Essay on Earthquakes in Bangladesh

An earthquake occurs because of the movement of the surface of the Earth and various changes in soil layers. Most earthquakes are so faint that they can be detected with only sensitive instruments. The Earth under our feet trembles, buildings collapse causing deaths and injuries, inducing fires, producing floods from collapsed dams and lands, when an earthquake of fearful Richter scale occurs.

Earthquakes happen when forces deep within our planet cause movement of the Earth's outer layer called the crust. Where pieces of the crust move, they sometimes release energy in the form of shockwaves, which we feel as tremors. Scientists have been working to predict earthquakes. The 'rock plates that make up the Earth's crust number about 20. Most earthquakes occur along the boundaries of major plates. As the mantle moves plates slowly around the globe, the plates may scrape against each other. Sometimes pressure along the edges becomes so great that something has to give way. Then the land trembles with all earthquakes.

Geologists believe that the Himalayas were formed when the plate carrying India bumped into the one carrying the rest of Asia. The mantle may also pull plates apart. That is what is causing North America to drift ever further away from Europe. Most earthquakes happen along boundaries between coastal plates, which are thick slabs of rocks. At the boundaries, the plates sometimes grind against each other, setting up strains that can result in earthquakes. Since most of the plate boundaries are on the ocean floor, most earthquakes actually occur under the ocean. More than 50 percent of all earthquakes occur at the edge of the Pacific plates.

Specialist scientists usually work on prediction, frequency, planning of land-use, hazardous structure, warning signal, earthquake

insurance, and provide safety tips and advocate research, the study of the impact of the earthquake. They also prescribe emergency operations and advise legislative procedures and perspective of quake-facing administration and preparedness planning. Their vulnerability analysis, shelter system, the safety of food and Medicare of victims are highly respected by public welfare-oriented administration.

The United States organizes study-tour of persons directly involved in the earthquake and other disorder-prone countries. Bangladesh scientists should attend such study tours in the USA or in any other advanced country to keep in touch with the various facets of major disasters, which may include earthquake, a tidal bore, hurricane, tornado, hailstorm, drought, volcano, famine, flood, bomb-blast, heat-wave, sea-rise, air, and water pollution, power dislocation and greenhouse gas emission and so on.

All segments of our people may find interest in a study on the earthquake, which occurred in quick succession recently in pretty fearful Richter scale, portending grave danger to our high-rise buildings constructed without caring for preventive scales of construction. We need to vitalize administrative functionaries and seismic scientists to come with remedial suggestions to avoid the disastrous effects of an earthquake with possible help from UNO and any other international agency.

Basic to survival in the event of an earthquake is adequate warning. We should endeavor to learn to mitigate sufferings and destructions, for which timely and correct warning, its dissemination and action thereon are of particular importance. It is a major national concern to keep close contact with international agencies as an earthquake-prone country. We must have a warning system with suitable warning points. Key officials in charge of emergency operation centers should

have a network of a communication system to receive information and relay directions.

We should not be surprised to learn that in the USA seismic scientists study behavior patterns of animals and cockroaches, using sensitive equipment designed to record the movement of plates. It turns out that horses and cockroaches are usually active just before earthquakes. A professor of California University reported that domestic and farm animals give a signal of an impending earthquake. His contention was verified by an animal behaviorist. People reported that their dogs and cats remain very close to their sides posing nervous. It was also verified that a horse was found kicking a wall of the stall about four hours before an earthquake. Peculiar pre-quake animal behavior has often been reported by the Chinese who are not still clear about the relationship to draw any conclusion as to whether or not such behavior is a precursor of a major earthquake.

Throughout China, people watch insects and animals and report they’re unusual behavior to seismic scientists. In 1975, China scientists observing animal behavior and other signs predicted that an earthquake would hit soon. Officials evacuated 100,000 people from the city of Haicheng. A few hours later, a large quake leveled the city. Such accurate predictions are still rare. .A few years later, a major earthquake struck central China without warning, killing 7,00,000 people in the city of Tangshan.

Often the side effects of an earthquake do more damage than the tremors themselves. Earthquakes often trigger fires, send huge ocean waves crashing into coastlines and slosh lake water out of its basin, causing floods. Our geologists may use sensitive instruments to gather information about the slightest tremors and study animal behavior and reach closer to making earthquake prediction a reality and alert people about the breakage of transport arteries,

interruption of water and food supply, breakdown of the sewage disposal system and loss of public utilities such as electric power, gas, and telephones.

The frequency of mild earthquakes in Chittagong and Chittagong Hill Tracts in recent years alarmed the people because the quakes measured more than five on the Richter scale and did harm by flattening houses. According to local people, at least 50 after-shocks had shaken the areas in these districts, forcing a lot of people to shift to safety. The epicenter of a recent quake was located at Kalabwlia on the Indo-Bangladesh border. Four-story buildings in Chittagong port developed multiple cracks after the tremor with on the Richter scale hit the region on August 12, 2003, the highest ever Richter scale in the world is perhaps 8.8.

Besides, the roof of the Power Development Board sub-station in Chittagong city collapsed. The frequent jolts and the petty damages have already raised the concern of the government and the seismic experts and frightened people across Bangladesh. There is a widespread allegation that building code has not been followed at all even by developers of high-rise buildings (public and private).

The fear of hit has caught people residing in Dhaka city which is full of unauthorized and authorized high-rise buildings without any reference to the building code. Experts on earthquake generally feel that Bangladesh may have a big earthquake in the Chittagong area whose impact may be felt in Dhaka also in the form of a collapse of a lot of multi-storied buildings or in some other forms. The record shows that Madhupur gar and haor of Sylhet were the centers of the earthquake in 1762; Tista River changed its course as a result of all earthquakes of 1787. 40,000 sq miles of Khasia hill areas were destroyed by the earthquake of 1891 and the course of Brahmaputra River was also changed.

We have made an attempt to indicate the general nature of seismic events and their effects, so that appropriate authority may take actions in advance, needed to mitigate the effects of future earthquakes. An earthquake is judged by the dimensions of the clipped area of the fault and the intensity and duration of ground-shaking which damage buildings and structures, kill and injure humans and animals and destroy many things.

Shocks of energy release cause a greater loss when the earthquake occurs in the city instead of a sparsely populated region. When freeways are crowded, when many people are on the streets casualties may rise from falling debris and automobile accidents. An earthquake, however, reveals certain weaknesses in engineering and construction practices, calling for corrective measures by appropriate improvements in safety regulations, in building codes and in preparation for an emergency.

Old buildings generally constitute the most serious threats to public safety because of the probability of their collapse during strong earthquakes. Such buildings should naturally be brought up to modern standards of seismic resistance or they should be demolished. To carry out such a program, priorities as to relative use, location and nature of construction should be established. In some countries, appropriate tax relief or other incentives to help ease the economic burden have been suitably organized.

Old earthen dams, highway structures, and building codes have undergone revision to conform to the current state of knowledge of earthquake engineering. Structures and facilities vital in emergencies such as hospitals, emergency power installations, emergency operating centers, public safety facilities and essential elements of key communications systems have also been designed and constructed or remodeled to withstand strong earthquake shaking.

Similarly, need has been felt to review and revise standards of designing and constructing utility systems so that future damage may be within acceptable limits. Bangladesh may undertake similar measures. Most undeveloped countries like Bangladesh do not have safe educational institutions for students, designed to resist earthquakes and other natural disasters. Yet, these are in most cases the structures where shelters and post-disaster operations are organized.

The hazard to student life is hardly given importance in Bangladesh. Educational institutions lacking safety should be prohibited until these are brought up to modern standards of safety. If these cannot be made safe, these should be vacated and classes should be held in tents. It has been the general experience that most typical, modern one-story wood-frame houses perform better during earthquake ground shaking.

Bangladesh has undertaken comprehensive programs of rapid economic development. It seems necessary that Bangladesh considers carefully, it’s land-use planning without proceeding hastily with land-use programs in vulnerable areas. Precise traces of faults by geologists and its accurate mapping of breaks are essential pre-requisites for land-use planning. The thorough geological investigation can expose the hazards to critical structures like a new dam, a fertilizer factory or academic buildings or hospitals. All structures designed for public assembly need to be treated as subjects of special geological studies.

The present knowledge may not provide the ability to predict precisely when and where an earthquake will occur unless the faulting is clearly manifested on the surface. Experts in geology, soil mechanics and engineering may in due course be able to define precisely geological hazards. Meanwhile, vigorous enforcement of improved building code may be taken as the most effective measure

that can be taken to reduce the earthquake hazards. Buildings built of various types of masonry such as brick with lime mortar joints constitute serious hazards to occupants and to persons nearby when strong ground-shaking occurs. These structures withstand only the vertical load or weight of the building itself plus the added load from use.

No provision is made for horizontal loading by earthquake forces and little testing of building materials is done at the time of construction. Sometimes the low level of seismic resistance is established by professionals also. Advanced countries in recent decades have set standards for earthquake-resistant designs of new constructions and remodeling works of old buildings and passed legislation to force the abandonment of unsafe structures.

In the United States, deficiencies in old masonry structures have been largely corrected through the passage and enforcement of “Parapet Laws” which require hazardous parapets and cornices to be strengthened or removed in order to reduce hazards to occupants and pedestrians from debris.

The usual weakness in Bangladesh buildings can be located in the poor quality of brick, brick joints being improperly filled with mortar, the absence of mechanical ties between parallel layers of brick, the absence of reinforcing steel in the walls, inadequate structural ties connecting floors, roofs and walls to each other. So, we need to bring sub-standard buildings and structures to the current international levels of safety. Such a program will, of course, involve economic and human disruption to occupants in densely populated areas.

It is not correct to suppose that where no earthquakes of consequence have happened in two centuries there will be none in the future. An

important earthquake fault may be quiescent for many years and then produce a major attack. Faults, active or not, are identifiable by geologists but it is difficult to trace their courses under deep alluvium of valleys. Small shocks are positive evidence that something is occurring at depth. Many earthquakes are preceded by smaller shocks from nearly the same source. The succeeding intervals may be on the order of minutes, days or weeks. Foreshocks may not be distinguished from the common small earthquakes of the region until after the main event. Aftershocks may be numerous and long-continued. Occasionally damaging earthquakes occur in pairs of nearly equal magnitude.

In Bangladesh, warnings have been on against high-rise construction spree in view of the frequent mild tremors. But none seems to have taken note of such warnings. Although the intensity range is still minor, the fear of devastating earthquakes has not abated. The impact of these tremors has drawn particular attention to building code, which was not followed for so long. The damage inflicted by an earthquake may be catastrophic. In advanced countries, various insurance programs are at work to protect earthquake victims. We should also start such programs in Bangladesh.