

COURSE : DISASTER MANAGEMENT (MA/ MSc PART I)

Paper : VII

Prepared by : Prof. B. K. Mishra, Course coordinator

Topic : Earthquake Prone Areas in India

INTRODUCTION :

Earthquake is a sudden geological event below the surface of the earth which results in generation of waves that travels far and wide and causes vertical and horizontal vibrations. The consequential motion causes destruction. The severity of the impact depends on the magnitude of earthquake, which in turn depends on the amount of energy released at the spot where the geological event took place below the surface of the earth. Earthquakes occur suddenly, and thus there is no dependable technique for prediction of earthquakes as yet. India is highly vulnerable to earthquakes and severe earthquakes have occurred here.

EARTHQUAKE PRONE AREAS :

India is having a high risk towards Earthquakes. More than 58 per cent of India's land area is under threat of moderate to severe seismic hazard. During the last 20 years, India has experienced 10 major earthquakes that have resulted in more than 35,000 deaths. The most vulnerable areas, according to the present seismic zone map of India include the Himalayan and sub-Himalayan regions, Kutch and the Andaman and Nicobar Islands. Depending on varying degrees of seismicity, the entire country can be divided into the following seismic regions: Of the earthquake-prone areas, 12% is prone to very severe earthquakes, 18% to severe earthquakes and 25% to damageable earthquakes.

Though the regions of the country away from the Himalayas and other inter-plate boundaries were considered to be relatively safe from damaging earthquakes, the presence of a large number of non- engineering structures and buildings with poor foundations in these areas make these regions also susceptible to earthquakes. In the recent past, even these areas also have experienced earthquake, of lower magnitude than the Himalayan earthquakes. The North-Eastern part of the country continues to experience moderate to strong earthquakes. On an average, this region experiences an earthquake with magnitude greater than 5.0 every year. The Andaman and Nicobar Islands are situated on an inter-plate boundary and therefore are likely to experience damaging earthquakes frequently. The increase in earthquake risk in India in recent times is caused due to a spurt in developmental activities driven by urbanization, economic development and the globalization of India's economy. The increase in the use of high-technology equipment and tools in manufacturing and service industries have also made them susceptible to disruption due to relatively moderate ground shaking.

Earthquake - prone areas of the country have been identified on the basis of scientific inputs relating to seismicity, earthquakes occurred in the past and tectonic setup of the region. Based on these inputs, Bureau of Indian Standards [IS 1893 (Part I):2002], has grouped the country into four seismic zones, viz. Zone II, III, IV and V. Of these, Zone V is seismically the most active region, while zone II is the least. Broadly, Zone - V comprises entire northeastern India, parts of Jammu and Kashmir, Himachal Pradesh, Uttaranchal, Rann of Kutch in Gujarat, part of North Bihar and Andaman & Nicobar Islands. Zone - IV covers remaining parts of Jammu and Kashmir and Himachal Pradesh, National Capital Territory (NCT) of Delhi, Sikkim, Northern Parts of Uttar Pradesh, Bihar and West Bengal, parts of Gujarat and small portions of Maharashtra near the west coast and Rajasthan. Zone - III comprises Kerala, Goa, Lakshadweep islands, remaining parts of Uttar Pradesh, Gujarat and West Bengal, Parts of Punjab, Rajasthan, Madhya Pradesh, Bihar, Jharkhand, Chhattisgarh, Maharashtra, Orissa, Andhra Pradesh, Tamilnadu and Karnataka. Zone - II covers remaining parts of country.

Indian cities, ranging from the metros to the smaller cities - all at least once have been shaken up due to earthquakes which usually range from medium to high intensity on the Richter scale.

The top 10 Indian cities which are observed as high earthquake prone zones are:

Guwahati –Assam :Guwahati falls in zone five of the seismic zones in India which is highly prone to earthquakes. The place has seen some of the deadliest earthquakes and even today small tremors are a common situation.

Srinagar - Jammu and Kashmir :This capital city of Jammu and Kashmir also comes under Seismic Zone 5. Most parts of the Kashmir Valley, which is around 11% of the area of the state covering the Districts of Srinagar, Ganderbal, Baramulla, Kupwara, Bandipora, Budgam, Anantnag, Pulwama, Doda, Ramban, Kishtwar, come under Seismic Zone 5, where around 50% of the population of the state lives. The rest of the state, including the whole of the Ladakh region and Jammu Division (90% of the total area of the state), are under the Seismic Zone 4.

Being very close to the Himalayas, Srinagar faces heavy risk of earthquakes.

Delhi :Delhi is categorised under Seismic Zone 4. It has been hit by five devastating earthquakes measuring higher than magnitude of 5 since 1720. Areas prone to earthquake in Delhi lie about two miles on either side of the Yamuna river, the southwestern outskirts of the city known as the Chhattarpur basin, as well as an area popularly known as The Ridge in Delhi

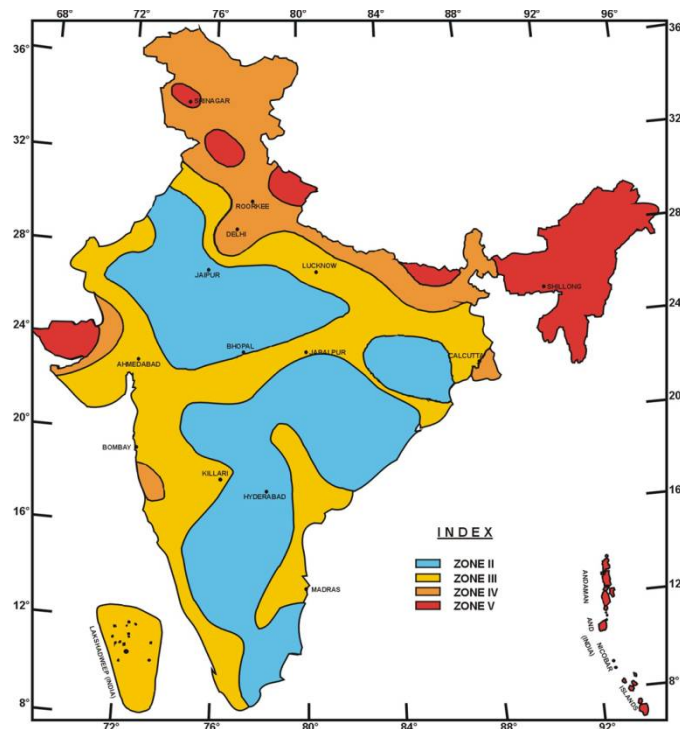
Mumbai – Maharashtra :Mumbai falls in the Zone 4 of the seismic zone divisions which makes it quite vulnerable to damage.

We all know Mumbai is located on the coastal line, which increases the risk of facing tsunami-like disasters. Mild to strong earthquakes are very common in parts of Mumbai. Mild earthquakes are often faced by people living there and parts of the adjoining regions of Gujarat. It should be noted that for the last 20 years, almost all of the buildings in Mumbai have been designed and built keeping in mind that the city falls in seismic zone 4.

Chennai - Tamil Nadu: The city, formerly in the comfort Zone 2, has now shifted to Zone 3 - indicating higher seismic activity. According to the seismic mapping, districts in the western part along the border with Kerala are also in Zone 3, along with districts along the border of Andhra Pradesh and a section of the border with Karnataka.

The status of Chennai along with major towns on the eastern coast in terms of vulnerability has increased especially after Chennai experienced tremors in September 2001 following a quake measuring 5.6 on the Richter scale off the Pondicherry coast.

Tamil Nadu, had faced the wrath of the deadly 2004 tsunami when the Marina beach was affected. Recently, in the year 2012, Chennai shook terribly due to a rather high intensity earthquake (having its epicentre in the Indian Ocean).



(Earthquake Zones of India)

