

A REVIEW ON NATURAL DISASTER: MAJOR CASE STUDIES OF THE WORLD

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ABSTRACT

In this presentation, the unavoidable disasters are considered as the case studies. The measure disasters of the world occurred by different earth's dynamics like Earthquakes, volcanoes, plate tectonics activities, tornadoes and Tsunamis etc. are considered here and the photos of major disasters of the world are presented. The remedial measures (Mitigations) are also suggested as the part of disaster management.

Keywords: *Earth's dynamics, Earthquakes, Volcanoes, Plate tectonics activities, Tornadoes, Tsunamis, Remedial measures (Mitigations).*

I. INTRODUCTION

This presentation includes the study of the unavoidable natural disasters of the world occurred by different Earth's dynamics. World is facing troubles with many natural disasters and this study includes most of the Volcanoes, Earthquakes, Tsunamis, Tornadoes/Cyclone (Typhoons, Storms) etc. Earthquakes can also form Tsunamis which are large waves that crush up against the shore and can wash away people, buildings and bridges. Another disaster is volcanic eruption. Through a volcanic eruption lava is poured out with pyroclastic material, ash, poisonous gases and spreads all over the area. It also includes study about Tornadoes and Cyclones coming in August, when it hits the rainy season. Tornadoes and Cyclones with very high speeded winds and very heavy rains cause more damage, due to secondary hazards like landslides and floods. In the following chapters, different natural disasters and its impact on human being OR environment is discussed and mitigation methods also suggested.

II. NATURAL HAZARDS

Volcano:

An opening or vent through which lava (molten rock), gases (volatiles) and pyroclastic material like ash erupts on the earth's surfaces is called volcano. Most of the volcanoes are located at the convergent and divergent plate boundaries but others located in the interior plates, associated with hot spots. There are 454 active volcanoes around the earth, of which 283 border the Pacific Ocean and 98 occur in the Alpine-Himalayan belt.

Volcanoes can produce a number of quickly moving hazards, including flying debris, hot gases, lava flow and mudslides. If the volcano is of Hawaiian type, the lava spreads far longer distances which cause the large hazardous impact in the surrounding areas of the volcano.

The human settlements is also deciding factor for the hazard magnitude. The rain followed after the volcanic activity mixed with ash or mud flow, the large volume of the ash and sediments accumulated on the slope. The human settlements is also deciding factor for the hazard magnitude. The rain followed after the volcanic activity mixed with ash or mud flow, the large volume of the ash and sediments accumulated on the slope causing the burial of settlements and properties. In Vesuvius type of eruption, lava and other pyroclastic material comes out and is hot enough to light the fire in the surrounding areas. Fire also causes lot of damage to the life and property.

The gases like SO_2 emits through the vent of volcano, if mixed with rain water causes acid rain. This rain damages the quality of soil and further affects the yield of the crops. Rock fall and avalanches are also possible in these regions, this avalanches blocks the nearby river channels and may cause flood as seen at various places like St. Helens, Washington; Hawaiian, California; Mt. Fuji, Japan.

Earthquakes:

Earthquake means sudden slip on a fault. The tectonic plates are always slowly moving but they get struck at their edges due to friction, when the stress on edge overcomes the friction, there is an earthquake that releases energy in the form of waves that travel through the earth's interior and causes the shaking of the Earth. Majority of the earthquakes of the world are of plate tectonic type. Buildings are not the only thing to fail under the stress of seismic waves. Often unstable regions of the hills or mountains failure cause problems when they block highways. Liquefactions can cause other problems as the soils lose its ability to resist shear and flows much like quick sand. Anything relying on the substrata for support can shift, tilt or collapse. Earthquake generates Tsunamis on the ocean floor, which is one of the devastating hazard causing thousands of lives and economic crises in many countries at a time



Tsunamis:

Photo Photograph (A): June 25, 1896 an Earthquake of Japanese coast generated a Tsunami that hits the shore with wave.

Tsunami is Japanese term that means “harbor wave”. Tsunamis are giant sea waves generated in the ocean due to the earthquakes of higher magnitude. Tsunamis are initiated by sudden displacement of the ocean floor during earthquakes; volcanic processes also generate Tsunamis.

Tornadoes/Cyclones:

Spanish word ‘turned’ which came from the Latin word torque which means ‘twist’. A tornado is violent whirling wind, accompanied by a funnel shaped cloud extending down from a cumulonimbus cloud. Commonly known as a twister, a tornado has average width of a few hundred meters, but can be anywhere from a few meters to a kilometers wide where it touches the ground. Tornadoes are probably the most spectacular type of storm, but are certainly one of the most violent. Fortunately, however, they are restricted in their range. Although they occur in some form on all continents, it is the U.S.A. where they most frequently cause disaster.



Photograph (B): Satellite view of a cyclone.



Photograph (C). Funnel shaped Cloud of tornado

Cyclones develop over warm seas near the equator. i.e. figure 1.1. Satellite view of a cyclone. The water of a storm surge rushes inland with deadly power, flooding low line coastal areas. The rains from cyclones are also heavy enough to cause serious flooding, especially along river areas. Water often becomes contaminated from dead animals and people are threatened with diseases.

III. WORLD'S MAJOR DISASTERS

Volcanoes:



Photograph (D). A car buried in pahoehoe lava, Hawaii. (Kenneth)



Photograph (E). Eruption of Mount St. Helens May 18, 1980. (USGS)

Mt. Tambora, Indonesia. April 10-15, 1816, Death Toll: 92,000. The eruption of Tambora killed an estimated 92,000 people; including 10,000 from explosion and 82,000 from other related causes. The concussion from the explosion was felt as far as thousand miles away. Mt. Tambora, which was more than 13,000 feet tall before the explosion was reduced to 9,000 feet after ejecting more than 93 cubic miles of debris into the atmosphere. The effects of the eruption were felt worldwide: 1816 became known as the "year without summer" because of the volcanic ash in the atmosphere that lowered worldwide temperatures. It snowed in New England that June, and crop failures were common throughout Northern Europe and North America as many as 100,000 additional deaths from starvation in these areas are thought to be traced to the eruption.

Mt. Vesuvius, Italy, December 1631, Death Toll: 16,000+. In one of the most famous eruptions of all time, Mt. Vesuvius erupted and completely destroyed the Roman town. When the flows consumed many of the surrounding towns, boiling water ejected from the volcanoes added to the destruction. The intense heat, perhaps as much as 750 degrees carbonized much of the organic material in the area. Many of the victims have been found with the tops of their heads missing, their brains having boiled and exploded.

Earthquakes:

Chile, China 1290-19609:5 R.S. Earthquake killed 100,000 people. Calcutta, India, 1737: people 300,000 dead. San Francisco, 1906: Earthquake and fire, people dead, 3,000. Gansu, China Earthquake, 1920-1927: 900,000 people dead. Bihar, India, 1934: Earthquake people dead 10,700. Valdivia, Chile, 1960: Most powerful Earthquake of the century and people dead 5,700 R.S. 9.5. Latur, India, 1993: Earthquake people dead 22,000. Southeast Asia, 2004: Tsunami caused by 9.1 R.S. Earthquake 245,00 dead which 111,000 dead in Indonesia, 31,000 in Sri Lanka, 10,700 in India, 5,400 in Thailand, 68 Malaysia, 82 in the Maldives, 300 in Myanmar and 150 in Somalia, including 15,000 Scandinavian tourists, and dozens of Germans, Italians, Dutch etc. Haiti, January 2010: Earthquake people dead 230,000.

Tsunamis:

In 1983 the volcanic eruption of Krakatau resulted in the collapse of caldera that initiated a Tsunami which killed 36,000 people. In June, 25, 1896 an Earthquake of Japan cost generated a Tsunami that hits the shore with wave heights ranging from 10 to 100 feet. In 27, March, 1964, Alaska Earthquake Tsunami washed many vessels into the heart of Kodiak. 2004, Indian ocean Tsunami was among the deadliest natural disaster in human history with over 230,000 people killed in 14 countries bordering the Indian ocean. The Tsunami that struck South Asia and East African people in December, 24, 2004 killed a staggering 31,187 people in Sri Lanka.

Tornadoes/Cyclones:

Texas and the Southern states of the U.S.A. are visited by hundreds of tornadoes a year. Georgia, 1903: 203 dead. Missouri, Illinois, Indonesia, Tri state tornado 695 killed. India, 1864: cyclone killed people 70,000 dead. Bangladesh, 1876: Cyclone killed people 200,000 dead. Orissa, India, 1999: Cyclone killed people 7,600 dead. Indian subcontinent, June 2007: Storms (228 in Pakistan, 500 in India, 600 in Bangladesh.)

IV. MITIGATIONS

Volcanoes:

As the volcanic processes cannot be predicted, the only effective measure is to excavate the area. It depends on the volume of lava poured on the surface if it can be diverted to other ways away from the populated area. The people who are outside, poor visibility resulting in automobile accident that causes injuries during and after an ash fall. Educating the families and all the people by creating a disaster preparedness plan that includes a disaster survival kit and emergency evacuation plan. Airborne and accumulated ash is major volcanic hazard; effects can be minimized by using goggles and disposable breathing masks. Making regular updates with the volcanic monitoring centre and clearing the danger zones should be the first priority to minimize the effects.

Earthquakes:

For minimizing effects the suggestion is to plan ahead of time; all people should know how to turn off utilities (Electricity, water and gas) at the home, to take awareness of the breakable items.

The people who are inside their houses when an earthquake strikes, staying inside and getting under a heavy table or desk are necessary. Candles should not be used near the gas line connections, need to stay alert for aftershocks. The people outside, should stay away from buildings, large trees, power lines. All this information should be provided to the people of the affected areas.

Tsunamis:

There are no preventive measures for Tsunami but definitely the bad effects of Tsunami can be avoided as a lot of preventive actions. When there are abnormal water level variations, it could be a warning. The people should be advised to get far away from the shore as early as possible. If early excavation is not possible, the nearby mangrove forests can be utilized. Because mangrove forests are vegetated intertidal wetlands that provide protection against wave impact and erosion.

Tornadoes/ Cyclones:

Atmospheric administration weather radio and listening for severe weather information from the weather services is necessary. Pre-storm precautions need to be made early to allow time for additional preventative measures to be taken when a tornado is approaching. Other recommendations made, includes removing debris, securing stacks of wood and installing permanent window shutters. The disaster coalition recommends keeping a close eye on the sky for clues. These clues includes-1.A dark greenish sky.2.A wall cloud.3.Large hail often causes clouds to green.4.Funnel cloud a rotating extension.5.Roaring noise.6.Sunlight.

“Prevention is better than cure”

V. ACKNOWLEDGMENT

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