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Cowasjee Earthquake Study Centre
NED
NEWSLETTER

Devastating Earthquakes all Across the Globe

HAITI EARTQUAKE

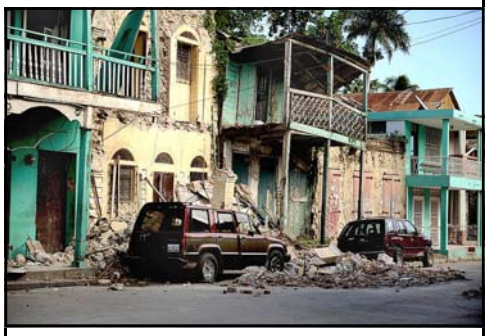

Fig 1: Damaged buildings in Jacmel

Haiti is the poorest country in the Western Hemisphere, and is ranked 149th of 182 countries on the Human Development Index. The Australian government's travel advisory site had previously expressed concerns that Haitian emergency services would be unable to cope in the event of a major disaster, and the country is considered "economically vulnerable" by the Food and Agriculture Organization. It is no stranger to natural disasters; in addition to earthquakes, it has been struck frequently by cyclones, which have caused flooding and widespread damage. The most recent cyclones to hit the island prior to the earthquake were Tropical Storm Fay and Hurricanes Gustav, Hanna and Ike, all in the summer of 2008, causing nearly 800 deaths.

Fig 2: Large portions of the National Palace collapsed

The island of Hispaniola, shared by Haiti and the Dominican Republic, is seismically active and has a history of destructive earthquakes. During Haiti's time as a French colony, earthquakes were recorded by French historian Moreau de Saint-Méry (1750–1819). He described damage done by an earthquake in 1751, writing that "only one masonry building had not collapsed" in Port-au-Prince; he also wrote that the "whole city collapsed" in the 1770 Port-au-Prince earthquake. Cap-Haïtien, other towns in the north of Haiti and the Dominican Republic, and the Sans-Souci Palace were destroyed during an earthquake on 7 May 1842. A magnitude 8.0 earthquake struck the Dominican Republic and shook Haiti on 4 August 1946, producing a tsunami that killed 1,790 people and injured many others.

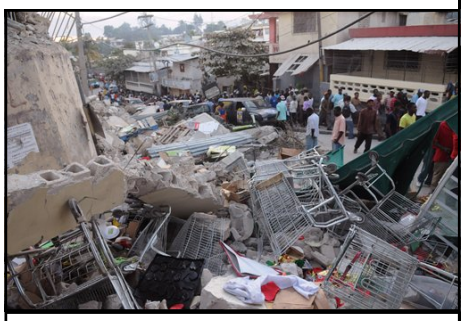

Fig 3: Aftermath of Haiti Quake

The 2010 Haiti earthquake was a catastrophic magnitude 7.0 M_w earthquake, with an epicentre near the town of Léogâne, approximately 25 km (16 miles) west of Port-au-Prince, Haiti's capital. The earthquake occurred at 16:53 local time (21:53 UTC) on Tuesday, 12 January 2010. By 24 January, at least 52 aftershocks measuring 4.5 or greater had been recorded. As of 12 February 2010, an estimated three million people were affected by the quake; the Haitian Government reports that between 217,000 and 230,000 people had been identified as dead, an estimated 300,000 injured, and an estimated 1,000,000 homeless. The death toll is expected to rise. They also estimated that 250,000 residences and 30,000 commercial buildings had collapsed or were severely damaged.The earthquake caused major damage to Port-au-Prince, Jacmel and other settlements in the region. Many notable landmark buildings were significantly damaged or destroyed, including the Presidential Palace, the National Assembly building, the Port-au-Prince Cathedral, and the main jail. Among those killed were Archbishop of Port-au-Prince Joseph Serge Miot, and opposition leader Micha Gaillard

(*Continued on page 4)*

Sources. USGS. Wikipedia, Dawn News

EDITORIAL

The first issue of volume 10 of CESNED NEWS LETTER is here, to keep you well informed about earthquake happenings and its destructions all around the globe.

CESNED is and shall keep on striving hard for its cause and hope that the NEWSLETTER would receive your personal attention and patronage.

CESNED is dedicating this issue to the effectives of Haiti , Chili and Turkey Earthquakes ——

Editor

Inside this Issue:

CESNED ACTIVITIES

Workshop on Preparedness for Tsunami and Coastal Hazard Risk Reduction

Two workshops were arranged by NEDUET in collaboration with UNDP for the residents of coastal belt of Makran and Gwadar. The first workshop was organized on 22nd-23rd December 2009 in NEDUET Karachi whose participants were resedents of Gwadar studing in Karachi , Ormara Pasini and Gwadar. The second workshop was the sequel of the first one but was done in Quetta on 16h and 17th March 2010 targeting the participants from Quetta and adjacent areas.

Fig 4: Participant receiving certificate from Dr. S.F.A Rafeeqi

All oceanic regions of the world can experience tsunami. Pakistan has a history of being affected by a tsunami on November 28, 1945 , where there were around 4000 casualties along the Makran Coast. Tsunami waves reached at the height of 40 ft in some Makran ports and caused great damage. The coastal area near Karachi and Gwadar are also disaster prone areas. The giant tsunami in the Indian Ocean on 26 December 2004 claiming more than 225,000 lives has emphasized the urgent need to assess tsunami hazards for various vulnerable coastlines around the world, especially for those neighbouring the Indian Ocean.

Fig 5: Audiences during the last session along with the faculty members in NEDUET

Historical tsunami have been studied for many vulnerable coastlines of the world and published in tsunami catalogs or databases. Markan region is one of the most vulnerable regions in Pakistan due to the presence of Makran Subduction Zone (MSZ) and tsunami and cyclone are identified as two key hazards among many in the National Disaster Risk Management Framework of the Government of Pakistan, the project "Strengthening Tsunami Early Warning System in Pakistan" was designed which aims to assist the Government of Pakistan in strengthening its national tsunami and other ocean-related hazards warning system as well as the associated preparedness for disaster risks of the most vulnerable coastal communities of Pakistan. The UNDP component under the project has focused on "Tsunami and Coastal Disaster Risk Reduction and Preparedness at Community and Local Level" in coastal areas of District Gwadar. UNDP in collaboration of National Disaster Management Authority (NDMA) has already organised a two day training workshop in August 2009. These two workshops are the series of that one and entitled "Preparedness for Tsunami and Coastal Hazard Risk Reduction". The objective of theses workshops were not only to introduce basic concepts regarding tsunami generation to the students of these areas and but also to highlight issues related to tsunami. It was also aimed at providing skills and training to these students that will not only enable them to plan and execute disaster management activities but also strengthen early warning system in the project area.

5 Days Course on Earthquake MITIGATION

A five 5-Day training course (08th to12th March 2010) on Earthquake MITIGATION was organized by National Institute of Disaster Management (NIDM) Islamabad in collaboration with UNDP and NDMA. The CESNED resource persons Prof. Rafeeqi and Prof. Lodi were amongst the invited instructors to train the participants from all across the country. The objective of the workshop was to give the awareness to the participants about the earthquake disaster risk situation in Pakistan and its mitigation. On the first day of the training, the trainers discussed about the nature and causes of Earthquake hazard and associated secondary hazards in Pakistan. Second day was all about the discussion on impact of Earthquakes on different types of Buildings in Pakistan and hazard assessment techniques for such buildings. The workshop also talked about the Earthquake vulnerability assessment of the built environment, Techniques for earthquake hazard zonation and risk mapping. On Third day the planning techniques regarding Earthquake Risk Reduction were discussed, Planning for Earthquake Vulnerability Reduction, City level Action Planning for Seismic Safety, Planning for Seismic safety at community and household level were also discussed. The presentations regarding the Earthquake Mitigation Measures, Structural intervention (Seismic Design of Buildings), Non-Structural intervention (Land-use planning) and Community based earthquake mitigation measures were also presented. On fourth day of the training, Field visit at Muzaffarabad for the participants along with the trainers was also arranged. In which the trainers trained the participants on site regarding the hazard risk assessment and the mitigation techniques. On last day of the course, as a closing note of the course public awareness and Training & Capacity Building of Masons, Engineers, Planners was emphasized.

Fig 6: Participants discussing their queries

Fig 7: Dr. Rafeeqi elaborating the Mitigation techniques

CESNED ACTIVITIES

EARTHQUAKE MODEL OF THE MIDDLE EAST REGION

EMME (Earthquake Model of the Middle East Region) aims at the assessment of seismic hazard, the associated risk in terms of structural damages, casualties and economic losses and also at the evaluation of the effects of relevant mitigation measures in the Middle East region in concert with the aims and tools of GEM. The EMME will encompass several modules such as the Seismic Hazard Module, Risk Module, Socio- Economic Loss Module and the development of an IT infrastructure or platform for the integration and application of modules under consideration. The methodologies and software developments within the context of EMME will be compatible with GEM in order to enable the integration process. As such, a comprehensive interaction between the two projects is foreseen.

The duration of the project is o 4 years started from April 01, 2009 and is related to field of Earthquake Engineering and Geology. The Key Pakistan Side Participation for WP 4 & 6 Prof. Sahibzada F. A. Rafeeqi & Prof. Sarosh H. Lodi from NED University of Engineering & Technology, Karachi and National Disaster management Authority Pakistan EMME aims to contribute to and facilitate the seismic risk reduction through the realization of the following specific tasks:

Fig 08: EMME Participants in Discussion during

- Calculate seismic hazard uniformly and with the highest standards
- Rigorously validate earthquake and shaking probabilities using regional and global data
- Communicate seismic risk clearly, accurately, and transparently to all users
- Integrate local expertise in a regional and global context
- Monitor and update changing infrastructure and vulnerability
- Build seismic risk management capacity in the whole region
- Enable dialogue with decision-makers

Implement EMME as part of the Global Earthquake Model

EMME will be a living model, rather than a static study, with a flexible, modular architecture to allow addition and updating of components and datasets, and to maintain it continuously as state-of-the-art and in conformance with national developments and new international standards. As such, EMME will allow multiple user types to derive updated products and outputs, and keep up with changing requirements. The users and beneficiaries of EMME will be broad, and include all those who make decisions based on seismic risk: seismic agencies, engineers and practitioners, government officials, insurance and finance industries, emergency responders, risk professionals, homeowners, investors, and the population at large.

Devastating Earthquakes all Across the Globe

Continued from page 4

The Turkish quake occurred on the heels of quakes measuring 6.4 in Taiwan, 8.8 in Chile, and 7.0 in Haiti, raising speculation of a link. At least 57 people were killed when a powerful earthquake measuring 6.0 on the Richter scale struck the remote villages of Elazig Province in eastern Turkey on 8th March 2010.The quake struck at 04:32 am local time with an epicenter near the Karakocan town in Elazig province. It knocked down stone and mud-brick houses. More than 50 aftershocks measuring up to 5.5 vibrated the region and slowed efforts to treat dozens of injured people. The victims perished in six villages located near the epicentre of the tremor in Elazig city. The quake was felt in neighboring provinces and sent the residents of Elazig rushing out on to streets in panic. Several aftershocks were felt in the region. Deadly earthquakes are frequent in Turkey, which is crossed by several active fault-lines. Two powerful tremors in the heavily populated northwest claimed about 20,000 lives in August and November 1999.

Fig 11: Turkey earthquake destruction

Fig 12: Ruins in the province of southeastern city

Sources. USGS. Wikipedia, Dawn News

Devastating Earthquakes all Across the Globe

Continued from page 1

The headquarters of the United Nations Stabilization Mission in Haiti (MINUSTAH), located in the capital, collapsed, killing many, including the Mission's Chief, Hédi Annabi.Many countries responded to appeals for humanitarian aid, pledging funds and dispatching rescue and medical teams, engineers and support personnel. Communication systems, air, land, and sea transport facilities, hospitals, and electrical networks had been damaged by the earthquake, which hampered rescue and aid efforts; confusion over who was in charge, air traffic congestion, and problems with prioritization of flights further complicated early relief work. Port-au-Prince's morgues were quickly overwhelmed; tens of thousands of bodies were buried in mass graves. As rescues tailed off, supplies, medical care and sanitation became priorities. Delays in aid distribution led to angry appeals from aid workers and survivors, and some looting and sporadic violence were observed.

CHILE EARTHQUAKE

The 2010 Chilean earthquake occurred off the coast of the Maule Region of Chile on February 27, 2010, at 03:34 local time (06:34 UTC), rating a magnitude of 8.8 on the moment magnitude scale and lasting 90 seconds. It was strongly perceived in six Chilean regions (from Valparaíso in the north to Araucanía in the south), that together make up 80% of the country's population. The cities experiencing the strongest shaking were Arauco and Coronel, Chile. The earthquake was felt in the capital Santiago. Tremors were felt in many Argentine cities, including Buenos Aires, Córdoba, Mendoza and La Rioja. Tremors were felt as far north as the city of Ica in southern Peru (approx 1500 mi./2400 km). The earthquake triggered a tsunami which devastated several coastal towns in south-central Chile and damaged the port at Talcahuano. Tsunami warnings were issued in 53 countries, causing minor damage in the San Diego area of California and in the Tōhoku region of Japan, where damage to the fisheries business was estimated at USD$66.7 million. The earthquake also generated a blackout that affected 93% of the country's population and which went on for several days in some locations.

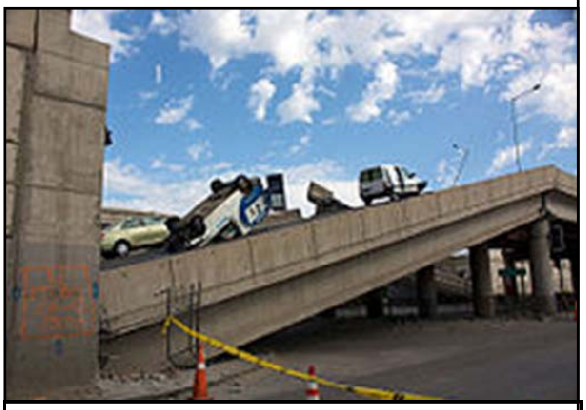

Fig 9: Collapsed Vespucio Norte Express Highway in Santiago.

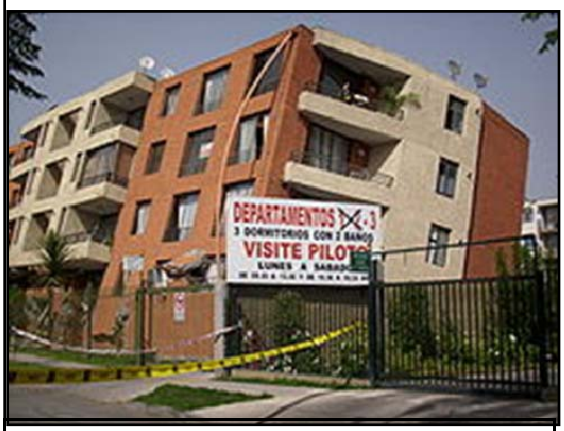

Fig 10: A severely damaged building in Maipú, Santiago

President Michelle Bachelet declared a "state of catastrophe" and sent military troops to take control of the most affected areas. The latest death toll as of April 7, 2010 is 486 victims (down from 802 reported by the previous administration on March 3). Seismologists estimate that the earthquake was so powerful that it may have shortened the length of the day by 1.26 microseconds and moved the Earth's figure axis by 8 cm or 2.7 milliarcseconds. Precise GPS measurement indicated the telluric movement moved the entire city of Concepción 3.04 metres (10 ft) to the west. The capital Santiago, experienced a displacement of almost 24 centimetres (10 in) west, and even Buenos Aires, about 1,350 kilometres (840 mi) from Concepción, shifted 3.9 centimetres (1.5 in). The epicenter of the earthquake was offshore from the Maule Region, approximately 11 km (6.8 miles) southwest of Curanipe and 100 km (71 mi) north-northeast of Chile's second largest city, Concepción. The earthquake also caused seiches to occur in Lake Pontchartrain to the north of New Orleans, United States, located nearly 7,500 kilometres (4,700 mi) from the epicenter of the quake. The earthquake took place along the boundary between the Nazca and South American tectonic plates, at a location where they converge at a rate of eighty millimeters (about three inches) a year. This earthquake was characterized by a thrust-faulting focal mechanism, caused by the subduction of the Nazca plate beneath the South American. Chile has been at a convergent plate boundary that generates megathrust earthquakes since the Paleozoic (500 million years ago). In historical times the Chilean coast has suffered many megathrust earthquakes along this plate boundary, including the strongest earthquake ever measured, which is the 1960 Valdivia earthquake. Most recently, the boundary ruptured in 2007 causing the 2007 Antofagasta earthquake in northern Chile. This was the strongest earthquake affecting Chile since the magnitude 9.5 1960 Valdivia earthquake (the most energetic earthquake ever measured in the world), and it is the strongest earthquake worldwide since the 2004 Indian Ocean earthquake. It is tied with the 1906 Ecuador-Colombia and 1833 Sumatra earthquakes as the seventh strongest earthquake ever measured, five hundred times more forceful than the 7.0 M_w earthquake in Haiti in January of 2010. An aftershock of 6.2 was recorded 20 minutes after the initial quake. Two more aftershocks of magnitudes 5.4 and 5.6 followed within an hour of the initial quake. T he USGS said that "a large vigorous aftershock sequence can be expected from this earthquake". By March 6 UTC, more than 130 aftershocks had been registered, including thirteen above magnitude 6.0.

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Sources. USGS. Wikipedia, Dawn

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Information, news items, short notes on research findings are invited from across the globe.