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A STUDY OF HUMAN BODY EFFECTS AFTER EARTHQUAKES

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Abstract: Earthquake is one of the deadly natural disasters that we have regularly experienced India and its adjacent areas are vulnerable to very high magnitude of earthquake. The Himalyan belt, Bihar – Nepal border, Assam and north Bengal especially Darjeeling, Jalpaiguri, Gujrat Maharashtra district fall in this seismic zone. On the basis of investigation it has been found that earthquake has destructed many human lives and their properties in India. The earthquake was considered to be the main cause for avalanches, landslide, slumps, many creaks and fissures. The present project endeavors to examine the nature, extent, causes and consequences of the tremor of quakes and suggests suitable recommendations for its revival.

Keywords: Objectives, causes of earthquake, consequences and Recommendations

Introduction

Earthquake is a violent tremor in the earth crust, sending out a series of shock and aftershock waves (L waves) in all direction from its focus. Earthquakes constitute one of the most terrible natural hazards which often turn into disaster causing extensive devastation and loss of human lives and their properties. An earthquake is sudden shaking movement of the surface of the earth. It is known as a quake, tremblor or tremor. Earthquakes can range in size from those that are so weak that they cannot be felt to those violent enough to toss people around and destroy whole cities, the seismicity or seismic activity of an area refers to the frequency, type and size of earthquake experienced over a period of time. So far, there have been sixty-two earthquakes in India. The first recorded earthquake in India was on 6th June 1505 it occurred in Saldang, Karnali zone. And the most recent one happened in India as on 31st January 2018 and occurred in Kashmir, Pakistan, Afghanistan, and Tajikistan.

An earthquake is measured in Richer's scale. A seismometer detects the vibrations caused by an earthquake. It plots these vibrations on a seismograph. The strength, or magnitude, of an earthquake, is measured using the Richter scale. Quakes measuring around 7 or 8 on the Richter scale can be devastating.

Study Area

2001 Bhuj Earthquake

A Powerful Earthquake of magnitude 6.9 on Richter-Scale rocked the Western India State of Gujrat on the 26th of January, 2001. It caused extensive damage to life & property.

The epicenter of the quake was located at 23.6 north Latitude and 69.8 east Longitude, about 20 km Northeast of Bhuj Town of the Kutch district in Western Gujrat. At a depth of only 23 kms below surface this quake generated intense shaking which

was felt 70% region of India and far beyond in neighboring Pakistan and Nepal too. The Bhuj earthquake of 2001 (m7.7) (Figure – 1) occurred at 08:46AM and killed 13,805 persons in a much larger area in.

Figure – 1

Gujrat Earthquake

Chimoli Earthquake

The Chamoli earthquake of 29th March 1999 in northern India is yet another important event from the viewpoint of Himalayan seisomotectonics and seismic resistance of non-engineered constructions. The earthquake occurred in a part of the Central Himalaya, which is highly prone to earthquake and has been placed in the highest seismic zone (zone V) of India.

The earthquake caused death of about 100 persons and injured hundreds more. Maximum MSK intensity was up to VIII at a few locations. The quake was felt at far-off places such as Kanpur (440 km south-east from the epicenter), Shimla (220 km north-west and Delhi (280 km south-west). Maximum death and damage occurred in the district of Chamoli where about 63 persons died and over 200 injured; about 2,595 houses collapsed and about 10,861 houses were partrially damaged. In all, about 1,256 villages were affected.

Latur Earthquake

The Latur earthquake of 1993 occurred at 03:53AM and killed 7,635 persons in 52 villages in the state of Maharashtra. This being a winter night time, most people were sleeping indoors at the time, which caused high casually rates. Being a shallow focus earthquake, the affected area was rather small. The earthquake intensity in affected region ranged upto IX on the MSK scale of intensity.

Nepal Earthquake

A deadly earthquake shook Nepal and sent tremors through Indian subcontinent. On 25th April and 12th May 2015, Nepal and its surrounding area were hit by earthquakes which are considered to be the most devastating in the living memory of the inhabitants of these affected areas. The quake measuring 7.9 on the Richter scale, which was followed by 97 aftershocks of magnitudes 3.0-6.9 on Richter scale, caused heavy casualties in Kathmandu and injured thousand others. The earthquakes had its epicenter at Lumjung, around 80 km north-west of Kathmandu. It had its impact in several areas in Nepal and north-eastern part of India, China, Tibet, Bangladesh and as far as Pakistan. Continued aftershocks occurred throughout Nepal and its adjacent area at 15-20 minutes intervals, with one shock reaching a magnitude of 6.9 on 26th April at 12:42 IST. It was a major earthquake similar in intensity to the 1934 Monghyr (Munger) and the 2001 Gujrat Earthquakes.

A second major earthquake occurred on 12th May 2015 at 12:35 IST with a magnitude of 7.3 on Richter scale. The epicenter was near the China border between Kathmandu and Mt. Everest at Kodari around 113 kms east of Kathmandu. It struck at the depth of 18.5 km. This earthquake occurred along the same fault as the original earthquake of 25th April 20415. As such, It is considered to be an aftershock of the 25th April quake. Tremors were also felt in Bihar, Uttar Pradesh, West Bengal and other North-East Indian States.

Problems

On the basis of investigation it has been found that earthquake and its effects are major problem in study area. In study area, the region of convergence of Indian plate and Eurasian plate is more vulnerable to earthquakes and the problem under study is to assess the nature of earthquakes to determine specifically the extent of this type of disaster, in details through data generated from the internet and website of Indian Meteorological Department (IMD) and Geological Survey of Indian.

Literature Review

After Independence some famous scientists and geographers published too many research papers on the nature and of the Earthquake hazards. Hemmady, A.K.R. published a classic book – "Earthquake'' (1996), bolt B.A. published" earthquake'' (1993). Another popular article was published by Dakshinaranjan Nandy (2007) "Mapping Earthquake Hazards''. About Earthquake hazard predictable, the authentic article was published 2007, popularly known as "Observation of pre-seismic signals through Geochemical Monitoring'' by the senior Scientist and research scholar of Dapartment of Science and Technology and Department of Atomic Energy, Hirok Chaudhari, Nisits K. Das, Rakesh K. Bhandari, Dabasis Ghose, Prasanta Sen and Bikash Sinha. Other well-known books are "Earthquake: Forecasting and Mitigation'' (2004) of H.N. Srivastava; ''Earthquake Prediction" (1975) of F. Press and "Earthquake Prediction Techniques'' (1982) of Asada, T.

Methodology

This research work is based on the empirical study of consequences of earthquakes. A systematics methodological principle was followed in this project work. At the beginning intensive literature from related books, journals, articles, government publication, etc. has been done to specify the research problem. For this, I have visited libraries of various school like Shri Ram International School, Bal Bharti Public School etc. I have also visited NCERT's library along with my parents.

The spatial information collected from the website of Indian Meteoeological Deaprtment (IMD) and Geological Survey of India was also taken into consideration.

Data has been obtained through internet and News Papers. Photographic records ot the related features have also been collected from different sources.

Objectives

Following objectivies have been chosen for the project work.

1. To highlight the problem of earthquake in India and its adjacent area.
2. To examine the nature and extent of earthquake.
3. To emphasize the causes and consequences of the tremor of earthquakes.
4. To suggest suitable prevention measures.

Causes of Earthquake

Earthquakes in India along the Himalayan belt were caused mainly due to collision of Indian plate and Eurasian plate. The main cause of Nepal earthquakes is attributed to the northward movement of Indian plate.

Earthquakes are caused by sudden tectonic movements in the Earth's crust. The main cause is that when tectonic plates one rides over the other and collide, earthquakes occurred. The stress increases and breaks, suddenly allowing sliding over the locked portion of the fault, releasing the stored energy as shock waves.

The other main problem is to construct unscientific and non-seismically engineered multi storied building which had easily collapsed by the tremor, disrupting civic life.

Deaths during earthquake may be caused by structural collapse, tsunamis, fires, rock falls, Landslides and other secondary hazards. However, the main cause of fatalities is usually the structural collapse which depends mainly upon the type and quality of constructions and the shaking intensity.

The number of casualties depends on structural response, type of constructions, time (and season) of the earthquake, and on rescue and relief. Generally, construction typologies may be divided into three broad categories: (a) engineered (for seismic loads), (b) engineered (for gravity loads), and (c) nonengineered. Many developing countries like Indian have a large percentage of category (b) and (c) type constructions. Such constructions typologies cause huge loss of life during strong shaking.

Findings

From the above comprehensive study I have assembled several important aspects, which are noted below

1. Loss of many human and cattle lives.
2. Damage and destruction of many human constructions, namely buildings, roads or highways, bridges, temples, UNESCO world heritage sites, town and villages.
3. Earthquake creates landslide which may block the highways, river channels, etc.
4. Earthquake crates different types of avalanches which may kill hundreds of climbers, trekkers.
5. Earthquakes and continuous aftershocks destroyed the civil structures killing thousands of people and injured over twenty-two thousand people in Nepal and northern India.

Consequences of Earthquakes

The hazardous effects of earthquakes depends not only on their magnitude of Richter scale or intensity alone, but also on so many factors, such as geology of the earth crust (lithology, elasticity, soil condition, permissible stress, rock structure, etc.), design of buildings, quality of construction, population pressure, etc. Several villages, towns, human construction and their properties, lives were completely damaged.

Latur earthquake (Figure – 2) occurred in a region with very highly vulnerable construction (random rubble) masonry in mud mortal, with heavy roofs and at a time when most people were sleeping indoors.

Bhuj earthquake (Figure – 3) on the other hand occurred in a region with better construction (even though still far inferior to what the codes require) and at a time when many people were outdoors. As a result, Latur earthquake caused significantly higher death rates as compared to Bhuj earthquake.

The urban area of Kathmandu, the capital of Nepal, was completely destroyed by April earthquake (Figure – 4) which hit Nepal. Several buildings collapsed like a pack of cards as if they were mud huts.

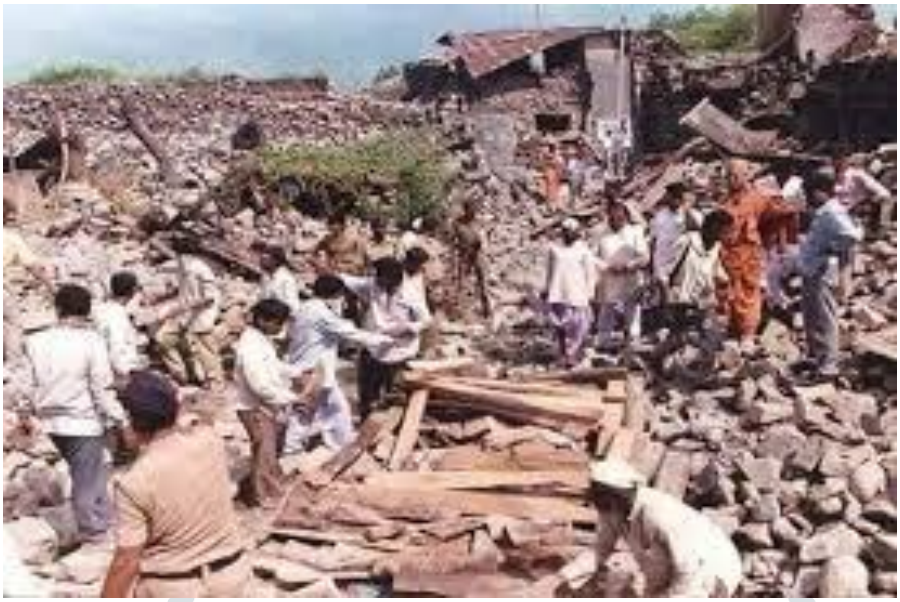
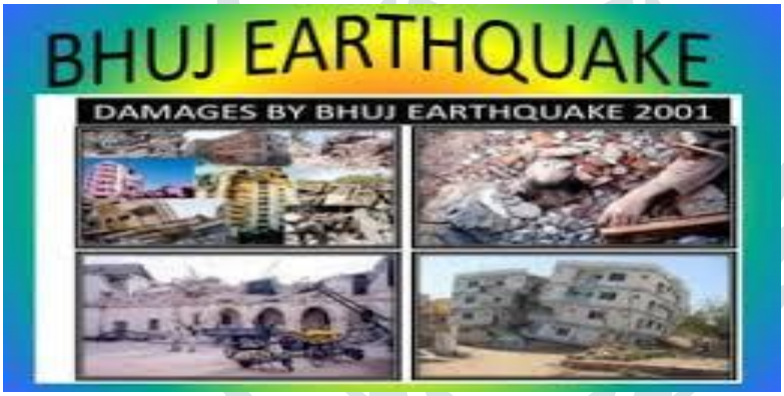


Figure – 2

Latur Earthquake



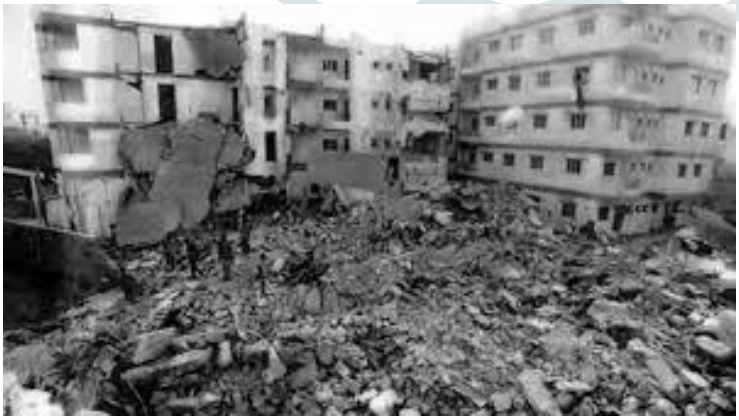
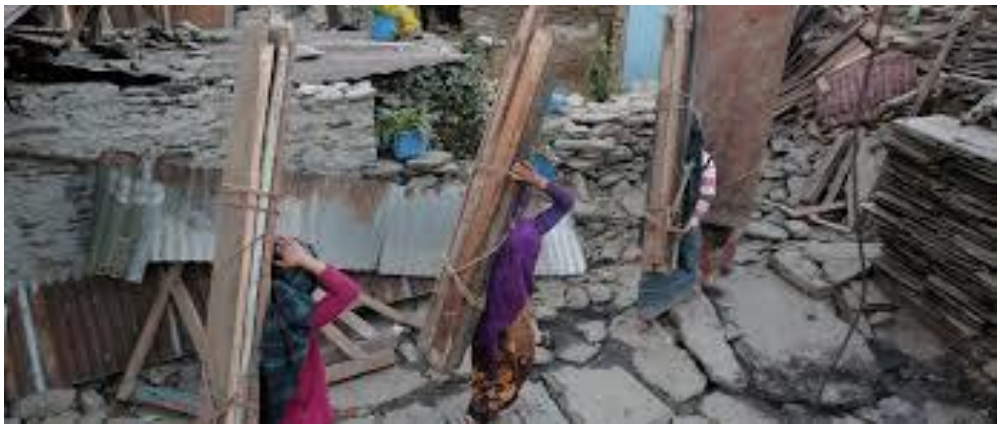


Figure – 3

Bhuj Earthquake



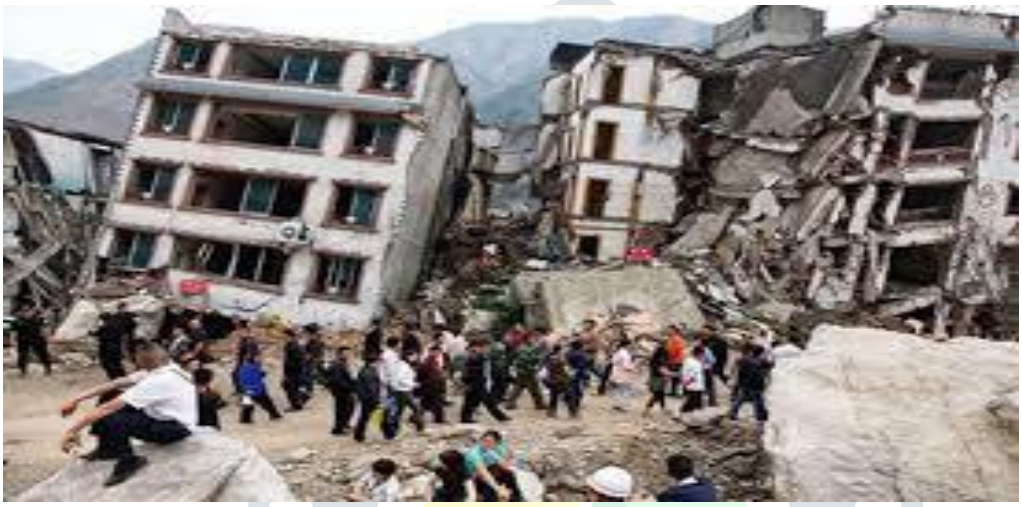


Figure – 3

Nepal Earthquake

Recommendations

1. During earthquake, you should run towards safe place like an open area away from buildings, electricity wires, flammable inputs, etc.
2. If you are in moving car during earthquake, you should stop the car as quickly as possible.
3. If you are staying indoors, you should take shelter under a heavy and hard furniture namely desk, table, bench, etc.
4. You should not run through or near the buildings; always stay in open space until the tremor stop.
5. You should construct seismically engineered (earthquake resistant design) buildings or light weight buildings with lighter roofs in highly earthquake prone areas.

Conclusions

An earthquake cannot be prevented or accurately predicted, but there are some forewarning sign of a coming tremor, and there are various system being developed and in use reduce the damage from this disaster. However, no perfect techniques have been developed to predict the tremor till date. Making exact prediction about the occurrence of a tremor in an area and time is still a tricky proposition. The seismologists are more and more concentrating on the aspect of earthquake forecasting. When we would be able to predict of earthquakes accurately on the basis of animal behavior or other unusual phenomena, it would save many lives and property damages.

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