.

Here's how it works:

1. Several types of seismic waves extend out from the epicenter of an earthquake. Weaker but faster-moving P-waves first activate sensors, which then send signals to data processing centers.
2. Algorithms can swiftly determine the location, magnitude, and intensity of an earthquake.What happened to it?What is the size of it?Who will be affected?
3. Before the slower, but more destructive S-waves and surface waves arrive, the system transmits an alert.

Although those living near the epicenter will have little, if any, advance warning, those living further away may only have a few seconds to prepare for tremors.

Early warning systems, when combined with automated responses like slowing trains or shutting down gas lines, could help avert some of the injuries and damage that come with big earthquakes.

Can earthquakes be predicted?

No-A significant earthquake has never been anticipated by the USGS or any other scientist.
We don't know how, and we don't expect to find out any time soon.Only the probability of a large earthquake occurring in a certain place within a specified number of years may be calculated by USGS scientists.
at least not so that we could issue an advanced warning for a specific time at a specific location that would allow for an orderly evacuation. Most quakes do, however, occur in predictable locations along well known fault zones, as was the case with last week's megathrust off the coast of Japan.
Although several natural 'warning signs' (ranging from frog behavior to cloud patterns) have been proposed, there is currently no reliable way to predict when or where an earthquake will occur prior to its rupture.
An earthquake prediction must define 3 elements: 1) the date and time,2) the location and 3) the magnitude.

How close can we come to predicting earthquakes?
For areas with a high rate of previous activity, the likelihood of a major quake occurring in the next several decades can be rather significant."We have models that estimate the likelihood of having an earthquake of magnitude 7.5 or larger in southern California during the next 30 years is 38%," says Thomas Jordan, director of the Southern California Earthquake Center and member of the Collaboratory for the Study of Earthquake Predictability.
According to Jordan, if the same models are applied to determine the likelihood of an earthquake occurring in southern California during the following week, the odds plummet to around 0.02 percent.

Why are big earthquakes so hard to predict?
Precursors - some form of earth signal indicating a major quake is on the way – are required for accurate predictions.The signal must occur exclusively prior to significant earthquakes, and it must occur prior to all large earthquakes.Seismologists have yet to discover those predecessors, if they exist at all.

An earthquake has just occurred.Why didn't I get a notification on my phone?
might be too close to the epicenter-Three to five seconds after an earthquake begins, early-warning warnings are routinely sent out.That's how long it takes for seismic waves to

reach the nearest stations and computers to process the information.It is unlikely that you will receive a warning if you are less than 10 miles from the epicenter.

The shaking might not have been strong enough- It's crucial to note that the majority of people only feel minor tremors during an earthquake.This is due to the rarity of large earthquakes and the fact that people are often too far away from the epicenter to feel any substantial shaking.Apps like MyShake are currently designed to only give alerts for severe shaking.As scientists and government officials continue to fine-tune the system's parameters, this could alter.

What promising approaches may lead to successful prediction in the future?

Increases in radon gas concentrations, changes in electromagnetic activity, foreshocks signaling a larger quake to come, warping or deformation of the Earth's surface, geochemical changes in groundwater – and even unusual animal behavior in the moments leading up to a major quake – have all been studied as potential signals.

We have evidence that each of the signs listed above may act strangely in the lead-up to a big earthquake.Unfortunately, these abnormalities can also occur in the absence of a big quake.

"Nothing stands up when you apply the whole weight of statistical rigor," says Susan Hough, a geophysicist at California Institute of Technology in Pasadena.

A number of scientists are continuing to study variations in electromagnetic signals in the days leading up to significant earthquakes.Friedemann Freund's work at NASA's Ames Research Center in California has bolstered the technique.Freund demonstrated that crushing a rock causes positive electrical charges to accumulate in the earth, which could explain strange electromagnetic signals prior to an earthquake.

Ex. According to Japan's Meteorological Agency, about 200 aftershocks with an intensity of 5 or more on the Japanese scale of 0 to 7 occurred in the first three days following the 11 March Sendai earthquake.According to the agency, the chances of more quakes reaching level 5 or above between 14 and 17 March are still 40%.

cyclones usually have a prolonged warning period–

Atmospheric disturbances around a low-pressure area cause cyclones, which are characterized by rapid and often destructive air circulation.Storms and poor weather are frequently associated

with cyclones.In the Northern hemisphere, air circulates inward in an anticlockwise direction, while in the Southern hemisphere, it circulates clockwise.

For providing cyclone warning services to the maritime states, the India Meteorological Department has constructed three Area Cyclone Warning Centres (ACWCs) in Kolkata, Chennai, and Mumbai, as well as three Cyclone Warning Centres (CWCs) in Ahmedabad, Bhubneswar, and Visakhapatnam.

As soon as the warnings are received, these centers issue warnings for their respective areas of responsibility to various users such as port authorities, commercial shipping, the Indian Navy, fishermen and Department of Fisheries officials, officials of the State and Central Governments, Relief officials, Chief Secretaries of the coastal states, District Collectors, Tehshildars, and BDOs for distress mitigation. **These authorities are given a warning in two stages.**

A " Cyclone Alert " is issued in the first stage roughly 48 hours before the start of the poor weather over these locations.The " Cyclone Warning " is given roughly 24 hours ahead of time in the second stage.

Satellite), IMD regularly monitors the Arabian Sea and Bay of Bengal for possible tropical cyclone development.Data from ships and ocean buoys is also taken into account.A network of Cyclone Detection Radars (CDRs) has been erected along India's coastal region.Within a 400-kilometer range, these Radars can find and monitor oncoming cyclones.The Area Cyclone Warning Centers (ACWCs) prepare information regarding the cyclone, such as the areas that are likely to be affected, its severity, movement direction, and time to reach the shore, among other things.Based on these, ACWCs (in Chennai, Kolkata, and Mumbai) send out warning messages at regular intervals via the various channels indicated above.

inherently unreliable and prone to disruption during inclement weather, particularly during cyclones.Satellite signals are always available to anybody, everywhere, at any time, and are unaffected by bad weather.

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These types of communication primarily rely on landlines, which are relatively inexpensive.

In 1985, IMD began a satellite-based system for cyclone warning distribution in conjunction with the Department of Space, employing the broadcast capabilities of the INSAT satellite in the C/S Band transponder.This system is known as CWDS (Cyclone Warning Dissemination System) and is still working after 25 years because of its analogue-based technology.

How long do cyclones typically last?

Low pressure systems that originate over warm tropical waters are known as tropical cyclones.When the sea surface temperature is over 26.5°C, they form.Tropical cyclones can last for days, even weeks, and their courses can be highly irregular.When a cyclone passes over land or over cooler oceans, it dissipates.

The "PRE CYCLONE WATCH" warning, which is issued 72 hours ahead of time, provides early notice of the development of a cyclonic disturbance and its anticipated intensification into a tropical cyclone.At least 48 hours before the Second Stage warning, known as "CYCLONE ALERT," is issued.

preparedness for Earthquake

Earthquake preparedness is a combination of individual, organizational, and social actions done to reduce the effects of an earthquake.Securing heavy things, structural improvements, and storing supplies are all examples of preparedness measures, as are having insurance, an emergency pack, and evacuation preparations.

Survival measures, or preparation that will promote survival in the case of an earthquake, or mitigating measures, which strive to reduce the impact of an earthquake, are examples of preparedness.Food and water should be stored for an emergency, and people should be educated on what to do in the event of an earthquake.

Large items of furniture (such as bookcases and large cabinets), TV and computer screens that may otherwise tumble over in an earthquake can be tightly secured as mitigation measures.Avoiding keeping items above beds or sofas also decreases the risk of objects falling on people.

1. Deep plaster cracks in ceilings and foundations should be repaired.
2. If there are symptoms of structural problems, get professional help.
3. Fixtures for overhead lighting should be anchored to the ceiling.
4. For building standards, follow the BIS codes that apply to your location.
5. Attach shelves to the wall with a strong adhesive.
6. Large or heavy items should be placed on lower shelves.
7. Low, closed cabinets with latches are ideal for storing breakable things such bottled foods, glass, and china.
8. Heavy things, such as portraits and mirrors, should be hung away from beds, settees, and other places where people sit.
9. Fixtures for overhead lighting and fans should be braced.

10. Repair any faulty electrical wiring or gas connections.
11. These are possible fire hazards.

Water heaters, LPG cylinders, and other appliances should be secured by strapping them to the walls or anchoring them to the floor.

Planning for a related tsunami, tsunami preparedness, can also be part of earthquake preparedness.

preparedness for Cyclone

1. Check the house for loose tiles and make any necessary repairs to the doors and windows.
2. Remove any dead branches or dying trees that are close to the home, and anchor any moveable things that can fly in severe winds, such as lumber stacks, loose tin sheets, loose stones, garbage cans, signboards, and so on.
3. Keep some wooden boards on hand in case you need to board up any glass windows.Keep a kerosene-filled hurricane light, battery-operated torches, and enough dry cells on hand.
4. Buildings that are condemned should be demolished.
5. Extra batteries for transistors should be kept on hand.
6. Always have some dry, non-perishable food on hand in case of an emergency.

During a cyclone DO NOT venture out even when the winds appear to calm down. The 'eye' of the cyclone might be passing. Winds might intensify and gush again and cause damage. Be safe inside till it is officially announced that the cyclone has passed.

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Earthquake:

1. On the morning of India's annual Republic Day, an earthquake struck near the town of Bhuj.More than 20,000 people were killed, with more than 150,000 others injured, and more than a million buildings were damaged.
2. The magnitude of the quake was 7.7 (6.9 on the Richter scale).
3. Bhuj, city, northwestern Gujarat state, west-central India. It is situated in the lowlands between the Rann (marsh) and the Gulf of Kachchh (Kutch)**.**

4. Creating a flexible foundation for a structure could help it survive an earthquake. Building the structure on top of pads that divide it from the ground is one possibility.The pads then move, but the building remains stationary.

Cyclone:

1. In Gujarat, the storm displaced almost 200,000 people.The cyclone also wreaked havoc on India's western coast, destroying infrastructure and crops.
2. The NOAA calculated Tauktae's 1-minute sustained winds at landfall to be 125 mph (205 km per hour) in the advisory, making it the fiercest storm to make landfall in Gujarat.
3. Tauktae is located **259 km northwest of Mumbai, India**, and has moved northward at 15 km/h (8 knots) over the past 6 hours
4. The cyclone-resistant building's design is influenced by the site selection.During cyclones, high-velocity wind with rotatory motion moves in a direction from sea to land, as we all know.Buildings in raised earth mounds are also recommended in cyclone-prone areas (when the site is closer to the coast).The reason behind this is to lessen the risk of flooding.

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