

EARTHQUAKE ENGINEERING STUDY CENTRE NEWSLETTER

Inside this issue:

Can Earthquake Be Predicted	2
Ten Largest Earthquakes (1989-98)	2
Earthquake Mitigation	2
Role of Diff. Groups in Mitigating Earthquake	3
Earthquake strikes, Western Honshu, Japan	4
NED Univ. team visits Earthquake hit Areas	4

EDITORIAL

The Department of Civil Engineering, NED University of Engineering and Technology, Karachi, lived up to its commitments of establishing an Earthquake Engineering Study Centre which shall act as a resource centre and clearing house to disseminate knowledge regarding Earthquake hazard and its Mitigation. The first issue of the Newsletter which shall be published quarterly is in hand and must provide you with an insight, how the future issues would look like. The broader theme would remain Mitigation and each issue will highlight global efforts in this regard. Earthquake hazard is an international issue and we are committed to treat it as such. The efforts that Department of Civil Engineering is making single handedly deserves appreciation, and we are looking forward for grants from International Agencies to help fulfill the purpose of its establishment.

7.7 Magnitude Earthquake Strikes Gujarat State in Western India

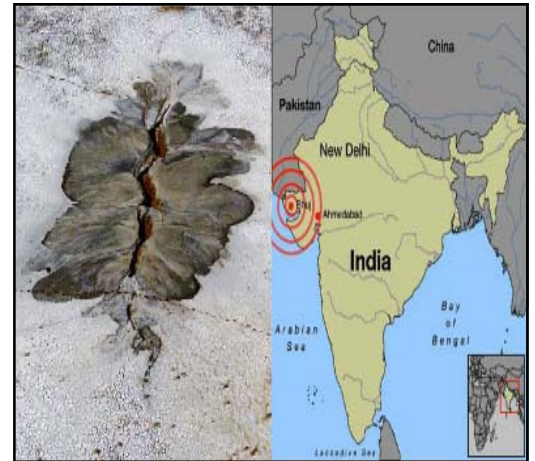
At 8:46 a.m. (8:16 a.m., PST) on Friday, January 26, a devastating earthquake of magnitude 7.7 struck the Western India State of Gujarat, leaving thousands of people dead, injured and homeless, who otherwise would have been celebrating the India's Republic Day.

The ground shaking lasted for almost 45 sec. The epicenter of earthquake was located near the desert resort town of Bhuj in the Kutch area; a remote and marshy region about 65 miles northeast of Jamnagar, India and 180 miles southeast of Hyderabad, Pakistan.

Shocks of the earthquake were felt across Pakistan, Bangladesh and Nepal. Much of the damage centered around Ahmedabad, the State's commercial center, located about 275 miles away from the epicenter.

Significant damage to power transmission lines has also been reported along with incidents of railway de-railment.

The buildings that have collapsed are most likely to be of reinforced concrete with infilled brick masonry, the most common form of construction in India. (Source: USGS)



Left: An aerial view of the epicenter of the recent earthquake shows huge cracks in the earth in a salt marsh near Dhorji village in the western Indian state of Gujarat on February 2, 2001. The length of the crack, from top to bottom, is about 200 yards. (Kamal Kishore/Reuters)

Right: Location of Epicenter near Bhuj. (EQE International).

Earthquake Report

Pakistan Meteorological Department

Seismological Network of Pakistan Meteorological Department reported that an earthquake of magnitude 6.5 on the Richter Scale was recorded on 26th January, 2001 at 08 hours 16 minutes 35 sec P.S.T. According to the preliminary analysis of Meteorological Station, Peshawar, the epicenter was located about 1300 kilometers South of Peshawar in Arabian Sea (near Run of Kutch). US Geological Survey has reported a magnitude of 7.7 for the same earthquake.

The earthquake was felt in Islamabad, Karachi, Lahore, Multan, Quetta, Bahawalpur, Hyderabad and Peshawar.

Right: Estimated Damage Areas due to the earthquake in Gujarat, India on January 26, 2001



Can Earthquake Be Predicted?

A lot of attempts have recently been made worldwide to develop some sort of mechanism that can predict earthquakes so that humanity may be spared of the gravest of losses. The most prominent attempt came from China when they were able to predict one earthquake. This success, however, turned out to be illusions in the desert, as they failed to predict the others. Some Japanese researchers recently, have advocated, that the efforts and huge amount of funds needed for research in prediction may have served the humanity better, if it were diverted to earthquake mitigation.

The above facts and the damage that earthquakes have caused in the last decade strengthen the idea that more emphasis should be laid on disaster mitigation than prediction.

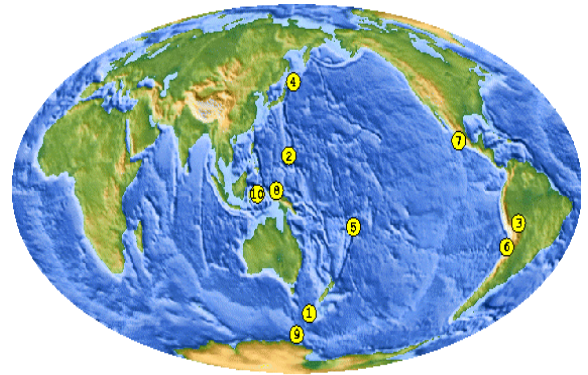
Earthquake Mitigation

The word mitigation is defined as the reduction in severity of something. Earthquake mitigation therefore, implies that such measures be taken which help reduce the severity of damages caused by earthquake to both the life and property.

Reduction of earthquake hazards through prediction was considered to be the most effective measure and billions of dollars were spent on prediction strategies. Countries like Japan mostly diverted their energies towards earthquake prediction, but they failed as in 1995 in Kobe, a strong 7.2 magnitude earthquake went unnoticed by prediction centers.

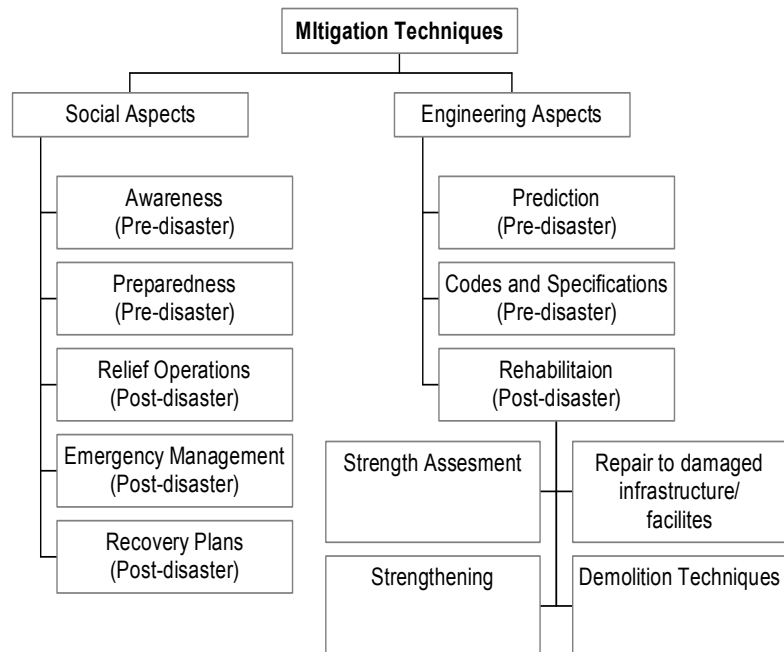
Devastation of Kobe revealed that prediction does not guarantee safety and even if predicted correctly, the damage to property on such a large scale warrants the use of mitigation techniques. A flow chart on the right shows, how mitigation could be taught of globally.

The Largest Earthquakes in the World in the Past 10 Years: 1989 to 1998



USGS National Earthquake Information Center

	Date	Location	Magnitude	Coordinates/Depth
1.	1989 May 23	Macquarie Islands	8.2	52.341S 160.568E /10 km
2.	1993 Aug 08	Mariana Islands	8.0	12.982N 144.801E /59 km
3.	1994 June 09	Northern Bolivia	8.2	13.841S 67.553W /631 km
4.	1994 Oct 04	Kuril Islands	8.3	43.773N 147.321E /14 km
5.	1995 April 07	Tonga Islands	8.0	15.199S 173.529W/21 km
6.	1995 July 30	Northern Chile	8.0	23.340S 70.294W/45km
7.	1995 Oct 09	Jalisco, Mexico	8.0	19.055N 104.205W/33km
8.	1996 Feb 17	Indonesia	8.2	0.891S 136.952E/33km
9.	1998 March 25	Balleney Islands	8.8	62.877S 149.527E /10km
10.	1998 Nov 29	Ceram Sea	8.3	2.071S 124.891E/33km



Roles of Different Groups in Mitigating Earthquake

Following is a chart prepared at the Earthquake Engineering Study Center, Department of Civil Engineering, NED University of Engineering and Technology, Karachi. The chart outlines the roles and responsibilities of people belonging to different professions and agencies in order to effectively respond to the disaster. Earthquake Engineering

Center is fully capable of preparing comprehensive mitigation plan that may define the role of each player and may help them find ways and means to effectively fulfill that role. Continuous work in this regard is underway at the Center and the Center is ready to collaborate with any agency seeking advice.

NON PROFESSIONAL

GROUPS	PRE-DISASTER	POST-DISASTER
MEDIA	<ul style="list-style-type: none"> Promoting awareness and preparedness programs for general public. Guiding government agencies regarding hurdles, ground realities. Critical reviews on research directions, education and course of actions. 	<ul style="list-style-type: none"> Special news bulletins and programs related to happenings. Highlights of mitigation techniques. Realistic reporting and highly professional journalism
GOVERNMENT ORGANIZATIONS AND AGENCIES	<ul style="list-style-type: none"> National disaster preparedness plans. Code and specification enforcement. Building and infra-structure stock management. Collaboration with research organizations and universities. Budgeting and fund raising for protection. 	<ul style="list-style-type: none"> Developing contingency plans for immediate and long term relief. Co-ordination between National and International relief agencies. Removing hurdles for immediate and emergency handling of issues.
NGO's	<ul style="list-style-type: none"> Developing relevant data bank at local level. Imparting awareness and conducting workshops and training programs. Linkage with other GO's and NGO's. 	Fire fight, controlling leakage of gases, epidemic diseases control, provision of food, water, medicine, clothes, temporary bridges, temporary roads, temporary shelters.
DEFENCE	<ul style="list-style-type: none"> Preparing and training for post-disaster relief operation. Sharing training with civil administration. 	
RESCUE WORKERS	<ul style="list-style-type: none"> Preparing for response to disaster. Developing skills to the best of abilities. Registering with local NGO or GO as trained rescue worker. 	

PROFESSIONAL

GROUPS	PRE-DISASTER	POST-DISASTER
ENGINEERS	<ul style="list-style-type: none"> Developing insight into engineering aspect of earthquake resistant structures. Persuading clients to protect. Designing earthquake resistant structures. Seismic evaluation of building and its components. Improving earthquake resistance of existing buildings and infrastructure facilities. 	<ul style="list-style-type: none"> Classifying damaged structures. Demolition techniques for structures in a progressive collapse mode. Proposing choice of repair methods and strengthening techniques.
URBAN AND REGIONAL PLANNERS	<ul style="list-style-type: none"> Micro-zoning and vulnerability mapping. Population density optimization. Protection strategies for infra-structure facilities and transportation. 	<ul style="list-style-type: none"> Learning from disaster and updating plans.
DOCTORS AND PARAMEDICS	<ul style="list-style-type: none"> Developing national data on medical resources . Categorizing nodes according to resources. Training allied professionals for preparedness and formulation of preparedness module. Linkage with international organizations for relief. 	<ul style="list-style-type: none"> Emergent mobilization of resources. Filtering effected people according to requirements and injuries. Epidemic control strategies.
RESEARCHERS AND ACADEMICIANS	<ul style="list-style-type: none"> Strengthening understanding of regional seismicity, collecting and analyzing data and developing modules for mitigation. Developing guidelines for codes for local building materials and construction methodologies. Updating and transferring knowledge through mid-career training programs for professionals. Advising different agencies for developing contingency plans. 	<ul style="list-style-type: none"> Assessing extent of damage. Learning from disaster and reconsidering research options. Preparing post-disaster rehabilitation plans and imparting update information.

EARTHQUAKE ENGINEERING STUDY CENTRE (EESC)

EESC based at the Department of Civil Engineering, NED university of Engineering and Technology, Karachi, Pakistan., is a non-profit organization established to act as a resource centre and a clearing house for disseminating knowledge in the field of earthquake engineering and mitigating strategies across the globe.

Having no immediate source of funding it deserves the attention of International and National Funding Agencies, to help fulfill the purpose of its establishment.

For donations and information please feel free to contact resource persons.

RESOURCE PERSON:

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

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

Phone: 92-21-9243261-8 Ext. 2284 & 2281

Fax: 92-21-9243255

Email: civilchr@neduet.edu.pk

Web page: www.neduet.edu.pk

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

The newsletter is available on the web page and may be downloaded for wide circulation if needed.

EARTHQUAKE STRIKES WESTERN HONSHU, JAPAN

A strong earthquake occurred about 20 miles (30 km) south-southeast of Hiroshima at 11:27 PM MST, Mar 23, 2001 (Mar 24 at 3:27 PM local time in Japan). University of Tokyo Earthquake Research Institute places the main shock at about 45 km depth based on regional network observations and Masauki Kikuchi's group at ERI places it at 55 km depth. It has a preliminary moment magnitude (Mw) of 6.7. This was a normal-faulting event striking about north-south (i.e., roughly in the down-dip direction of the Nankai slab, which is common for slab events in this subduction system). Two people are reported to have been killed and about a dozen injured.

Earthquake Engineering Study Center at NED University in Operation

Earthquake Engineering Study Center which, otherwise was working for last few years behind the curtains, have started its operation formally from the day the earthquake of 26 January struck Pakistan.

NED University Team Visits Earthquake Hit Areas

A team of Earthquake Engineering Centre, Department of Civil Engineering, NED University of Engineering and Technology, Karachi, visited earthquake effected areas of Badin and Hyderabad, Pakistan to collect information on extent of damage and data that might help in identifying and understanding the causes and repercussions of damage.

The team comprising of Prof. SFA Rafeeqi, Prof. SH Lodi, Zafar Razzaq (Asst. Prof.), AJ Sangi (Lect.), GA Jokhio



From Left: Wasi-u-Din, Prof. Dr. SH Lodi, Mr. Jamal Akhtar, Maj. Tariq, Prof. Dr. SFA Rafeeqi and GA Jokhio.

(Research Student) and two administrative officers of the University, were equipped with non-destructive testing instruments, video recorder and cameras for purposeful recording of the required information. The first hand account of the happening was covered through interviews with the residents of the affected areas. Some of the important places visited by the team were Dergah Lovari Shareef, Mirza Sugar Mills, Badin Kadhan Road, in district Badin and Ghosia Apartments in Qasimabad, Hyderabad.

The District Administration of both Hyderabad and Badin districts gave all out support to the team in carrying out not only the survey but showed immense hospitality to make the stay comfortable. The Commissioner of Hyderabad Mr. Imtiaz Kazi was all the time in close contact with the deputed officers escorting the team. Colonel Ali Hyder, Wing Commander Thar Rangers briefed the team about his visit to the border areas and earthquake affects there in. During the team's visit to areas in District Badin, Major Tariq of Thar Rangers took the role of guide as he was well

aware of the locality while in Hyderabad, SDM Qasimabad, HDA and HBCA officials coordinated with them.

The team expresses their gratitude for extensive help and support provided by all these officers and administrators.

The team hopes to finalize their findings in the light of the available information and data, and present it to a larger audience through a Seminar, expected to be held very shortly at Department of



A view of the collapsed block of Ghosia Apartments, Hyderabad

Civil Engineering, NED University of Engineering and Technology, Karachi.

COURTESY OF
**COWASJEE
FOUNDATION**