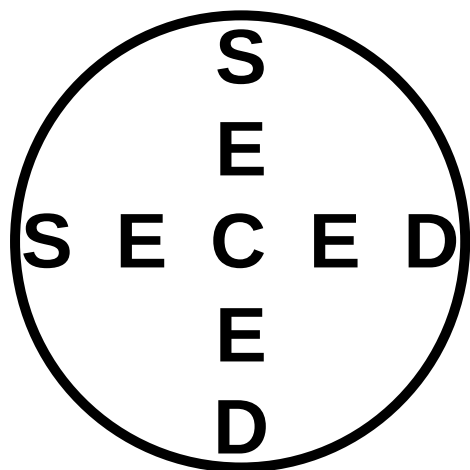




A Summary of Earthquakes in 2000

David Galloway and Alice Walker present a summary of seismic activity during 2000

Overseas

This year was quite exceptional in terms of the number of large worldwide earthquakes (Figure 1) and the small number of casualties resulting from them. There were 3 'great' earthquakes (magnitude over 8.0), 13 'major' earthquakes (magnitudes between 7.0 and 7.9) and 159 'strong' earthquakes (magnitudes between 6.0 and 6.9). These numbers are in general above the long-term averages for these magnitude ranges, which are 1, 18 and 120, respectively. The number of people

killed by earthquakes during 2000 was 236 (Table 1) which is well below the long-term average of 8,700. This is the lowest annual death toll since 1984 when 174 people were killed and results from the larger 'major' earthquakes occurring in remote, sparsely populated areas (Figure 1).

The largest earthquake during the year, with a magnitude of 8.2 Ms, occurred on 16 November in northeast Papua New Guinea. It killed 2 people, one on Duke of York Island and one on New Ireland,

and left over 5,000 homeless on Bougainville, Buka, Duke of York Island, New Britain and New Ireland. Extensive damage was reported on Duke of York Island, New Britain and New Ireland from the numerous landslides and a tsunami. The tsunami reached a height of about one metre at Rabaul and Kokopo on New Britain and 2-3 metres on New Ireland and Bougainville. Seiches up to a metre high were observed in water tanks and swimming pools at Rabaul and 2-3 metres of

Table 1 Earthquakes causing deaths in 2000

DATE	LATITUDE	LONGITUDE	MAGNITUDE	LOCATION	DEATHS
14 January	25.61 N	101.06 E	5.9 Mw	Yunnan, China	7
2 February	35.29 N	58.22 E	5.4 Mw	Northern/Central Iran	1
4 May	1.11 S	123.57 E	7.6 Mw	Sulawesi, Indonesia	45
12 May	23.55 S	66.45 W	7.2 Mw	Argentina	1
17 May	24.22 N	121.06 E	5.4 Mw	Taiwan	3
4 June	4.72 S	102.09 E	8.0 Ms	Sumatra, Indonesia	107
6 June	40.69 N	32.99 E	6.1 Mw	Turkey	2
7 June	4.61 S	101.91 E	6.7 Mw	Sumatra, Indonesia	1
10 June	23.84 N	121.23 E	6.4 Mw	Taiwan	2
1 July	34.22 N	139.13 E	6.2 Mw	Honshu, Japan	1
6 July	11.88 N	85.99 W	5.1 Ms	Nicaragua	7
7 July	40.83 N	29.22 E	4.2 Mb	Turkey	1
17 July	36.28 N	70.92 E	6.4 Mw	Afghanistan	2
9 August	18.20 N	102.48 W	6.5 Mw	Michoacan, Mexico	2
21 August	25.83 N	102.19 E	4.9 Mb	Yunnan, China	1
20 September	1.89 S	80.46 W	5.5 Mw	Ecuador	1
10 November	36.60 N	4.77 E	5.8 Mb	Northern Algeria	2
16 November	3.98 S	152.17 E	8.2 Ms	New Ireland, P.N.G	2
25 November	40.25 N	49.95 E	6.3 Mw	Azerbaijan	31
6 December	39.63 N	54.77 E	7.5 Ms	Turkmenistan	11
15 December	38.61 N	31.06 E	6.1 Mw	Turkey	6
					236

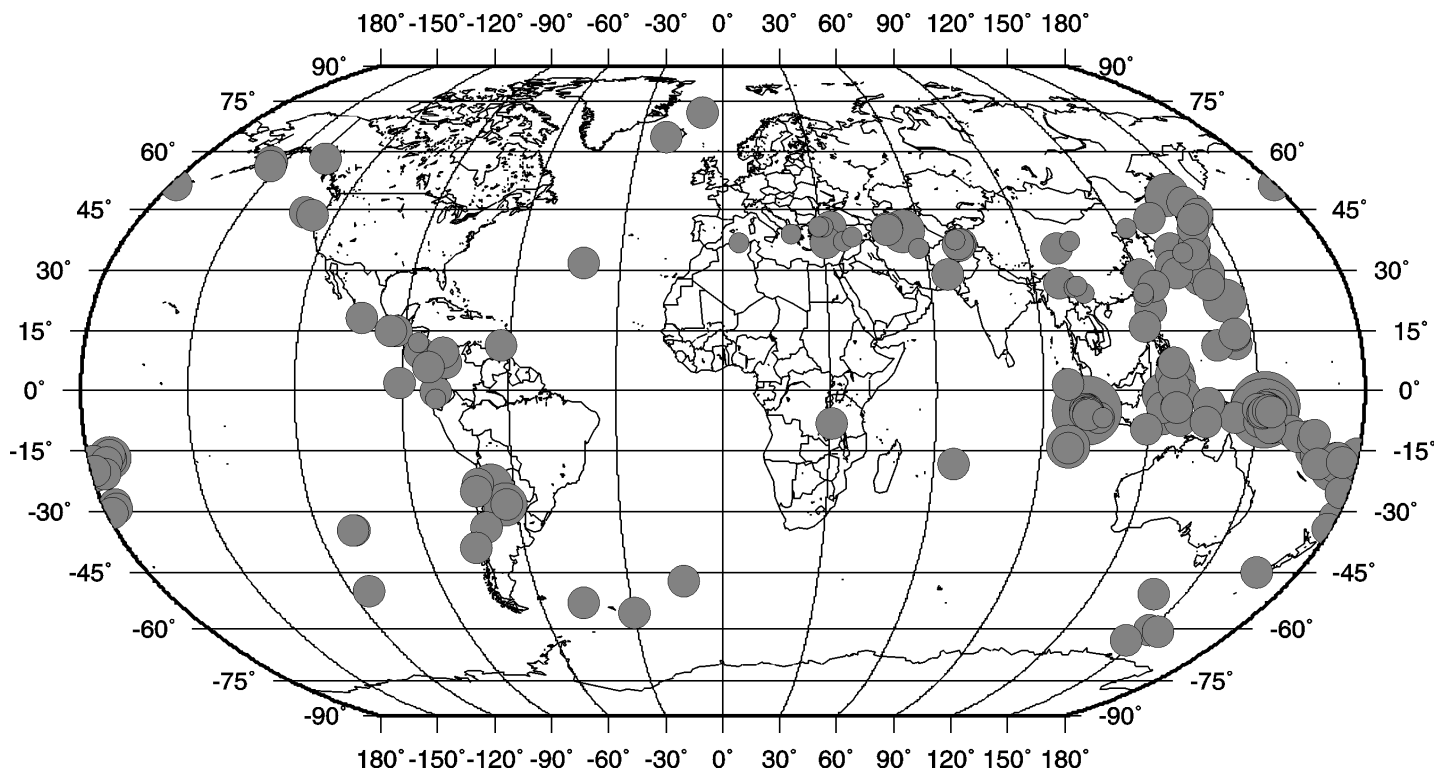
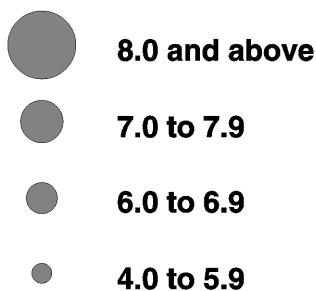


Figure 1 Notable world earthquakes of 2000

Magnitude Key



subsidence occurred over several hundred metres at the mouth of the Kamdaru River, New Ireland. This was the first event in a series of powerful earthquakes to occur in the area in late November. Other events in the series included a magnitude 8.0 Ms 'great' earthquake on 17 November, a magnitude 7.8 Ms 'major' earthquake on 16 November and 10 'strong' earthquakes between 16 and 23 November. These events caused additional damage in the region.

The most disastrous earthquake during the year, with a magnitude of 8.0 Ms, occurred on 4 June on Sumatra, Indonesia. It caused the deaths of at least 107 people, injured 1,052 more, destroyed or seriously damaged over 12,300 buildings and slightly damaged over 16,900 more in the Bengkulu area of Sumatra and on Enggano Island. The limits of the earthquake damage stretched from about 20 km north of

Bengkulu City to a few kilometres south of the town of Manna. Many aftershocks occurred in the region after the 4 June event including a magnitude 6.7 Mw earthquake on 7 June, which caused the death of 1 person and damaged 600 buildings at Lahat.

A month prior to the Sumatra event, on 4 May, an earthquake with a magnitude of 7.6 Mw, occurred on the neighbouring Island of Sulawesi, Indonesia. At least 45 people were killed, over 260 were injured and 10,500 families were left homeless as a result of this earthquake. Extensive damage occurred in the Luwuk area, Sulawesi and on the nearby islands of Banggai and Peleng where over 80% of buildings were either destroyed or damaged. Much of the damage east of Luwuk and on Peleng was caused by a local tsunami with estimated wave heights of 6 metres.

On 14 January, an earthquake with a magnitude of 5.9 Mw, occurred in Yunnan, China. It killed 7 people, injured 1,500 more and destroyed or damaged over 31,000 homes in Yaoan County. Yunnan Province is situated in southwest China to the east of the Tibetan Plateau and is one of the areas of China most prone to natural disasters. On 21 August, a relatively small magnitude 4.9 Mb earthquake in the same general area killed 1 person, injured over 400 more, left over 169,000 homeless and caused extensive damage in the Wuding County area. A

magnitude 4.9 Mb earthquake in north-east China, on 11 January, injured 30 people and destroyed or damaged some 12,000 housing units in the region.

In northern/central Iran, on 2 February, one person was killed during a magnitude 5.4 Mw earthquake in the region. Another 15 people were injured and over 400 houses were either destroyed or damaged in the Bardaskan-Kashmir area.

On 12 May, in the Atacama region of Argentina, an earthquake with a magnitude of 7.2 Mw killed one person at the Manto Verde Mine and damaged several buildings in the area. The earthquake was felt strongly throughout northern Argentina and was also felt in several towns in Chile.

In Taiwan, on 17 May, an earthquake with a magnitude of 5.4 Mw, killed 3 people, injured 13 more and caused several landslides in Tai-chung area. This earthquake was felt strongly throughout central and northern Taiwan. Three weeks later, on 10 June, a magnitude 6.4 Mw earthquake occurred in the same area, approximately 45 km from the 17 May event, and was felt throughout the whole of Taiwan. It caused the deaths of 2 people (from heart attacks) and injured 36 others in the Nan-tou area. Landslides and rockslides blocked a number of highways in central Taiwan as a result of the earthquake.

Several fatal and damaging earthquakes occurred in Turkey during the year. The first, on 6 June, with a magnitude of 6.1 Mw, killed 2 people, injured over 80 more, destroyed or damaged 4,600 homes in the Cerkes-Cubuk-Orta area and was felt in much of north-central Turkey and along the Black Sea coast. Another event, with a relatively small magnitude of 4.2 Mb, a month later on 7 July, killed one person and injured 7 more in the Gebze area and injured 27 others in the Kartal area. A further 6 people were killed, over 40 more were injured and minor damage was reported from the Afyon-Bolvadin area as a result of a magnitude 6.1 Mw earthquake on 15 December. These 3 earthquakes occurred approximately 300 km equidistant from each other in north-west Turkey.

Two earthquakes, both with magnitudes of 6.6 Mw, occurred in Iceland on 17 and 21 June. The 17 June event injured one person, destroyed 11 houses, damaged 19 others, caused rockslides which closed some roads at Vestmannaeyjar and disrupted utilities at Hella. The 21 June event destroyed 12 houses and severely damaged 24 more in the Grimsnes region.

On 1 July, a magnitude 6.2 Mw earthquake occurred near the south coast of Honshu, Japan. One person was killed, as a result of a landslide, several were injured and minor damage and power outages were reported on Kozu-shima. Many aftershocks, mostly in the magnitude range between 4 and 5, occurred in the following weeks in the same region. Another ten people were injured, over 20 more houses were damaged and more landslides and power outages occurred as a result of these aftershocks. In western Honshu, Japan, on 6 October, an earthquake with a magnitude of 6.8 Ms injured 130 people, damaged 2,230 structures, destroyed 104 houses, collapsed 7 bridges and caused 65 landslides in the Okayama-Tottori area.

In Nicaragua, on 6 July, 7 people were killed, another 42 were injured, 357 houses were destroyed, 1,130 were damaged and over 4,500 people were evacuated in the Masaya area, during a magnitude 5.1 Ms earthquake.

On 17 July, an earthquake with a magnitude of 6.4 Mw, occurred in the Hindu Kush region of Afghanistan. Two people were killed at Peshawar, Pakistan, due to the collapse of a three-storey building. The earthquake was felt in northern Pakistan, northern India, Kashmir and Afghanistan.

On Sakhalin Island, Russia, 8 people were injured, 1,390 buildings were damaged, over 19,000 were left homeless and a landslide destroyed roads and power lines during a 7.1 Ms earthquake on 4 August. Damage from this earthquake was estimated at \$US 920,000.

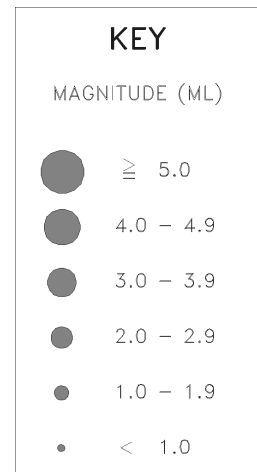
On 9 August, a magnitude 6.5 Mw earthquake occurred in Michoacan, Mexico. Two people were killed (a three year old minor when a fence collapsed and a 62 year old from a heart attack) and four others were injured. Significant structural damage was reported from two hotels and 12 houses at Lazaro Cardenas. Hundreds of people evacuated their homes in the Michoacan region in a state of panic as they recalled the 1985 Mexico earthquake which left some 10,000 dead and caused widespread destruction in the region.

Near the coast of Ecuador, on 20 September, one person was killed, several others were slightly injured and damage occurred in the Manabi Province during a magnitude 5.5 Mw earthquake in the region.

On 10 November, in northern Algeria, one person was killed in Bouga, another was killed in Chemini and 12 others were injured and 7 houses destroyed in Beni Ourtilane during a magnitude 5.8 Mb earthquake.

Two earthquakes within a minute of each other, both with magnitudes of 6.3 MW, occurred in Azerbaijan on 25 November. The epicentre was in the Caspian Sea, 25 km east of Baku, the capital of Azerbaijan. At least 31 people were killed; 5 by falling debris, 23 from heart attacks and 3 were killed the following day by an explosion caused by natural gas leaking from a pipe damaged in the earthquake. Over 430 others were injured and some damage was reported from the Baku area. The earthquake affected the north-east coastline of Azerbaijan and most of the damage occurred between the Absheron Peninsula and the Russian border. It was felt as far away as Tbilisi, Georgia, 600 km north-west of the epicentre.

In Turkmenistan, on 6 December, an earthquake with a magnitude of 7.5 Ms, killed 11 people, injured dozens more and caused much damage in the Nebitdag-Turkmenbashi area. The earthquake was reported felt throughout the region including much of southern Russia, and as far away as Moscow, some 2,000 km to the north-west.

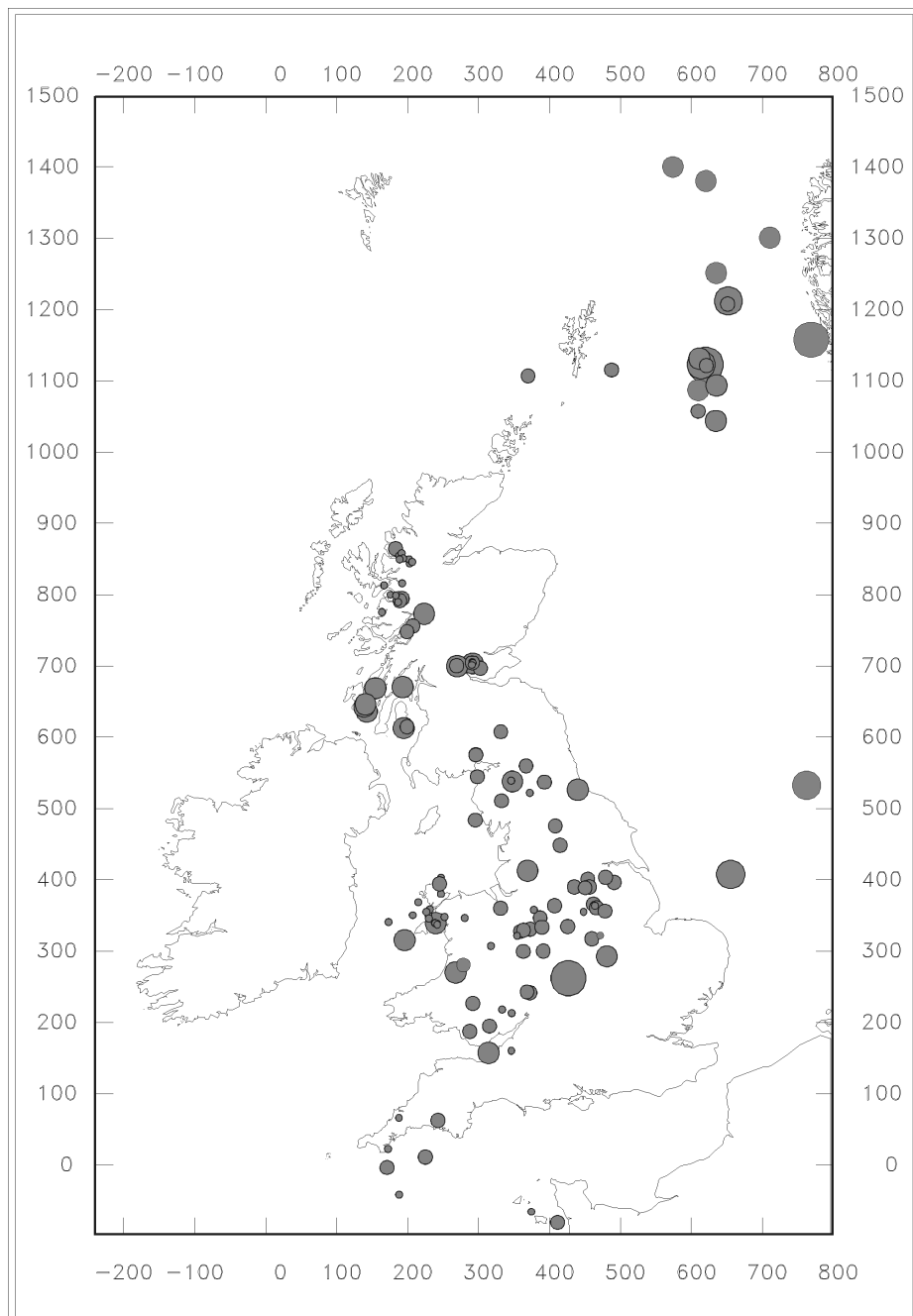


UK Earthquakes

The British Geological Survey detected and located some 156 earthquakes in the British Isles and surrounding continental shelf areas during the year (Figure 2), with 35 of them having magnitudes of 2.0 ML or greater. Of these, 8 are known to have been felt, together with a further 9 smaller ones, bringing the total to 17 felt earthquakes in 2000.

The largest onshore earthquake, with a magnitude of 4.2 ML, occurred near Warwick on 23 September. It was felt up to 150 km away and over an area of 14,900 km². A macroseismic survey conducted after the event yielded over 2,500 replies. The highest observed intensity was 5 EMS at Warwick, where in a number of cases, objects such as ornaments, pictures or toys fell or were displaced. In a few cases, heavy objects were also said to have been displaced, including two washing machines, a cooker, a microwave and a sofa. The nearest 3-component strong motion instrument to record the earthquake was 76 km distant and accelerations of 17.3, 16.6 and 20.8 mms⁻² were recorded for the vertical, NS and EW components, respectively. The focal mechanism indicates almost pure normal faulting on a NW-SE oriented plane, dipping either to the NE or to the SW.

The largest offshore earthquake occurred in the northern North Sea on 8 December. It had a magnitude of 4.6 ML and was located approximately 175 km north-east of the Shetland Islands. It was felt on a nearby oil platform in the Bruce field (20 km SW of the epicentre). One staff member reported that "the size of the movement was similar to that experienced in storm conditions although the sea state wasn't more than a few metres at the time". Using a standard attenuation formula, it is



**Figure 2 Epicentres of all UK earthquakes located in 2000
(from the BGS Bulletin of British Earthquakes for 2000)**

estimated that a ground acceleration of 0.04g might have been experienced at this range; enough to be felt strongly on land. Platform dynamics may have amplified the effect at deck level.

An earthquake, with a magnitude of 4.2 ML, was located on the Norwegian Coast also on 8 December. It was felt with intensities of 5 EMS around Bergen, Norway. A further 20 events occurred in the North Sea and surrounding waters during the year, with magnitudes ranging between 1.0 and 4.5 ML, and were located using both the BGS and Norwegian networks.

Near Lochgilphead, Strathclyde, an earthquake, with a magnitude of 2.7 ML, occurred on 12 February. It was felt in

Kames, Lochgilphead and Achahoish where residents described "tins fell off the shelf", "the house was shaking" and "was woken up from sleep", indicating an intensity of at least 4 EMS. Although the general area is seismically active, this is the largest event since the magnitude 3.5 ML Lochgilphead earthquake in 1972, some 20 km to the northeast, which was also felt with intensities of at least 4 EMS.

Near Doune, Central Scotland, an earthquake with a magnitude of 2.3 ML occurred on 20 February. It was felt in Doune and Dunblane where residents described "windows and radiators rattled", indicating an intensity of at least 3 EMS. This is an area which has

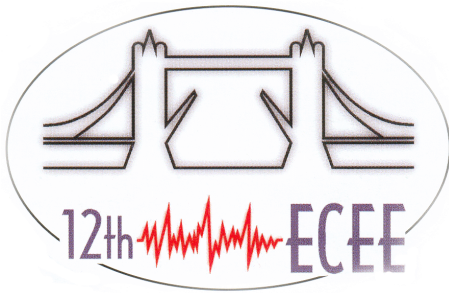
experienced a number of earthquakes in the past. In particular, in 1997, a swarm of ten earthquakes occurred with magnitudes ranging between 0.9 and 2.7 ML. The two largest of these were felt with intensities of at least 4 EMS.

Two events occurred near Calthwaite, Cumbria with magnitudes of 0.5 and 2.6 ML. The latter occurred on 24 April and felt reports described "the whole house shook" and "the windows rattled", indicating an intensity of at least 3 EMS. The nearest 3-component strong motion instrument to record the earthquake was 38 km distant and accelerations of 1.3, 7.2 and 1.4 mms^{-2} were recorded for the vertical, NS and EW components, respectively. A focal mechanism for the larger event was calculated and shows dominantly normal faulting with a minor component of strike-slip. The nodal planes strike NNW-SSE.

In North Wales, six events with magnitudes ranging between 0.0 to 2.7 ML, were located on the Llyn Peninsula, in the same area and at similar depths (20 km) as the magnitude 5.4 ML Llyn earthquake of 19 July 1984, which was felt throughout England and Wales and into Scotland and Ireland. The magnitude 2.7 ML event occurred on 22 June and felt reports were received via the media, the Police and residents in Dinorwic, Maentwrog, Llanberis and Caernarvon, North Wales. These reports described "the whole house shook" and "felt a shudder", indicating an intensity of at least 4 EMS. This is the largest event in the Llyn Peninsula area since the magnitude 2.7 ML earthquake on 15 April 1986, which was felt with intensities of 2 EMS in Pwllheli and Porthmadog. The calculated focal mechanism shows dominantly strike-slip faulting with a varying component of dip-slip. The nodal planes strike WNW-ESE and NS. This is in reasonable agreement with the calculated focal mechanism for the 1984 earthquake. The P and T-axes are consistent with the regional stress direction for the UK.

Near Middlesbrough, Cleveland, an earthquake with a magnitude of 2.7 ML occurred on 8 August. Earthquakes of this size are usually felt when they occur onshore but enquiries to local Police stations and post offices revealed that no felt reports were received. The depth (24.4 km) may have contributed to the lack of felt effects. This is an area that has experienced little seismicity in both the historical and instrumental periods, with only two events located since 1970 within 10 km of this event.

Fourteen earthquakes were detected in the Blackford area of Tayside during the year 2000, with magnitudes ranging between 0.4 and 2.1 ML. The largest occurred on 9 August and was felt in the Blackford and Glendevon areas of



Tayside, where intensities reached at least 3 EMS. Felt reports described "the furniture moved" and "the building shook". This is an area that has continued to be active in recent years; 49 events occurred in 1997, of which five were felt by local residents; 10 events occurred in 1998, of which 2 were felt by local residents and 3 in 1999. In the same general area in 1979, a magnitude 3.2 ML Ochil Hills earthquake was felt with a maximum intensity of 5 EMS.

Seven events, with magnitudes ranging between 0.7 and 1.8 ML, occurred near Dumfries, Dumfries and Galloway. Two of these events with magnitudes of 1.2 and 1.8 ML were felt by local residents in the Tinwald area of Dumfries and Galloway, where intensities reached at least 3 EMS.

Near Dollar, an earthquake with a magnitude of 1.1 ML, occurred on 25 September. Felt reports were received from the village of Rumbling Bridge, where intensities reached at least 3 EMS. Felt reports described "a rumbling beneath the feet", "felt a thud" and "the whole house shook". This is the first felt event in the Dollar area, since the magnitude 1.0 ML earthquake, on 25 August 1999, which was felt in the Forest Mill area, with intensities of at least 2 EMS.

An earthquake, with a magnitude of 1.4 ML, occurred near Mold, Clwyd on 3 November. Felt reports were received via the North Wales Environment Agency, Flintshire County Council and residents of Eryrys and Nercwys. Felt reports described "heard a tremendous bang", "like a boulder hitting the side of the house" and "ornamental plates on the shelves rattled", indicating an intensity of at least 4 EMS. This is the first felt event within 30 km of Mold, since the magnitude 4.5 ML Widnes earthquake, on 3 November 1976, which was felt with intensities of 4 EMS.

The coalfield areas of Yorkshire, Staffordshire, Mid Glamorgan, Northumberland and Nottinghamshire continued to experience shallow earthquake activity that is believed to be mining induced. Some 13 coalfield events, with magnitudes ranging between 0.8 and 1.9 ML, were detected during the year. Three of these were reported felt by local residents. The

largest coalfield event (1.9 ML), occurred near Doncaster, South Yorkshire on 4 August. Felt reports were received via Yorkshire Television and residents of the Woodlands area of Doncaster, where intensities reached at least 5 EMS. Felt reports described "the walls shook" and "the whole street ran outside". This is an area that has experienced similar events in the past.

David D Galloway and Bennett A Simpson are both members of the Global Seismology and Geomagnetism Group of the British Geological Survey.

The 'Bulletin of British Earthquakes 2000' edited by B A Simpson was published in April 2001. Copies of this and previous years' bulletins can be obtained from the Global Seismology and Geomagnetism Group secretaries and from BGS bookshops. For further details contact: D D Galloway, Global Seismology and Geomagnetism Group, British Geological Survey, Murchison House, West Mains Road, Edinburgh, EH9 3LA, Scotland, UK.

Twelfth European Conference on Earthquake Engineering

The preparations for the Twelfth European Conference on Earthquake Engineering are now well under way. The Technical Programme of the Conference will include the following Keynote Lectures:

- Professor Nicholas Ambraseys, UK: *Earthquake hazard in Europe and adjacent regions.*
- Mr. Joe Barr, UK: *Seismic design of bridges*
- Professor Ian Davis, UK: *Seismic risk mitigation*
- Professor Amr Elnashai, UK: *Experimental verification in earthquake analysis*
- Professor Ezio Faccioli, Italy: *"Complex" site effects in*

earthquake strong-motion, including topography

- Professor Peter Fajfar, Slovenia: *Structural analysis in earthquake engineering*
- Professor Michael Fardis, Greece: *Code development in earthquake engineering*
- Mr. Jack Pappin, UK: *Design of foundations and lifelines for seismic loading*
- Professor Haluk Sucuoglu, Turkey: *Repair and strengthening*

Close to 800 abstracts have been received for the Conference and these are now under review by an international committee of referees. Authors will be notified of the outcome of the review process at the beginning of June 2001.

The deadline for submission of abstracts was extended from 31 January to 19 February, because near the original deadline the web site became overloaded, but this will not result in any delay in terms of the preparation and publication of papers. In fact, manuscripts of those papers that are accepted for the Conference will be now be required by the 15 October 2001, as opposed to the end of October. The complete papers are to be reviewed by the Technical Affairs Committee and then the decisions discussed at a two-day meeting in London, so that authors can be notified of the outcome before the end of the current year. Final camera-ready manuscripts will be required by 15 February 2002, by which time the publication fee must also be paid.

The format of the Conference will be a balance between oral and poster presentations, with a larger proportion of papers in the latter format since in recent conferences this has proved successful in allowing greater discussion and avoided the problems of excessive numbers of parallel sessions. The number of oral presentations will be limited so that these can be allocated sufficient time and each session will begin with a Special Paper, chosen by the referees on the basis of originality and relevance of the subject and reputation as a speaker of the presenter, which will be assigned a little more time for the presentation.

Registration for the Conference will be open from 1st January 2002 and there will be a period of early registration at reduced rates. A brochure with details of the Conference, accommodation, social

programme and registration will be published and distributed before the end of the year. However, information regarding all aspects of the Conference, including the cocktail reception on Sunday 8th September 2002 and the Conference Dinner on Thursday 12th September, will be posted on to the Conference web site at <http://www.12ecee.org.uk> as it becomes available.

With preparations for the Conference now in full swing, there is a great deal of work to be done and the Conference Committee urgently needs volunteers to come forward and take on responsibility for particular tasks. In particular we would like young members who are keen to become more actively involved in SECED activities to come forward and get involved with the Conference. Anyone wishing to get involved should



immediately contact the Chairman of the Conference Committee, Dr. Robert May, by e-mail (rmay@gibb.co.uk), telephone (0118-963-5000) or fax (0118-949-1054). We are looking forward to hearing from you!

Julian Bommer
Vice-Chairman, Technical Affairs
Committee

**EURODYN 2002
CALL FOR PAPERS**

Fifth European Conference on
Structural Dynamics
September 2 - 5, 2002
Technical University Munich, Germany

For further information, please contact

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Germany
Tel: +49 89 289 28345
Fax: +49 89 289 28665
E-mail: eurodyn2002@bv.tum.de

Seismic Upgrade of Industrial Plant

On Wednesday 29th February the SECED evening meeting enjoyed a lively debate on Seismic upgrade of industrial plant in the UK nuclear power industry.

David Edge (Senior Engineer, WS Atkins) presented an informative case study of a 120Te EOT Crane in a turbine hall. Analysis revealed the vulnerability of the bogie to bridge bolted connection and the weakness of the lateral restraint to the crane rail. Dynamic tests were also carried out to indicate natural frequency, mode shapes and damping levels in the cranes, before strengthening modifications were devised.

Phil Adams (Project Engineer, WS Atkins) then presented examples of a wide range of retrofitted plant including storage tanks with seismic restraints, pipework with robust supports, electrical cabinet with anchorage upgrade, strengthened battery racks, masonry walls with reinforcement and cable trunking that had been seismically strengthened.

Neale Brittain (Dungeness B Safety Enhancement Project Manager, British Energy) completed the presentation with an illuminating summary of the owner / operators view of the benefits of the seismic upgrades. Neale presented the view that whilst, for any particular power station, the seismic nuclear safety objectives has been met by the upgrade work (thus allowing the station to continue to operate), the overall safety of the plant may possibly be worse since the plant is more difficult to operate (because it has changed), more difficult to maintain, with industrial safety impacted because more day-to-day hazards have been introduced. Neale questioned whether the multi-million pound investment have been better directed to raise overall plant safety, rather than just addressing seismic issues? Neale went on to suggest that the answer requires a balance to be struck between big impact/low frequency events and small impact/high frequency events. In this context Neale suggested that the introduction of higher standards should be prioritised against all aspects of safety management, not just one

(seismic) aspect. He went on to suggest the establishment of a level playing field for all industrial installations which present a public safety risk, noting that whilst nuclear plant owners have invested heavily in seismic upgrade, few other high hazard industrial facilities had made a comparable investment in this area.

An interesting debate ensued which covered not only various technical aspects of the plant modifications, but also how seismic hazard is measured, the need to treat exposure to hazard more rationally, public perceptions of tolerable risk and some response to Neale Brittain's appeal for a "level playing field" for safety evaluation of all high hazard industrial plant.

The meeting demonstrated the commitment and competence with which British Energy have addressed Seismic safety issues in their plant, whilst also raising the understanding of the wider public safety issues which arise when mitigating remote hazards.

Graham Roberts *WS Atkins*

The Institution of Civil Engineers

Structures and Buildings Journal: Special Issue - May 2002 Call for Papers "Dynamic Behaviour and Earthquake Design"

THEMES: Newspaper headlines associated with the dynamic behaviour of structures have been increasingly common over the last few years. Earthquakes in several parts of the World and crowd excitation of bridges and stadiums are two recent examples. The contrast between the engineering background to each of these is startling. On one hand the catastrophic failure of buildings in Gujerat is being blamed on poor regulation and control whilst on the other the problems associated with the Millennium Bridge in London may well be new and a symptom of pushing the boundaries ever further.

There is excellent expertise in the area of dynamics and earthquake engineering but it remains relatively specialised and not seen as the norm for the average Structural or Civil Engineer. However as our structures become ever more slender and effect of Earthquakes more widely reported there is a need to ensure that the specialist expertise is made more generally available.

These aspects point to a special issue of the journal that addresses the problems of dynamic behaviour and earthquake design. SECED readers are invited to submit papers in these areas and specifically encouraged are papers that provide new data on Earthquakes and on new forms of dynamic loading and describe new ways in which adverse dynamic effects have been countered. In addition papers that suggest ways in which good design and construction may be disseminated and guaranteed the world over will also be welcomed.

Professor Howard Wright

Structures & Buildings Advisory Panel Member

PAPER FORMAT: The papers will follow the current Proceedings format and length limitations. Papers should be between 2000 and 4000 words in length and, if appropriate, be illustrated with around 6-10 photographs and/or simple line drawings. All papers will be subject to the normal review procedure, with external referees and an assessor

appointed by the Structures and Buildings Advisory Panel.

TIMETABLE: It is envisaged that the papers will be published in the May 2002 issue of the Structures and Buildings Journal. To allow sufficient time for the review process, first drafts must be received by 30 September 2001. It is proposed that authors will be notified during early November 2001 of the Panel's decision, with submission of their final draft incorporating any necessary revisions by mid December 2001.

If you would like to contribute a paper or article to this issue please let me have a brief outline of your proposed paper as soon as possible.

For further information and Journal Guidelines please contact:

Lyn Richards

Journals and Publications

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NOTABLE EARTHQUAKES JANUARY - APRIL 2001

Reported by British Geological Survey

YEAR	DAY	MON	TIME UTC	LAT	LON	DEP KM	MAGNITUDES ML MB MS	LOCATION
2001	01	JAN	06:57	06.97N	126.60E	33	6.5 7.3	MINDANAO, PHILIPPINES Minor damage occurred throughout the Davao area.
2001	04	JAN	21:31	59.80N	1.92E	19	3.1	NORTHERN NORTH SEA
2001	13	JAN	17:33	13.06N	88.79W	39	7.8	EL SALVADOR At least 827 people were killed, approximately 4,500 people were injured and over 93,000 houses were destroyed. A large number of the casualties and damage was caused by large landslides in the Santa Tecla area.
2001	26	JAN	03:16	23.32N	70.31E	23	6.9 7.9	SOUTHERN INDIA At least 14,240 people have been confirmed killed, more than 61,600 people injured and approximately 600,000 people have been left homeless.
2001	13	FEB	14:22	13.61N	89.07W		5.6 6.5	EL SALVADOR At least 283 people were killed, approximately 3,000 people were injured.
2001	19	FEB	12:45	59.39N	6.08W	15	3.0	NORWEGIAN COAST
2001	23	FEB	00:09	29.52N	101.14E	33	5.7 5.4	SICHUAN, CHINA Ten people were killed, approximately 100 people were injured and 60,000 houses were damaged or destroyed.
2001	24	FEB	07:23	1.46N	126.27E	35	6.6 7.0	N MOLUCCA SEA
2001	28	FEB	18:54	47.15N	122.72W		6.4	SEATTLE One person was killed and over 160 people were injured. Most of the damage state of occurred in and around Seattle, about 50 km northeast of Olympia. A emergency was declared for western Washington where damage to buildings roads is estimated to run into billions of dollars. Mudslides hit Mount St Helens in southwestern Washington.
2001	14	MAR	22:20	58.25N	0.69E	20	3.4	CENTRAL N SEA
2001	18	MAR	01:43	51.47N	1.91W	9	2.7	SWINDON, WILTS
2001	19	MAR	05:52	3.91S	127.97E	40	6.1 6.5	SERAM, INDONESIA
2001	24	MAR	06:27	34.07N	132.53E	33	6.4 6.5	HONSHU, JAPAN Two people were killed and 161 people were injured.
2001	03	APR	14:57	34.92N	138.05E	30	5.1 4.8	HONSHU, JAPAN At least eight people were injured.

Issued by Bennett Simpson, British Geological Survey, May 2001

Forthcoming Events

26 September 2001

Seismic Design of Composite Structures
ICE 5.30pm

31 October 2001

Soil Structure Interaction
ICE 5.30pm

28 November 2001

Human Excitation on Structures

30 January 2002

Seismic Qualification of Equipment by
Experience Methods

27 February 2002

Seismic Design of Earth Retaining Structures

27 March 2002

Rail Induced Vibration

25 April 2002

The Year's Earthquake

29 May 2002

Flow Induced Vibrations in Hydroelectric
Penstocks

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SECED Newsletter

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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 the authors on request. Diagrams and pictures may also be sent by Email (GIF format is preferred).

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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 the UK Earthquake Engineering Field Investigation Team. The objective of the Society is to promote co-operation in the advancement of knowledge in the fields of earthquake engineering and civil engineering dynamics including blast, impact and other vibration problems.

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