

NEWSLETTER

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Spring 1996

From Kobe to Clackmannan

Alice Walker and David Galloway present a summary of seismic activity during 1995.

The occurrence of two 'great earthquakes' in 1995, both with magnitudes of 8.0 Ms, in the Tonga and Kuril Islands indicates a higher than normal annual average (usually there is only one per year).

Despite their size, neither resulted in casualties or damage owing to their remote epicentres. Lower down the scale, there were 15 'major earthquakes', with magnitudes between 7.0 and 7.9, which is consistent with the long term average of 18 per annum. Seven of them resulted in casualties and damage to buildings. There were 120 'strong earthquakes', with magnitudes between 6.0 and 6.9, exactly matching the annual average.

The number of people reported killed by earthquakes during 1995 was 7,722 which is less than the long term average of 8,700 per year. Most of the casualties were a result of two earthquakes; the Kobe earthquake, with a magnitude of 6.8 Ms and the Sakhalin earthquake with a magnitude of 7.6 Ms.

Most of the damaging earthquakes were in the major to strong earthquake category, although there were a few exceptions, proving that a relatively small magnitude earthquake with a shallow depth of focus in a populated area can be destructive.

In particular, the smallest earthquake of 1995 to cause fatalities, occurred in Colombia. With a magnitude of 4.4 Mb, it killed at least eight people and injured ten in the Pasto area. On 23 February, two people were killed and 14 injured in an earthquake with a magnitude of 5.8 Mb located offshore of Cyprus and felt throughout Cyprus and northern Israel. A shallow earthquake with a magnitude of 5.7 Mb, on 14 April in western Texas, injured two people and damaged buildings in the Marathon and Ozona areas. It occurred in an area with little or no previous history of earthquakes.

Kobe strikes

The year started off with a destructive earthquake which devastated the city of Kobe on 16 January 1995. It had a magnitude of 6.8 Ms and was one of the largest earthquakes to hit the area for 50 years.

The earthquake killed some 5,300 people (70% of the casualties from earthquakes in 1995), injured 27,000 and cost \$99 billion in damage. The main elevated Hanshin expressway collapsed and some 100,000 buildings were damaged and destroyed during the earthquake and the subsequent fires, which devastated the old part of the city of Kobe.

The epicentre of the earthquake was only 15 km from the centre of Kobe and the focus was 16 km beneath the surface of Awaji island. Five aftershocks with magnitudes >4.0 Mb (largest 4.9 Mb) occurred in the 24-hour period following the mainshock; all were felt in the epicentral area.

Three days later, on 19 January, a shallow earthquake (18 km), with a magnitude of 6.6 Ms, killed five people in the Bogota area of Colombia. The landslides which occurred during the earthquake blocked several rivers and streams in Colombia. In contrast, a smaller (magnitude 6.3 Mb) and deeper (69 km) Colombian earthquake in the Cali-Pereira area, resulted in the deaths of 40 people, injured 400 and damaged or destroyed over 2,000 buildings on 8 February. Landslides blocked two roads in the epicentral area and damage occurred in the nearby towns of Armenia, Cali, La Union, Manizales, Pereira, Trujillo and in many parts of western Colombia.

A 'strong earthquake' in Taiwan, with a magnitude of 6.2 Ms, killed two and injured 14 when their bus was struck by a landslide on 23 February. On 1 April, offshore of Niigata on the eastern side of Honshu, Japan, a magnitude 5.8 Mb earthquake injured

some 40 people and destroyed and damaged around 500 buildings in the Niigata area.

Between 18 April and 9 May, 116 earthquakes, with magnitudes greater than or equal to 4.0, were detected on Samar in the Philippine Islands. Of these, three were above magnitude 7.0 ie 'major earthquakes'.

On Timor, Indonesia, a magnitude 6.9 Ms earthquake killed 11 people and several houses were destroyed in Dili by a local tsunami.

Two damaging earthquakes have occurred in Greece this year. The first, on 13 May with a magnitude of 6.5 Ms, injured 25 people and caused substantial damage in the Kozani area. Over 70 aftershocks (with magnitudes greater than 4.0 Mb) were detected in the week following the mainshock, the largest of these, had a magnitude of 5.3 Mb.

The earthquake destroyed some 5,000 houses and damaged 7,000 resulting in a preliminary estimate of damage at \$450 million. There were no casualties reported for this event. This may be attributable to the strong foreshocks alerting the population and

its occurrence on a Saturday morning when most people were outdoors and not occupying schools and churches, which were badly damaged. The area of its occurrence was characterised by seismologists as being of low seismicity, where it was calculated that the maximum earthquake to be expected would be 6.1.

Fatalities

The second event, occurred on 15 June, with a magnitude of 6.5 Ms. It killed 26 people and injured 60 in the Aiyion area. Extensive damage occurred at Aiyion and Eratini with some in Corinth, Patras and Pargos. The event was felt in Athens, Ioannina, Kalamata, Kahdhitsa and Kozani and was followed, some 15 minutes later, by a magnitude 6.0 Ms aftershock. The preliminary estimates of damage in the region are around \$660 million.

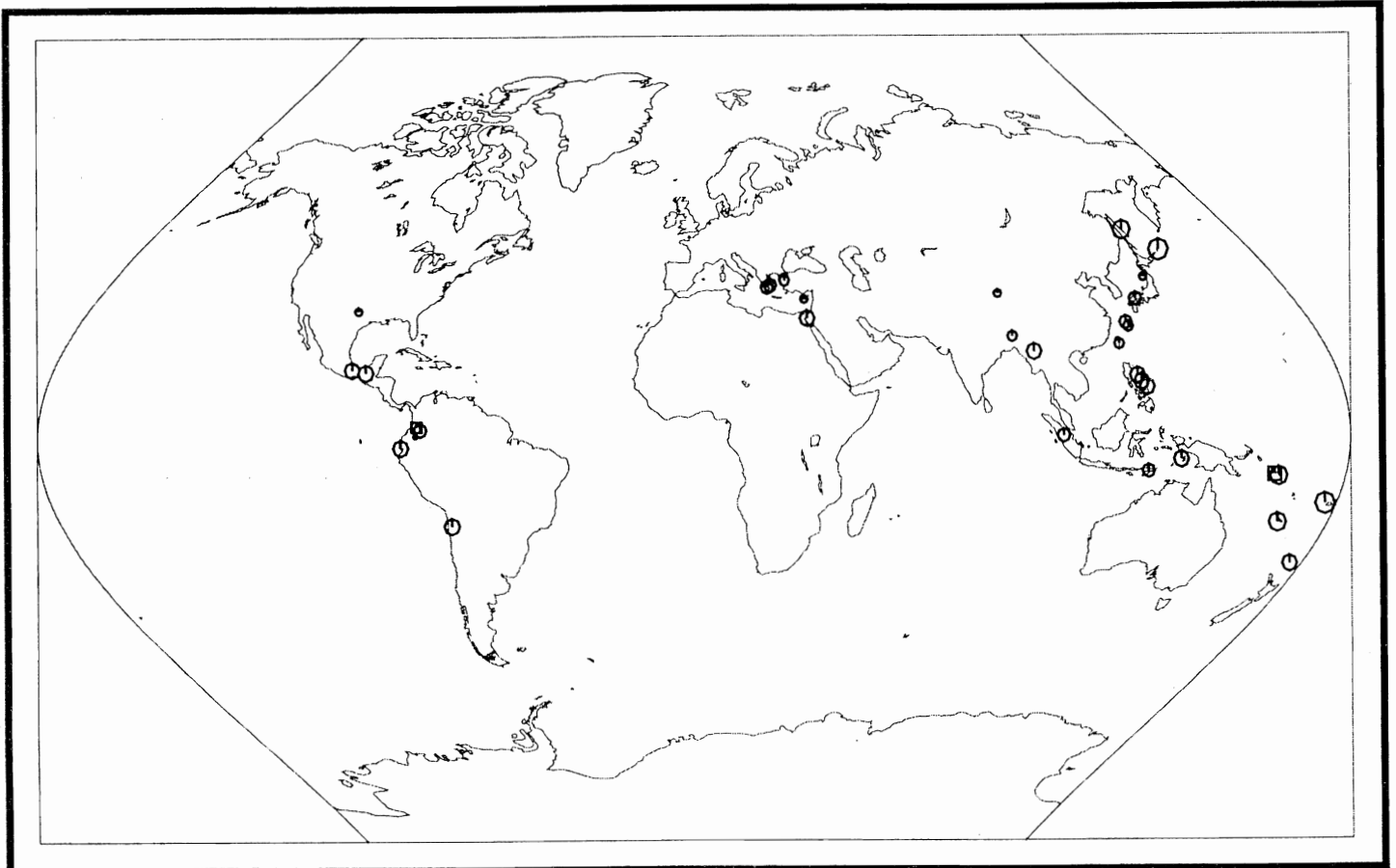
After Kobe, the second most significant earthquake in terms of fatalities occurred in the remote island of Sakhalin in northern Russia, on 27 May and had a magnitude of 7.6 Ms. Some 2,000 people were killed and

450 injured with extensive damage occurring in the Neftegorsk area. Several aftershocks were reported to be felt; the largest had a magnitude of 5.0 Mb.

Three fatal and damaging earthquakes occurred in China during the year. The first, on 11 July, near Myanmar, with a magnitude of 7.2 Ms, killed six and destroyed and damaged some 150,000 houses in the Lancang-Menglian-Ximeng area; the second, 10 days later with a magnitude of 5.7 Mb, killed 14, injured 60 and left 5,000 homeless in the Yongdeng area. In the Yunnan Province, on the eastern edge of the Himalayas, an earthquake, with a magnitude of 6.4 Ms killed at least 40 people in the Wuding area on 23 October.

In northern Chile on 30 July, a magnitude 7.3 Ms earthquake killed three people and injured 60. Over 100 houses were destroyed in the Antofagasta area and damage occurred in Calama, Mejillones, San Pedro de Atacama, Taltai and Tocopilla. A tsunami with maximum wave heights of 0.75 m (peak-to-

NOTABLE WORLD EARTHQUAKES OF 1995



trough) occurred. Hundreds of aftershocks greater than magnitude 4 were detected in the days following the main shock, the largest being 5.8 Mb.

A 'strong earthquake' (6.1 Ms) in Turkey on 1 October, killed over 100 people, injured 350 and made 50,000 homeless in the Dinar and Evciler areas.

On the Peru/Ecuador border, on 3 October, a magnitude 7.0 Ms earthquake killed two people and injured five and at least 83 homes were damaged or destroyed in Ecuador. Damage also occurred in Archidona, Canelos, Limon, Macas, Mendez, Patuca, Puyo, Santiago, Sucua and Tena. Some 12 hours after the mainshock, a magnitude 6.1 Ms aftershock, resulted in further damage.

In the Jambi Province of Sumatra, Indonesia, on 6 October, a magnitude 6.9 Ms earthquake killed some 80 people, injured 2,000 and made 65,000 homeless. Over 18,000 houses were destroyed in the province and landslides blocked roads in the epicentral area. It was felt

throughout Sumatra, southern Malaysia and Singapore.

In Mexico, on 9 October, a magnitude 7.3 Ms earthquake killed 49 people, injured 100 and made 1000 homeless in the states of Calimo and Jalisco. It was felt strongly in Mexico City and as far away as Dallas and Houston in the USA (up to 2,000 km from the epicentre). Landslides blocked roads and tsunamis were recorded at Manzanillo with heights of 2m (peak-to-trough). The largest aftershock, with a magnitude of 5.5 Ms, occurred three days later, injuring a further five people and damaging buildings in Manzanillo.

Widespread damage

An earlier earthquake occurred in southern Mexico on 14 September, with a magnitude of 7.2 Ms. It killed three people and caused extensive damage in Guerrero and Oaxaca. Damage also occurred in Puebla and in Mexico City and the event was felt strongly along the Pacific coast of Mexico from Michoacan to Chiapas.

In October, two earthquakes in the Ryukyu Islands, with magnitudes of 6.8 and 6.3 Ms, generated local tsunamis with wave heights of 1.8 and 1.5 m, respectively.

A damaging earthquake in the Gulf of Aqaba on 22 November, with a magnitude of 7.3 Ms, resulted in the deaths of eight people. The earthquake was felt throughout Jordan with damage occurring in Aqaba, Jerusalem and Israel. Liquefaction was reported at Elat in Israel and high waves were observed along the coast at Aqaba.

Between 24 November and 3 December 1995, eight earthquakes with magnitudes > 6.0 Ms, were detected in the Kuril Islands. The largest was the magnitude 8.0 Ms 'great earthquake' on 3 December and was felt throughout the Kuril Islands. This event also generated a local tsunami with maximum wave heights (peak-to-trough) of 1.7 m.

In the United Kingdom, the British Geological Survey detected and located some 230 earthquakes on land and the surrounding continental shelf areas, during 1995. Of these, 37 had magnitudes of 2.0 ML or greater; nine in this category were felt, together with a further 12 smaller ones, bringing the total to 21 felt earthquakes for the year.

UK earthquake activity was below average with no earthquakes

above magnitude 3.0 ML occurring onshore (the average is three). There were 26 earthquakes in the magnitude range 2.0 to 2.9 ML, against an annual average of 24.

The two largest onshore UK earthquakes during the year had magnitudes of 2.7 ML. The first occurred at Reedham in Norfolk on 1 January and was not reported felt. The other occurred near Aviemore, Highlands, on 28 August and was felt in Boat of Garten, Aviemore, Grantown-on-Spey, Carrbridge and many of the surrounding villages. Felt reports described "a bang, a rumble, the building shaking" and one person reported that "ornaments moved and glasses shook"; a few reports of minor damage were also received. The earthquake was felt over 1300 km² and was located in an area where no previous seismicity had been recorded. A macroseismic survey throughout the region showed that it was felt in the epicentral area with a maximum intensity of 4 EMS (European Macroseismic Scale - equivalent to MSK).

Twenty events in the northern North Sea were located throughout the year, with magnitudes ranging between 1.3 and 3.6 ML. The two largest, with magnitudes of 3.6 ML, occurred on 28 June and 13 November; none were felt.

Earthquake swarms

A swarm of earthquakes was located in the Stoke-on-Trent area in February. They had magnitudes ranging between 1.4 and 2.5 ML and six were felt by local residents. The largest (magnitude 2.5 ML) was felt throughout the Stoke-on-Trent area, with intensities of at least 4 EMS in the epicentral area. From the available data many of these events had characteristics typical of natural earthquakes but with some showing characteristics typical of mining-induced earthquakes. Similar swarms in the area were detected in the mid 1970's, early 1980's and early 1990's.

Other notable UK earthquakes of 1995 include the event in the English Channel, 55 km south of Plymouth, with a magnitude of 3.1 ML on 17 August and the event near Horndean, in Hampshire, on 9 September (magnitude 2.3 ML). Both occurred in areas with no recent history of seismic activity. Two events were located some 9 km south-west of Mansfield on 11 October with magnitudes of 1.9 and 2.4 ML; the

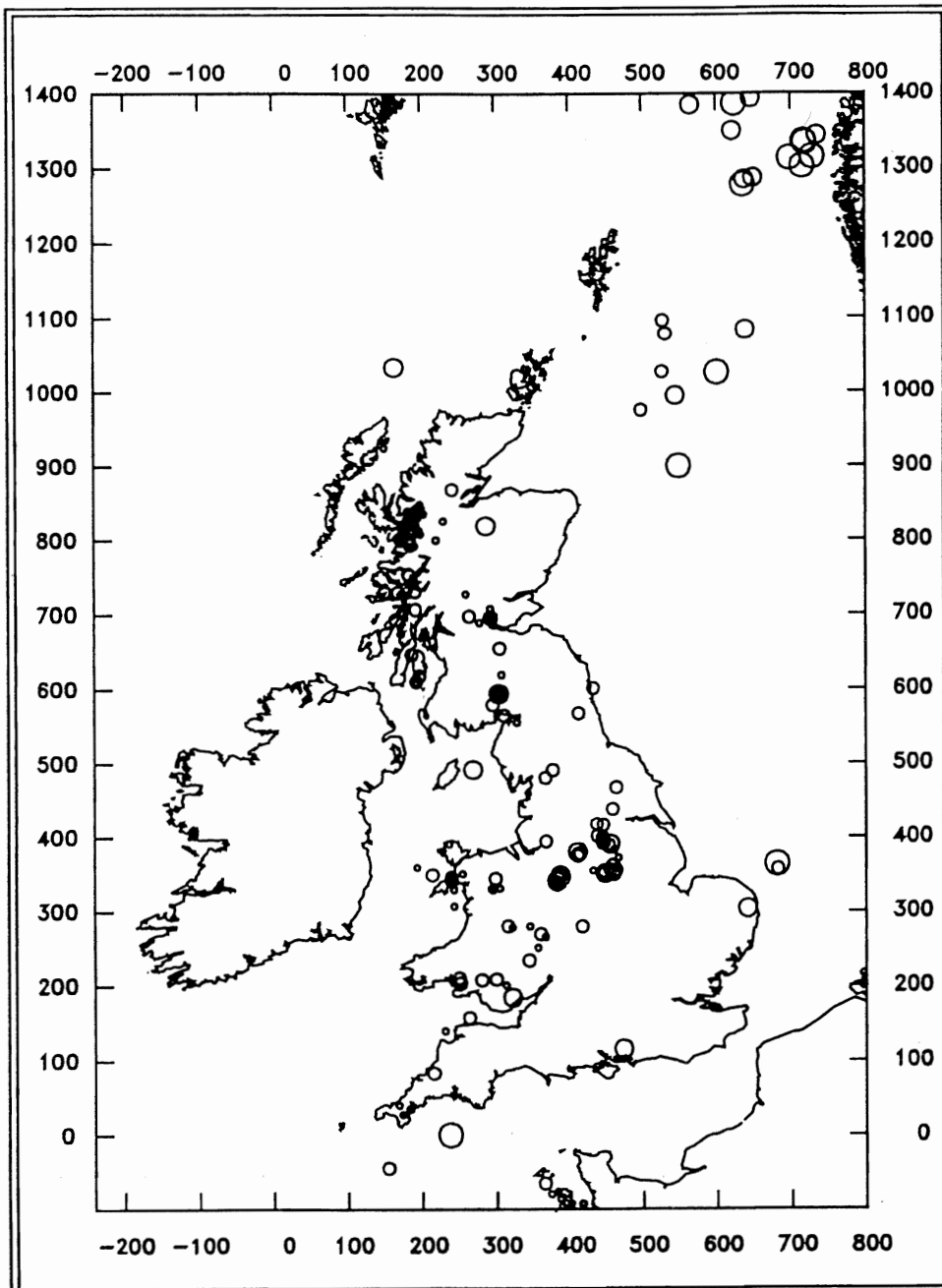
KEY TO SYMBOLS

DEPTHS(kms)

⊙	≤	60
□	60 AND ≤	300
△	300 ≤	

MAGNITUDE (M_w) (Symbol Radius)

·	≤	5.0
·	5.0 AND ≤	5.5
·	5.5 AND ≤	6.0
·	6.0 AND ≤	6.5
·	6.5 AND ≤	7.0
·	7.0 AND ≤	7.5
·	7.5 AND ≤	8.0
·	8.0 AND ≤	8.5
·	8.5 ≤	



Notable 1995 UK Earthquakes

latter was felt by local residents in South Normanton with intensities of at least 3 EMS. Although events in this general area are typically mining induced, these events occurred at depths of 6.8 and 6.5 km and the

absence of surface waves suggest that they were tectonic.

The coalfield areas of central Scotland, Yorkshire, Staffordshire and Nottinghamshire continued to experience shallow activity believed to be associated with nearby mines. Over 50 coalfield events with magnitudes ranging between 0.5 and 2.3 ML have been detected in the year, thirteen of which were felt. Thirty were located in the Clackmannan area in the central region of Scotland, where the magnitudes ranged from 0.5 to 1.8 ML; five of these were felt by local residents. Near Mansfield in Nottinghamshire, five events with magnitudes ranging from 0.7 to 1.7 ML have been located, one of which was felt by local residents in the Mansfield Woodhouse and Forest

Town areas of Mansfield. Near Newcastle-Under-Lyme, on 22 February, a magnitude 2.3 ML event was felt by local residents in Newcastle-Under-Lyme, Madeley and Stoke-on-Trent, with reports of strong shaking. The signal showed that the source was shallow (presence of surface waves) and it is thought to be related to the nearby mines in the region. Two other shallow events, located in the same area, occurred on 14 October (magnitude 1.5 ML) and 29 November (magnitude 2.0 ML); the latter was felt with intensities of at least 2 EMS.

The 'Bulletin of British Earthquakes 1995' edited by A B Walker was published in March 1996. Copies of this and previous years' reports can be obtained from the Global Seismology Research Group secretary and from BGS bookshops.

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Alice B Walker and David D Galloway are members of the Global Seismology Research Group of the British Geological Survey.

The Japan-UK Seismic Risk Forum

Cooperation between UK and Japanese earthquake engineers has now been formalised, as **Amr Elnashai** reports.

During a visit to Japan by Imperial College's Earthquake Field Training Unit (EFTU) in the wake of the Hyogo-ken Nanbu earthquake of 17 January 1995, a meeting was arranged by the British Council to assess the possibilities of formalising co-operation between UK and Japanese earthquake engineers, which has been on-going for a number of years.

The meeting was attended by Professor T. Kimura (President of Tokyo Institute of Technology), Professor K. Takanashi (Professor Earthquake Engineering, Institute of Industrial Science, University of Tokyo), Professor A. Elnashai (Professor of Earthquake Engineering and Head of Section, Imperial College) and the First Officer, Science and Technology, British Embassy in Japan.

Memorandum of Intent

The meeting was hosted by Mr R. Sowden, Science Officer at the British Council. It was tentatively agreed at the meeting to establish a working group to progress the formation of a "Japan-UK Seismic Risk Forum". A "Memorandum of Intent" was signed by the two parties and countersigned by the British Council, which also agreed in principle to provide funding for a number of UK researchers to meet with Japanese workers in the field.

The objectives of this body are to formalise and encourage co-operation between earthquake engineers in both countries and to organise regular technical meetings. This initiative is seen as the first formal cooperation between the two countries in the field of earthquake risk, and is an acknowledgement of the important role played by UK earthquake engineering on the international level. The first workshop is scheduled for 2, 3 and 4 April 1996.

The constitution of the Japan-UK Forum comprises researchers from three UK and three Japanese

universities (Imperial College, Bristol and Cambridge in the UK; Tokyo Institute of Technology, University of Tokyo and University of Chiba in Japan). There are also a number of European observers, included so as to have the possibility of widening the Forum to a Japan-Europe in the future. Two regional Coordinators were appointed (Professors Kimura and Elnashai) to act as focal points for technical cooperation.

Five themes

Cooperation in five themes was agreed to form the scientific statement of the Forum. These are:

1. Seismic Hazard and Engineering Seismology
2. Foundations and Geotechnical Structures
3. Performance of Structures
4. Assessment, Repair and Retrofitting
5. Risk Management, Education and Public Awareness

The panels in Japan, UK and Europe comprising the Forum are listed below:

United Kingdom Panel

Regional Coordinator:

Professor A.S. Elnashai, Imperial College

Topic 1 Coordinator

Dr J.J. Bommer, Imperial College

Topic 2 Coordinator

Professor D. Muir-Wood, Bristol

Topic 3 Coordinator

(buildings) Professor D. Key, Bristol

(bridges) Professor A.S. Elnashai, Imperial College

Topic 4 Coordinator

Dr A.J. Kappos, Imperial College

Topic 5 Coordinator

Dr R. Spence, Cambridge

Japanese Panel

Regional Coordinator

Professor T. Kimura, Tokyo Institute of Technology

Topic 1 Coordinator

Professor S. Midorikawa, TIT

Topic 2 Coordinator

Professor J. Koseki, TIT

Topic 3 Coordinator

(buildings)

Professor K. Takanashi, IIS/Chiba (bridges)

Professor K. Kawashima, TIT

Topic 4 Coordinator

Professor K. Takiguchi, Chiba

Topic 5 Coordinator

Professor F. Yamazaki, IIS

European Observers

Topic 1:

Professor A. Ansal (Turkey)

Topic 2:

Dr A. Decker (France)

Topic 3:

(buildings)

Professor P. Fajfar (Slovenia)

(bridges)

Professor G.M. Calvi (Italy)

Topic 4:

Professor T.P. Tassios (Greece)

Topic 5:

Professor G. Penelis (Greece)

These topics will also form the themes for the April 1996 workshop on "Implications of Recent Earthquakes on Seismic Risk" at Imperial College. This will be the first step in a mutually-beneficial and long-lasting cooperation between the UK and Japanese earthquake engineering communities, and will form the basis of a wider cooperation on a European level.

Technology Exchange for Natural Disasters

STEND now invites contributions

The second meeting of the STEND Advisory Committee was held in Geneva, from 30 October to 2 November, 1995, and the system is now in operation.

The System for Technology Exchange for Natural Disasters is an information exchange programme aimed at increasing awareness of available technology, that is particularly targeted at developing countries. It is being developed by the Hydrology and Water Resources Department of the World Meteorological Organisation in Geneva, and is closely modelled on a similar scheme that they have been successfully operating in hydrology for the last twelve years or so.

The newly-established STEND has now been extended to include the fields of seismology and volcanology as well as hydrology, and includes related engineering topics. The meeting also took the first steps towards including landslides among the disciplines covered by STEND. Later extension to include further disciplines such as meteorology and tsunamis is envisaged.

Contributors supply "components", each describing some piece of technology, which are listed in a printed Reference Manual, and are also available on the World Wide Web. Users can peruse the available components and approach the suppliers with a request directly, with a copy to WMO.

Technology included in STEND can be in the form of instruments, software, publications or services in the fields of data acquisition, analysis, interpretations and methodologies. New and established submissions are both welcome, from laboratories, research establishments and the commercial sector. All components should be fully operational and supported by the supplier.

STEND now comprises about 160 relevant hydrological components taken from the HOMS programme, and 20 or so in seismology - this number is steadily growing as new components are received and approved. The information is already available on the Web, and it is

proposed that a printed version of the STEND Reference Manual will be available early in 1996.

The description of each "component" should be brief enough to fit on two pages, and should comprise details of its purpose, a description of exactly what is offered, how it is presented, from where it is available and any cost involved. Detailed guidelines for preparing components are also available on the Web.

The STEND Reference Manual will eventually be available in computer-readable form as well as in a printed version. Copies of the manual will be made available at national centres such as IDNDR focal points and national seismological and volcanological agencies, and regional scientific and engineering centres, such as the GSHAP Regional Centres.

Now is the time to build up the components available through STEND, and all those wishing to have software, equipment other services listed in the system should submit them as soon as they can. Components should be submitted to the address below, from which further information, and detailed instructions on the preparation of components is available:

The STEND Project
Hydrology and Water Resources
Department
World Meteorological Organisation
PO Box 2300
CH-1211 Geneva 2
Switzerland

Tel: + 41 22 730 8407
Fax: + 41 22 734 8250
e-mail: jbmiller@www.wmo.ch
<http://www.wmo.ch/web/homs/stand.html>

Access to Large Shaking Tables

The European Commission has agreed to provide funded access for researchers to the large shaking tables and reaction-wall listed below under its Training and Mobility of Research (TMR) Programme. Application for such access from nationals of a Member State of the Community or Associated State is now invited.

Applicants with interests in research in earthquake engineering should apply in writing to the Director of one of the laboratories for consideration by a Management Panel appointed by the Commission. Details should be given of the research proposed and the likely amount of access required. Approved users will receive travel and subsistence costs from the host laboratory. More precise details are available from the Director of each of the following laboratories:-

Prof. P.G. Carydis

Laboratory for Earthquake Engineering, 157 00 Polytechnioupoli Zografou, Athens, GREECE

Dr M. Casirati

ISMES Spa, Viale G Cesare 29, 24100 Bergamo, ITALY

Dr E. Carvalho

Laboratorio Nacional de Engenharia Civil, Avenida do Brasil 101, 1700 Lisbon, PORTUGAL

Dr J. Donea

Institute for Safety Technology, Joint Research Centre, 1-21010 Ispra (Va), ITALY

Madame F. Gantenbein

Centre d'Etudes Nucleaires de Saclay CEA, Gif-sur-Yvette, 91191 Cedex, France

Professor R.T. Severn

Earthquake Engineering Research Centre, Department of Civil Engineering, University of Bristol, Queen's Building, University Walk, Bristol BS8 1TR, UK

Notable Earthquakes October - December 1995

Reported by British Geological Survey

YEAR	DAY	MON	TIME UTC	LAT	LON	DEP KM	MAGNITUDES			LOCATION
							ML	MB	MS	
1995	01	OCT	15:57	38.09N	30.18E	33	5.7	6.1		TURKEY One hundred and one people killed, 348 injured, 50,000 homeless and 4,500 houses damaged or destroyed in the Dinar area. About 600 buildings destroyed at Evciler. Felt in much of western Turkey as far west as Izmir and as far north as Bursa and Yalova.
1995	03	OCT	01:51	2.77S	77.88W	27	6.5	7.0		PERU-ECUADOR Two people killed, 5 injured and at least 83 homes damaged or destroyed in Ecuador. Some damage at Archidona, Canelos, Limon, Macas, Mendez, Patuca, Puyo, Santiago, Sucua and Tena, Ecuador.
1995	06	OCT	18:09	2.10S	101.41E	33	5.8	6.9		S SUMATERA, INDONESIA Eighty-four people killed, 2,178 injured, nearly 65,000 homeless and over 18,900 homes and buildings damaged or destroyed in the Jambi province. Landslides occurred in the epicentral area. Felt throughout many parts of central Sumatera and as far as southern Malaysia and Singapore.
1995	09	OCT	15:35	19.15N	104.22W	49	6.5	7.3		JALISCO, MEXICO At least 49 people killed, 100 injured, nearly 1,000 homeless and substantial damage in the states of Colima and Jalisco. Landslides blocked roads between Guadalajara and Manzanillo. Felt as far as Dallas and Houston, Texas and at Oklahoma City, Oklahoma.
1995	09	OCT	21:57	56.13N	3.72W	1	1.3			CLACKMANNAN,CENTRAL Felt Clackmannan.
1995	11	OCT	18:20	53.10N	1.3W	6	2.4			MANSFIELD, NOTTS Felt throughout South Normanton, Nottinghamshire.
1995	18	OCT	10:37	27.92N	130.34E	27	6.5	6.8		RYUKYU ISLANDS One person was slightly injured on Amami O-Shima. Felt on Kikai-Shima and at Naze, Amami O-Shima.
1995	19	OCT	02:41	28.10N	130.31E	31	6.3	6.8		RYUKYU ISLANDS Felt on Amami O-Shima. Landslides occurred on Kikai-Shima.
1995	19	OCT	09:41	56.15N	3.71W	0	1.6			CLACKMANNAN,CENTRAL Felt Clackmannan.
1995	23	OCT	22:46	25.90N	102.30E	33	6.4			YUNNAN, CHINA At least 26 people killed and 30 injured, buildings destroyed in the epicentral area and the earthquake was felt strongly up to 190 km away.
1995	01	NOV	00:55	53.83N	1.10W	1	1.9			STILLINGFLEET, N YORKS Felt Stillingfleet.
1995	06	NOV	16:09	56.15N	3.71W	0	1.1			CLACKMANNAN, CENTRAL Felt Clackmannan.
1995	11	NOV	20:51	52.96N	2.26W		3	2.0		NEW-U-LYME, STAFFS Felt Newcastle-Under-Lyme.

YEAR	DAY	MON	TIME UTC	LAT	LON	DEP KM	MAGNITUDES ML MB MS	LOCATION
1995	22	NOV	04:15	28.74N	34.81E	10	6.3 7.3	EGYPT At least 8 people killed and 30 injured in the epicentral region, including 2 people killed and 11 injured at Nuwaybi. Damage occurred in many parts of north eastern Egypt as far away as Cairo. One person died and several people were injured at Elat, Israel and Aqaba, Jordan.
1995	03	DEC	18:01	44.57N	149.39E	33	6.7 8.0	KURIL ISLANDS Felt on Itrup, on Matua and on Kunashir.
1995	14	DEC	14:00	56.14N	3.72W	0	1.3	CLACKMANNAN,CENTRAL Felt Clackmannan.

Issued by Bennett Simpson, British Geological Survey, January 1996

SECED Newsletter

The SECED Newsletter is published quarterly. Contributions are welcome and manuscripts should be sent typed on one side of the paper only. Copy on a PC compatible disk is also acceptable. Diagrams should be sharply defined and prepared in a form suitable for direct reproduction. Photographs should be high quality (black and white prints are preferred). Diagrams and photographs are only returned to authors on request.

Articles should be sent to
Dr A Blakeborough,
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of Oxford, Department of Engineering
Science, Parks Rd, Oxford, UK.
Email:
tony.blakeborough@eng.ox.ac.uk

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Forthcoming Events

5-8 March 1996

Int Conf & Exposition on Natural Disaster Reduction, Washington DC

27-29 March 1996

Wellington after the Quake, Wellington, New Zealand

27 March 1996

Blast Loading on Cladding and Cladding Fixings (SECED) ICE, 5.30pm

24 April 1996

SECED AGM, ICE 5.30pm followed by meeting on Controversies in Seismology

23 May 1996

Seismic Assessment of Existing Nuclear Plants (SECED/BNES) AEA, Risley (Registration fee)

5-8 June 1996

EURODYN '96, Florence, Italy

23-28 June 1996

11WCEE: 11th World Conf. on Earthquake Engineering, Acapulco, Mexico

3-5 July 1996

SUSI 96: Structures under Shock and Impact, Udine, Italy

3-5 July 1996

2nd Int Conf on Structural Dynamics Modelling, (DTA, NAFEMS & SECED) Cumbria UK

29-July - 2 August 1996

Pan Pacific Hazards 96 - A Conf on Earthquakes, Volcanoes & Tsunamis, Vancouver, BC, Canada

9-14 September 1996

25th General Assembly of the European Seismological Commission, Reykjavik, Iceland

SECED

SECED, The Society for Earthquake and Civil Engineering Dynamics, is the UK national section of the International and European Associations for Earthquake Engineering and is an affiliated society of the Institution of Civil Engineers.

It is also sponsored by the Institution of Mechanical Engineers, the Institution of Structural Engineers, and the Geophysical Society. The Society is also closely associated with EEFIT, the UK Earthquake Engineering Field Investigation Team. The objective of the society is to promote cooperation in the advancement of knowledge in the fields of earthquake engineering and civil engineering dynamics including blast, impact and other vibration problems.

For further information about SECED contact The Secretary, Institution of Civil Engineers, Great George Street, London SW1P 3AA, UK.