

Earthquake hits Indonesia, Pakistan, Iran and Afghanistan

Indonesia, Pakistan, Iran and Afghanistan were hit by earthquakes. A report of earthquakes in these countries is as under:

Indonesia The Indonesian region is one of the most seismically active zones of the earth; at the same time it has a leading position from the point of view of active and potentially active volcanoes. It is a typical island-arc structure with its characteristic physiographic features, such as a deep oceanic trench, a geanticline's belt, a volcanic inner arc and a marginal basin.

Frequent volcanic eruptions and frequent earthquake shocks testify to the active tectonic processes which are currently in progress in response to the continued movement of these major plates. Only this year to date Indonesia has been hit by six strong rated earthquakes, causing damage to human life and property. This series began in January when on January 27 a magnitude 7.6 on Richter scale hit Indonesia at BANDA SEA, second incident occurred in march, this time SERAM, was the location and the magnitude was 6.7, during the month of May two strong earth quake hit the country, on May 16 at NIAS REGION and on May 26 at JAVA having magnitudes of 6.8 & 6.3 respectively. In July South of Java got struck again by a Magnitude 7.7 Till date most recent hit area was Kepulauan Talaud with magnitude 5.6.

Pakistan A minor earthquake of magnitude 4.4 occurred in Pakistan's northern areas on Monday, 25th September 2006, coordinates of the area were 50 km (30 miles) E of Mingaora, Pakistan, 115 km (70 miles) N of ISLAMABAD, Pakistan, 145 km (90 miles) ENE of Peshawar, Pakistan, 155 km (95 miles) SSE of Chitral, Pakistan. Exactly a year after a disastrous earthquake of 8th October 2005, a mild intensity earthquake



measuring 4 on Richter scale jolted Balakot and Garhi Habibullah on 7th Oct, the earthquake originated at 2139 hours PST and its epicenter was 200 km north east of Peshawar in Hazara division.

Fig: Epicenter of 25th sep earthquake in Pakistan

Southern Iran

On 29th September the southern region of Iran was hit by an earthquake that has been recorded as Magnitude 4.3 on the Richter scale, the depth of the earthquake was recorded as 10 kilometers from the mean sea level.

Hindu Kush Region, Afghanistan

A mild earthquake, Magnitude 3.6 occurred in the Hindu Kush region Afghanistan 2006 on 6th September in the vicinity of 95 km (60 miles) S of Feyzabad, Afghanistan, 120 km (75 miles) WNW of Chitral, Pakistan, 160 km (100 miles) SSW of Khorugh, Tajikistan, 240 km (150 miles) NE of KABUL, Afghanistan On Monday, 2nd October a magnitude 4.3 earthquake was recorded in the Hindu Kush region of Afghanistan, the same region was also hit last month in September. The depth of earthquake was 74 km from the mean sea level. And coordinates of region were 60 km (35 miles) ESE of Feyzabad, Afghanistan 85 km (55 miles) SSW of Khorugh, Tajikistan 130 km (80 miles) NW of Chitral, Pakistan 130 km (80 miles) NW of Chitral, Pakistan 310 km (195 miles) NE of KABUL, Afghanistan.

Source: www.usgs.gov

CCEE holds 5 day International workshop on Seismic Analysis & Design

An international workshop on Analysis and design "Seismic Analysis & Design: A capacity Building Exercise" was organized by Centre for Continuing Engineering Education NED University in association with CESNED from 2nd August to 6th August. Renowned earthquake engineering expert Dr. Tanvir Wasti of Middle East Technical University, Turkey and Prof. Dr. SFA Rafeeqi Dean (CEA) NED University were the main speakers for the workshop. A large number of leading consultants, engineers, architects, academicians and students participated in the 5 day long interactive workshop.

Inside this issue:

South Asia Earthquake, One year on	2
CESNED holds seminar	3
Worldwide Earthquake 1990-2006	3

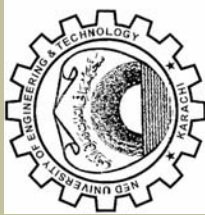
EDITORIAL

This issue of the CESNED newsletter marks the first anniversary of the October 08, 2005 earthquake that has caused the damages beyond imagination. Since then the brave people of NWFP and Azad Kashmir had come a long way. They have set examples of bravery and courage, still a large number of people are struggling to come to terms with the new scenarios in their lives. The government, international agencies, NGOs and other organizations have done a remarkable job, but there is still a lot to be done in health, education and housing areas.

CESNED playing its role has invited leading Professors from Japan for a one day seminar in May 2006 in order to learn from their experiences. CESNED also organized five day workshop which was addressed by leading expert from Turkey.

It has always been emphasized that any contribution in terms of articles shall be appreciated by CEDNED, however, CESNED have yet to benefit from contribution from outside sources, which, however, shall not discourage us.

Editor



Cowasjee Earthquake Study Centre NED

NEWSLETTER



South Asia Earthquake, One year on

On 8 October 2005, at 0350 GMT, a magnitude 7.6 earthquake occurred in Pakistan, Afghanistan and India, leaving about 75,000 dead and hundreds of thousands homeless. Much of the worst damage was in the disputed territory of Kashmir. The epicentre was located 80km (50 miles) north-east of Islamabad but was felt in the Pakistani capital and across South Asia, from Afghanistan to western Bangladesh. By 27 October, more than 1,000 aftershocks had been recorded. The World Bank described the 2005 earthquake as arguably the most debilitating natural disaster in Pakistan's history. The worst-hit areas were Pakistan-administered Kashmir and the eastern districts of the North-West Frontier Province. As well as the loss of human life, the earthquake destroyed homes, public buildings, infrastructure, commerce and communications. Relief agencies mobilised and pledges of \$5.4bn were made by the international community - all the more urgent as survivors faced the imminent onset of the Himalayan winter.

2005 Earthquake Toll

Pakistan side: 73,338 dead
India side: 1,360 dead
Affected population: 3.5m
Health facilities destroyed: 80%
Area affected: 30,000 sq km
Still in tent camps: 35,000

AID Relief Aid agencies and NGOs from around the world were deployed to the region immediately after the earthquake and some have remained, training local people in construction, helping to rebuild homes and schools. One year on, about 400,000 people face

Temporary Relief

Tents: 951,790
Blankets: 6,361,090
Rations: 256,376 tonnes
Medicines 2053.76 tonnes
Miscellaneous: 131,041.23 ton

a second winter without permanent shelter in the mountains and valleys of northern Pakistan, according to the International Federation of Red Cross and Red Crescent Societies. The UN says there are about 35,000 people still living in 45 tent camps and agencies are expecting at least another 20,000 to come down from the hills in the next couple of months before winter, when temperatures can drop to -15C or -20C in the highest villages. The Pakistani government's Earthquake Reconstruction and Rehabilitation Authority (Erra) says major roads have been re-opened and that four bridges washed away in recent floods have been replaced. The government says most of the power supply has been restored to affected areas.

Balakot: One of the worst-hit areas was the town of Balakot - which was reduced to rubble by the earthquake. The town is on a major geological fault-line and was close to the epicentre of the quake. The government has decided that more than 40,000 Balakot residents will be relocated to a new town some 30km (18 miles) away at Bakryal. Thousands of families have already left the area, but some have stayed to rebuild their homes. Most of the rubble has been removed, but there are still no permanent buildings - only re-inforced shelters. But Balakot remains an economic centre, markets are functioning and people are able to buy food and building materials. The Swiss government agency Swiss Humanitarian Aid (SHA) has been part of the international aid effort, working with local people in Balakot and Batagram. The head of the reconstruction team, Thomas Fisler, says the next big challenge is to prepare for the winter. He says most people have not been able to rebuild their houses entirely so they are making semi-permanent structures to see them through the harsh weather. They are using timber from their damaged homes, dry mud walls and the tarpaulins and corrugated iron sheets from their temporary shelters. "In my opinion the majority of shelters are barely... sufficient for the winter," he said. "There is a concern that if the winter is very harsh, there will be an immediate need for relief again."

Housing: Almost one million tents have been distributed since the earthquake to provide shelter for homeless families. Millions of sheets of tarpaulin and plastic have also been provided to insulate the tents from the rain and snow. The UN says its agencies have helped 76,000 people return from temporary camps to their place of origin. The Pakistani government has already distributed \$44m to 379,660 people to help them to rebuild their homes. Most people received \$441 to cover basic shelter needs. People whose homes were destroyed are receiving about \$2,485 in instalments as well as technical training and advice. Those whose homes were damaged receive about \$1,242. Twelve housing reconstruction centres have been set up around the region to help train people. More than 75,000 people have been given basic training. Erra has a selection of basic designs - which incorporate earthquake-resistant features. The UN agencies have allocated \$95.6m for 26 livelihood programmes involving seed distribution, fertilisers, livestock, skill development and agriculture implants. Different NGOs are also working on similar projects.

Health The UN says no cases of malnutrition were reported despite six out of the nine districts affected by the earthquake being areas where food is traditionally in short supply. More than 200,000 tonnes of food were distributed to 2.3m people, including 745,000 people in inaccessible remote mountainous locations. The UN says the emergency created the opportunity to set up new and temporary health facilities and restock existing ones. More than 1.25m children in the region who were not vaccinated before were given shots against polio, meningitis and measles and of Vitamin A. More than 69,000 people were severely injured in the earthquake, and an estimated 10,000 children left disabled. Aid efforts have enabled the setting up of a spinal cord injury rehabilitation facility in Islamabad for women and children, treating over 100 quadriplegic and paraplegic patients. Two medical rehabilitation centres have also been set up in Muzaffarabad and Abbottabad. The UN says more than 1,000 community health workers, 2,300 lady health workers have been trained to work in communities. Nine mobile service units deployed in the region have helped deliver some 4,500 babies.

Health Services

Rehabilitation centres: 2
New health outlets: 20
Prefab health facilities: 100
Ambulances: 10
Source: UN

Education More than 6,000 schools and colleges were destroyed in the earthquake. The Pakistani authorities plan to rebuild 1,574 of them during 2006 and 2007, including 1,202 primary schools, 126 secondary schools, 13 colleges and two universities. The UN says the relief efforts enabled the enrolment of school-age girls who had previously never joined a school. More than 4,300 schools were immediately re-established in tents allowing almost 400,000 children to enrol, of which 38% were girls, the majority of whom had not been enrolled before the earthquake. Save the Children says that after the disaster it was important to get children back to school as soon as possible as education plays a vital role in protection, providing children with a safe environment and giving parents time to rebuild their lives. "The things children learn in school can help them cope with the emergency - teaching children how to be prepared for an earthquake and what to do if it happens again can reduce their fear," a spokeswoman said. Among its aid programme, Save the Children distributed 522 school kits containing teaching materials, notebooks, pencils, games and toys to schools and provided 80,000 text books.

Report by BBC

CESNED holds Seminar on “Restoration and Reconstruction of the Affected Areas by the Pakistan Earthquake”

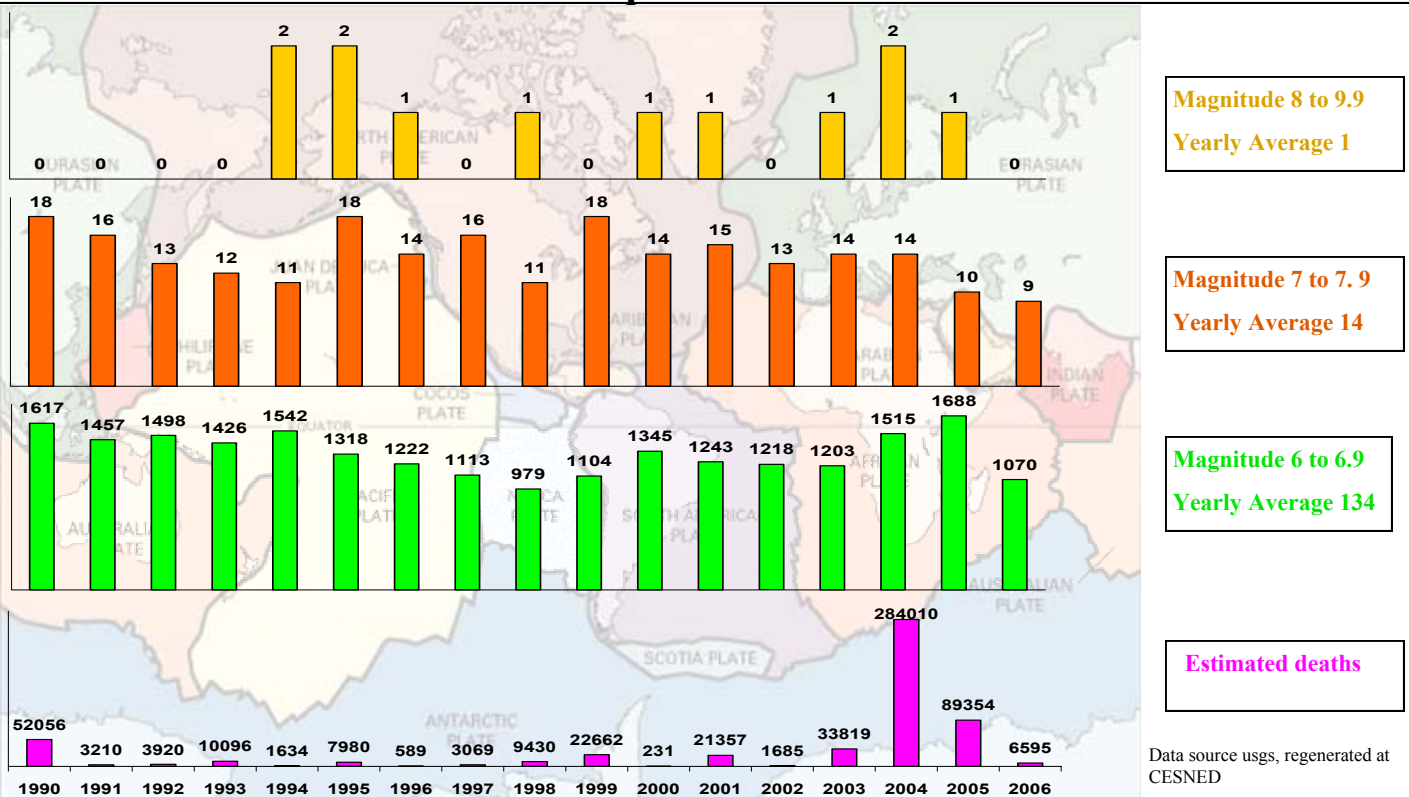
The Department of Civil Engineering has always taken a lead in developing working relationships with known centers of leading universities and professional bodies and is aspiring to serve the Civil Engineering community of Pakistan through its outreach activities. One aspect which is continuously been emphasized by the Department, a need for disaster mitigation both pre and post. In the wake of recent earthquake and its aftermath, a subsequent seminar is being organized for the engineering community on the recent developments in earthquake engineering and technological advancements. On Monday 8th May 2006, a one-day seminar titled: “**Restoration and Reconstruction of the Affected Areas by the Pakistan Earthquake on October 08, 2005**” was held by the Department of Civil Engineering in collaboration with Japan Society of Civil Engineers (JSCE) and Architectural Institute of Japan (AIJ) with the assistance of Japan International Cooperation Agency (JICA). Over 150 participants from various professional bodies, organizations, government agencies and NGO’s from different parts of the country along with students of NED University attended the seminar.



Fig 1 Japanese Speakers attending the seminar

The seminar comprising of three sessions started at 9:00 a.m and finished at 3:00 p.m and maintained enthusiasm all along. The full day seminar focused on the realities and concerns regarding restoration and reconstruction in the effected areas, subsequently leading to the identification of needs for disaster mitigation and possible answer to the solutions. Technical sessions included lectures entitled “Damage to Civil Infrastructures and Geotechnical Hazards in the 2005 October 8th Pakistan Earthquake and Rehabilitation Strategies” by Dr.Kazuo Konagai, Geotechnical Earthquake Engg, University of Tokyo. Second lecture was “Geological and Seismological Aspects of Kashmir Earthquake of October 8 ,2005 and A Geotechnical Evaluation of Failure of Natural and Cut Slopes with an Emphasis on Site Selection for Resettlement and Reconstruction in Earthquake Affected Region of Kashmir” by Dr. Omer Aydan , Rock Mechanics and Earthquake Engg , Tokai University. Third one by Dr Yoshiaki Nakano,Earthquake Engg of Building Structures. University of Tokyo “Damages to building structures due to 2005 October 8 Pakistan Earthquake and Seismic Rehabilitation Strategies on Vulnerable Buildings. Two presentations from NED University titled “Hazard Assessment of SCBS using circular disk technique” and “A note on Identification and Mitigation of Seismic Geotechnical Hazards” presented by Prof S.H.Lodi and Dr.A.Samad Khan respectively. All the participants lauded the efforts done by the department of Civil Engineering NED university of Engg and Technology in organizing a very informative and valuable seminar. In the end Prof Dr Rafeeqi distributed souvenirs to all respected speakers and thanked all participants and the organizing committee of the seminar in his closing remarks.

World Wide Earthquake 1990-2006



Karachi ShakeNet - Seismic sensors to monitor Karachi shaking.

Karachi lies at the intersection of four seismic zones that stretch hundreds of km to the cardinal points of the compass (Figure 1). The largest known earthquakes on these zones occurred in 1945, 200 km to the east ($M_w=8.1$) and in 1819, 150 km to the west ($M_w=7.8$). Smaller damaging earthquakes have occurred on the fault systems that mark the western edge of the Indian tectonic plate that runs approximately north-south 100 km west of the city center, although earthquakes on this zone may potentially exceed $M_w=7.5$. Closer to the heart of the city, and according to reports of minor shaking in the past two centuries, the geological structures on which the city is built may themselves potentially active. The principal east-west and north-south tectonic seismic zones must sooner or later fracture in earthquakes closer to the city than they have in the past few centuries, and when they do they will shake a megacity that only a century ago was a small fishing village.

Karachi's earthquake future is thus most certainly hazardous. It is not so much a matter of whether a future damaging earthquake will occur as when, and how the structures in the city will respond to such an event. Earthquake engineers are concerned that violent shaking will cause the collapse of many thousands of dwellings, and hundreds of bridges, giant hoardings and office buildings that were erected by contractors unaware of the need to construct for future shaking. Karachi will be shaken not just once, but many times in the future. Shoreline facilities will sink and contract, roads will be damaged, water lines and sewers disrupted, and power and communications out of action for days or weeks. Numerous fires may be initiated through the rupture of gas lines and petrol tanks. Estimates of fatalities range from a few tens of thousands for a moderate earthquake to more than one million for a large one, with economic losses tens to a thousand times greater than those associated with the recent Kashmir earthquake.

In order to brace the city to resist damage in earthquakes Karachi's engineers and civic planners need very specific information about the intensity, frequency and duration of future shaking. Such information that is currently available is theoretical and not specific to Karachi. Geologists have yet to identify those faults that are next most likely to fail, seismologists are almost entirely ignorant of the frequency with which earthquakes occur on any of the five seismic zones. Geotechnical engineers have yet to determine the response characteristics of soil layers near the city, which will amplify and attenuate seismic waves as they approach, recede and reflect in subsurface rocks. Geodesists have yet to specify the rate and direction of increasing stress on the boundaries of the Indian, Arabian and Asian plates that intersect only 100 km west of Karachi. This is an astonishing level of scientific ignorance for one of the world's largest cities. To be aware of Karachi's hazardous future and to do nothing about it would be criminally negligent. Accordingly a start has been made on setting of the city. These measures may ultimately yield a list of candidate future earthquakes near Karachi with probability estimates for their future occurrence. To be aware of Karachi's hazardous future and to do nothing about it would be criminally negligent. Accordingly a start has been made on quantifying the seismic setting of the city. These measures may ultimately yield a list of candidate future earthquakes near Karachi with probability estimates for their future occurrence to shorelines and to harbour facilities. Their digital memories will capture small earthquakes that are expected every few years near Karachi, and some of them will detect shaking from quarry blasts. Each sensor has a clock that synchronizes the array of instruments into a single coherent network. Maintenance consists of inspection and a change of batteries once each year. The hope is not to capture a catastrophic earthquake, but to capture the city shaken by a modest one. The data expected from a $M_w=5$ earthquake would be enough to identify the degree to which the sediments

and unfilled regions of the city amplify seismic waves, compared to the way in which they are attenuated in regions where rock emerges at the surface. The data will characterize the frequency of ground shaking, and the damping of impulsive shocks. The scale of the proposed network is driven by the size of the city and by the extraordinary ignorance currently faced by engineers charged with the safety of the citizens of Karachi. Action is needed urgently. For example, consider the consequences of a large earthquake occurring this year in Karachi. Damage would be immense and reconstruction a multi-million rupee enterprise requiring a decade or more. Building codes and design guidelines would be urgently required for new construction, but the quantitative criteria on which to base this reconstruction would be lacking. The complete absence of strong-motion accelerometers in the city would mean that engineers would have lost a unique opportunity to quantify the impact of shaking on geological and man-made structures. Thus we consider inaction unacceptable. The data anticipated from the proposed Karachi accelerometer network will guide construction in the city for the next century. These data, together with data from newly initiated geodetic, geologic, historical and seismic investigations will provide vital estimates of Karachi's vulnerability needed for urban planning and insurance purposes. We plan immediate implementation of the shake monitoring network with ten strong-motion accelerometers. This would be followed by deployment of a further 90 sensors.

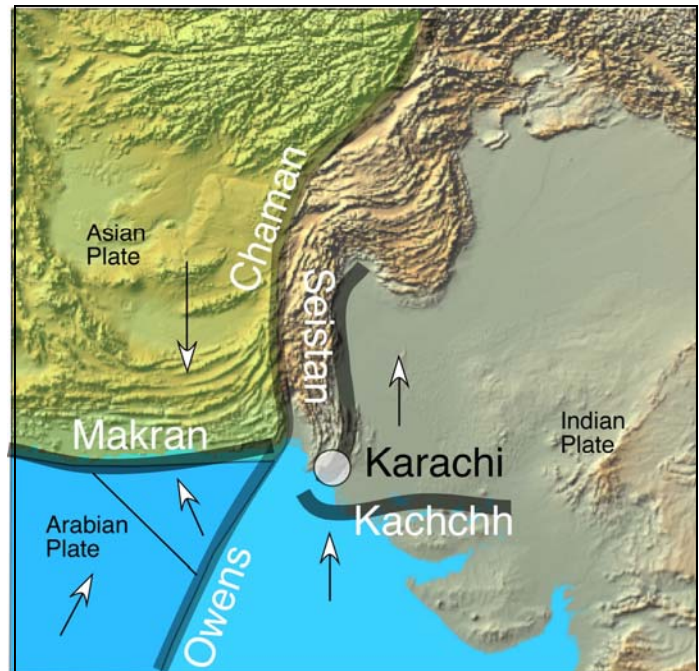


Figure 1. The corner of three gigantic tectonic plates (Indian, Arabian and Asian) is located 100 km west of Karachi. The forces and displacements at this triple junction are accommodated by earthquakes occurring on the Makran subduction zone, Owens Fracture Zone and Chaman faults. Further complexities have caused a fracture to develop eastward into the Indian plate, and northward following the foot of the Sistan range which terminates near the city. The arrows show inferred slip directions (currently under investigation).

RESOURCE PERSONS:

- Prof. Dr. S. F. A. Rafeeqi
- Prof. S. H. Lodi

Mail: Cowasjee Earthquake Study Centre NED,
Department of Civil Engineering,
NED University of Engg. and Tech.,
Karachi-75270, Pakistan

Phone: +92-21-926 1261-68
Ext. 2205 & 2223

Fax: +92-21-926 1255

Email: cesned@neduet.edu.pk

Web page: www.neduet.edu.pk

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