



AEES Newsletter

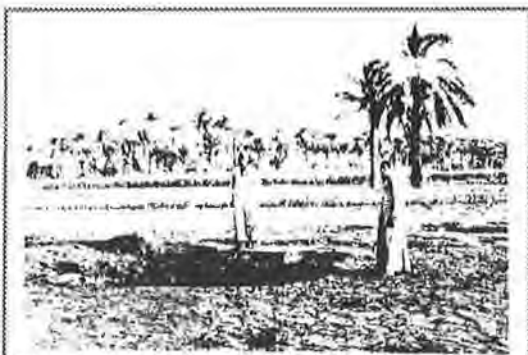
The Society - David Rossiter (Treasurer)

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New Year - The AEES executive hope you had a peaceful Christmas and wish you a productive and constructive 1994.



Liquefaction crater in the Nile valley Egypt, after the Ms 5.2 earthquake on 12 October 1992

President's column - Charles Babb

(Text of opening address to 2nd AEES AGM - Melbourne, 25 Oct 1993)
Welcome to the second annual seminar of the Australian Earthquake Engineering Society. This is our main function for the year and I look forward to hearing

our speakers today.

Our theme this year is *Earthquake Engineering and Disaster Reduction*.

When I opened the first of our seminars in Sydney last year I pointed out that some of the greatest life losses due to earthquakes had been caused by intraplate earthquakes rather than by the much better known and much better understood interplate earthquakes.

Tragically the recent Indian Earthquake is the latest devastating example of this type of earthquake. Although of only magnitude 6.4 about 10 000 lives were lost and many more were severely injured (report p4 - Ed.).

Let us remind ourselves again that we still have no fundamental theory for the causation of this type of Earthquake and that this is the type of Earthquake that we have here in Australia.

With no theory there can be no basis of prediction and therefore no forewarning. Without forewarning our only means to safeguard life in damaging earthquakes is by earthquake resistant design and construction.

Here at least we are on a sounder footing, we do have an Earthquake Code. Indeed since last we met we now have a new and revised Code, in a new format, although it is still from the same American stable and that as we shall hear is no bad thing.

We shall hear more about that code in a number of the papers to be delivered today and in the discussions arising from the presentations. In your discussions please raise any matters or areas where you consider the new Code might need some follow up action!

For example, it is a pure loading code now. Has action been taken to make it fully workable with all materials of construction???

What is the current situation regarding adoption by Building Authorities throughout Australia? Will it be enforced everywhere? Is it being

enforced yet? Will it be applied to the Olympic facilities to be built in Sydney?

By the way has anyone used it yet on real life project? (Ed- several in the audience indicated that they had already applied the code).

Now these are simple and straightforward questions but such simple questions do not always and everywhere have simple answers! I spoke earlier of recent events in India.

One of the oldest Universities in the British Commonwealth teaching Civil and Structural Engineering is in India, at the University of Roorkee. They have taught the principles and practice of Earthquake Engineering at a local, national and international level for many years eg: seismic design of large dams. Also Indian engineers have been knowledgeable and active in all aspects of Earthquake Engineering for a long time, yet this knowledge did nothing to prevent the terrible loss of life in the recent tragedy!

It is unfortunately true that knowledge is not enough; further, earthquake resistant design is not enough, even earthquake regulations are not enough.

Let us look for a moment at some comparative figures for loss of life and damage to property from Earthquakes in this Century so far (1900 to 1992)

The loss of life in Chinese earthquakes is 500 times that in American earthquakes, yet the property damage in money terms in the US is 6 times more than in the Chinese earthquakes. You don't have to be Chinese either, for example Italy in the same period had 100 times as many deaths from earthquakes as the United States.

Consideration of these figures led Hencher to say in a recent review of Earthquake Protection (Coburn & Spence, Wiley): "Despite the obvious influence of relative infra-structure costs on these statistics it is clear that the US is implementing measures to prevent loss of life to a level unknown elsewhere" (is this a sound and correct conclusion? or have the Americans just been lucky so far?) (Ed: The US lifeloss prevention measures worked again in Los Angeles in 1994).

So on the face of it, it is no bad thing that we have adopted American design and practice in our Earthquake Codes and Regulations. But that is not enough!!!

Earthquakes are unforgiving of the least fault and there is no shield or shelter.

So this work all has to be carried through and implemented to the fullest extent in the actual construction, faithful to the design and even to the design intent, to the quality of materials even if no one sees them go into the works, and of course the ongoing maintenance over the years which was perhaps the lesson of Newcastle.

Can we do all that? Of course we *can* do it, *will* we do it? That is another matter altogether and one fully open to all the influences of economics, education, and of politics!

So please keep some of these issues and questions in mind throughout the day and raise them in the discussions with the speakers and with each other in and out of session. Take your decisions and conclusions home with you.

AEES'92 Conference Proceedings

There are still copies available from the Hon Sec (GPO Box 378, Canberra 2601) for \$15 which includes post and packaging to anywhere in Australia.

The AGM & Seminar - Kevin McCue

Graham Hutchinson made available a most appropriate venue for our AGM and Seminar, at the Civil and Environmental Engineering Department, Melbourne University and the services of an excellent organiser in John Wilson. Thanks again to both!

The Seminar was most successful, attracting 69 participants.

The benefit of serial rather than parallel sessions is apparent at such a meeting - especially without external attractions. Everyone attends every session (well almost), so you hear and learn about the other disciplines, and meet the characters which is I believe the strength and intent of our annual seminar.

After the opening by Charles Bubb (see President's column) there followed sessions on *Earthquake seismology*, *Earthquake resistant design*, *Case studies and Disaster mitigation*, interspersed with tea breaks and lunch. A paper of great interest for many was the previously unpublished analysis of the Newcastle Workers Club failure which was used as evidence at the Coronial Enquiry in

1990. John Woodside read the paper in the absence of Ian Pederson.

The scope of papers was wide, ranging from the global context of earthquake hazard (David Denham) to the design of the Australian Embassy in Jakarta (Joe Muccillo). The response of concrete (John Woodside), masonry (John Scrivener) and steel (Lam Pham) structures was discussed as were dams (Len McDonald), earthquake insurance (Brian Peele) and damage scenarios (Russell Blong).

The new earthquake loading standard was dissected by Graham Hutchinson who also mentioned that software EQ-CODE has been developed at Melbourne Uni and CSIRO to assist engineers using the new code. Anthony Fowler talked about structural retrofitting which was timely and Gary Gibson showed a novel method for computing synthetic ground motionsyou can read the fine details in the Proceedings which will be published shortly by John Wilson if authors have sent him their texts!!!

AGM Charles Bubb opened the second AGM. He welcomed the 26 members present, moved a vote of thanks to the organisers, Graham Hutchinson and John Woodside, welcomed the Director of Engineering of IEAust, David Hood and presented a draft agenda. Kevin McCue reported on the year's activities and read David Rossiter's report of our healthy financial status. The Treasurer recommended that an internal audit be undertaken which was agreed by the meeting.

The Chairman appointed Bruce Boreham as returning officer to supervise the election of a new executive and committee which saw the return of the old executive unopposed:

President:	Charles Bubb
Hon Sec:	Kevin McCue
Hon Treasurer	David Rossiter

It was decided to expand the committee to 5 members and there being 5 nominations, the following were elected: Graham Hutchinson, Gary Gibson, Mike Griffith, Peter Hughes and Jack Rynn.

Charles Bubb resumed the chair and introduced David Hood who addressed the meeting to explain changes occurring within IEAust and that a task force has been appointed to review the Societies.

Professor Hutchinson suggested that AEES should offer to host the 1990 WCEE as Spain did when they hosted the Olympic Games. Executive agreed to consider this suggestion.

Professor Boreham brought up the problems of uncertainties of risk analyses and Professor Russell Blong suggested AEES open a dialogue with the new Risk Society. The Chairman advised that through his dual interests this had been done already and that dialogue would continue. A subcommittee to be chaired by Prof Boreham was established to review the use of the MM intensity scale. Gary Gibson, Kevin McCue and Marion Leiba were co-opted onto the committee.

The next AGM was discussed and members showed an equal preference for Adelaide and Canberra as the venue but no SA delegate present offered to organise it, effectively eliminating Adelaide. Progress on the PCEE'95 was discussed. Charles Bubb then thanked everyone for attending before closing the meeting, at which we adjourned to the Melbourne University Staff Club.



Soft storey failure, The Grand Hotel Guam, in the M8 earthquake of 8 August 1993.

Earthquake Loading Seminars - Standards Australia

A quartet of speakers has recently returned from a tour of Australian Capitals to explain the new earthquake loading Standard. All 4, John Woodside, Graham Hutchinson, Lam Pham and Kevin McCue, are members of AEES. Organised by Standards Australia, the seminars attracted more than 700 engineers; in Melbourne (100), Sydney

Seismic Vulnerability of New York State: Code Implications for Buildings, Bridges and Municipal Landfill Facilities

By Klaus Jacob

Most regions of New York State are characterized by a moderate level of seismicity and seismic hazard. The highest levels of seismicity are concentrated in the northern Adirondacks, the New York City Metropolitan area, and Western New York (Attica/Buffalo). Since 1886, at least four earthquakes with Richter Magnitude $M \geq 5$ have occurred in these areas, and numerous smaller, but widely felt earthquakes have occurred throughout the State. Earthquakes with magnitudes $M \geq 6$ are possible, although none are documented in the short historic record. These more significant earthquakes are expected to be rare (about once every few hundred years). On the other hand, in highly populated areas like New York City or Buffalo, multi-billion dollar losses can be expected from single earthquakes with magnitudes of about $M \geq 5.5$ to 6.

To reduce the earthquake risk to New York State, a variety of seismic hazard reduction measures are about to become effective in the near future. They concern seismic codes and regulations in at least three areas of public interest: Seismic Building Codes; Seismic Design Guidelines for new highway bridges and Seismic Retrofit Guidelines for existing bridges; and Federal EPA guidelines for solid waste disposal facilities, in particular for municipal solid waste landfills (MSWLF's).

Seismic Building Codes have been drafted for both New York State and New York City. Both are quite similar and represent essentially partly modified versions of the Uniform Building Code (UBC). New York State is divided into four seismic zones: A, B, C, D, with seismic zone factors of $Z = 0.09, 0.12, 0.15$ and 0.18 , respectively (measuring effective peak acceleration in fractions of g , where g equals the earth's gravity acceleration). The building code seismic hazard map for New York State uses these four zone factors, which are based on an exceedance probability of 10% in about 100 years (other codes usually use 50 years). Five seismic soil-type factors, $S_0 = 2/3, S_1 = 1.0, S_2 = 1.2, S_3 = 1.5$, and $S_4 = 2.5$, respectively, modify the reference design spectrum (defined for S_1 conditions) according to local geological site conditions ranging from very hard rocks (S_0) to very soft soils (S_4). A soil liquefaction screening procedure is also included in the code.



New York State is divided into four seismic zones: A, B, C, D, with seismic zone factors of $Z = 0.09, 0.12, 0.15$ and 0.18 , respectively.

STOP PRESS The media brought the M 6.6 January 17 earthquake near Los Angeles into our living rooms. 55 people died and the damage may exceed \$30b. Virtually a re-run of the M 6.6 1971 San Fernando earthquake, only a few km to the SW, this 'Northridge' earthquake was quite unexpected. Some of the same highway overpasses that collapsed in 1971 collapsed again despite a re-design, and a 3 storey apartment block lost its groundfloor soft storey. No high-rise buildings or houses collapsed. Free field accelerations of 0.91g were recorded close to the epicentre and at the Tarzana site, subject to site effects, the ground motion exceeded 1g repeatedly for 7

Earthquake Reconnaissance

NCEER Bulletin - October 1993

Surface Rupture and Damage Patterns in the $M_s = 6.4$, September 29, 1993 Killari (Latur) Earthquake in Central India

by L. Seeber, S.K. Jain, C.V.R. Murty and N. Chundak

NCEER investigator Leonardo Seeber, a research scientist at Lamont Doherty Earth Observatory, visited Central India following the devastating earthquake on September 29. The other authors of this article were sponsored by EERI and are affiliated with the Department of Civil Engineering, Indian Institute of Technology in Kanpur, India.

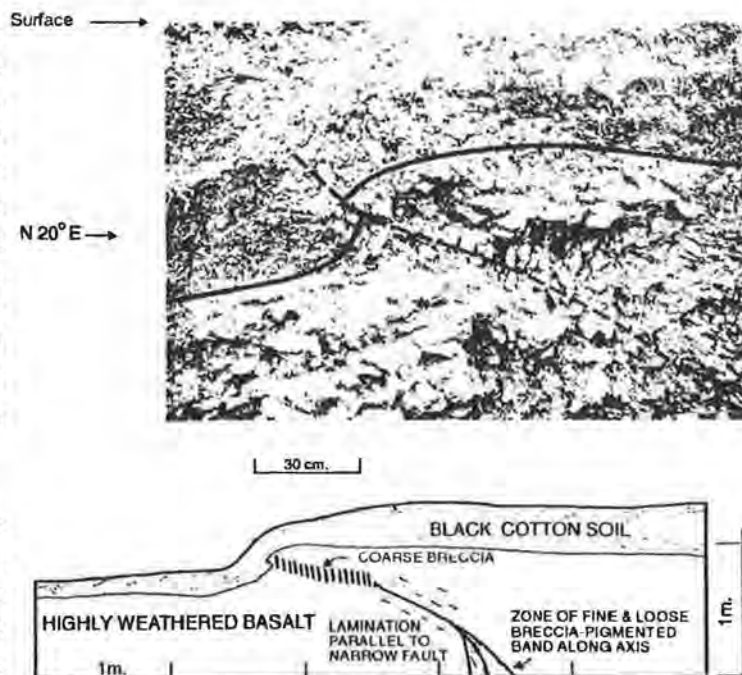
The September 29 earthquake in central India is not particularly large ($M_s=6.4$), yet is one of the most devastating intracratonic events known (about 10,000 people dead and more than twenty villages destroyed). Factors that may have contributed to the destruction are: shallow rupture; high population density; stone and mud construction; middle of the night timing; lowland sites for villages where site-response is unfavorable; and a false sense of security derived from absence of historical seismicity – the earthquake is centered in an area with the lowest level of perceived hazard.

The highest intensity, VIII-IX, is concentrated in a well-defined area about 10-15 km across. We mapped the surface trace of the rupture over a distance of about 1 km on the eastern side of this area. This trace is discontinuous and complex with scarps facing in opposite directions, but the overall strike is west-northwest and the deformation as exposed in three trenches indicates shortening of about 1/2 meter in a north-northeast direction. The surface trace probably extended to the northwest at least for another 2 km into an area characterized by deep soil where it had been obliterated by rain and plowing. A profile of a canal in that area shows a broad warp consistent with a reverse fault dipping southwest.

The epicenter is well within the vast area covered by Late Cretaceous basalt flows (Deccan Traps). Layering in the basalts is thought to contribute to the complexity of the rupture trace. We found no evidence of pre-earthquake faulting or folding in the basalts along or close to the rupture, nor did we see evidence of prehistoric scarps or accumulated deformation in the morphology.

This earthquake may fit into a class of shallow intracratonic earthquakes that are on faults without discernible

neotectonic activity. Thus, neither geology nor historical seismicity offered clues to the oncoming earthquake. Precursory seismicity in 1992, however, included a damaging event ($M=4.5$) and many felt events. Furthermore, the earthquake is close (~10 km) to the Lower Tima Reservoir (max water depth ~20 m). Several other recent earthquakes in peninsular India, including the well known 1967 Koyna earthquake, are located close to reservoirs. If a substantial portion of the recent seismicity in India is associated with reservoirs, earthquake hazard maps should reflect their distribution.



The photo and figure above present a cross-sectional view of the fault. The top of the fault can be seen approximately 30 cm from the surface at the boundary between the soil and rock layers.

or 8 s. The 6-storey Sylmar County Hospital which replaced a hospital that collapsed in the 1971 earthquake experienced 0.82g at the base and more than 2g at roof level. In downtown Los Angeles 30 km SE of the epicentre, the ground motion varied from 0.1 to 0.5g. For the first time a base-isolated structure was strongly shaken and behaved as designed. The largest after-shock was the size of the Newcastle earthquake, M 5.5. No surface faulting has yet been identified. On 19 and 21 January M 6.9 and 7.3 earthquakes occurred in Irian Jaya and Halmahera Indonesia with the loss of life.

(170), Newcastle (85), Brisbane (165), Darwin (21), Perth (105), and Adelaide (70). The Canberra and Hobart venues were cancelled due to an expectation of poor numbers. Pity!

AUBRRC are expected to recommend acceptance of the Standard next July which will mean its automatic acceptance into the Building Code of some States and Territories but still subject to legislation in others.

Australian Earthquakes

May - Dec 1993

Most activity in *May* was in Western and South Australia. The Ellalong events were coalmine headwall collapses, large ones, which were widely and strongly felt. The Laverton WA earthquake was felt and coincided with a meteorite sighting in the area.

June was a quiet month for Australia. Only 5 earthquakes of Richter magnitude 3.0 or more were located. Tennant Creek remained active. Two earthquakes were located offshore in WA.

July was another quiet month. Four earthquakes of Richter magnitude 3 or more were located. One earthquake was located offshore in WA.

There were only 2 recorded earthquakes above ML3 in *August*, both in WA.

In *September* there were 4 earthquakes over magnitude 3. Activity continued near Tennant Creek with a magnitude 3.6 aftershock and there was one event felt in Victoria, one in the Tasman Sea and another in Western Australia.

The seismicity stayed at a low level throughout *October* with 2 Tennant Creek aftershocks greater than ML 3. The event on October 23 was another long wall collapse at Ellalong Colliery, NSW.

In *November*, 7 earthquakes were located with magnitude 3 or more. Activity continued near Tennant Creek with one event greater than ML 3. The largest was near Lady Elliot Island, Qld and was felt (MM IV) by holidaymakers at the Resort. An isoseismal map was drawn by the University of Central Queensland. Another 3 small events were reported felt. On 2 November at 08:29 UTC, a magnitude ML 2.5 earthquake on the south coast of Tasmania was reported by the lighthouse keeper at Maatsuyker Island. On 4 November at 03:56 UTC, a

Date	ML	Place
December		
07	3.4	Tennant Creek NT
07	3.0	Western Eyre Pen SA
13	3.0	Offshore south Qld
17	3.0	Temma NW Tasmania
17	3.0	Gooranbat Victoria
18	4.2	Arnhem Land NT
18	3.0	Jindabyne NSW
November		
05	3.6	Tennant Ck NT
10	3.0	190km S Tasman Pen
17	3.0	110km E Dunalley Tas
20	3.3	155km NNW L Tobin WA
25	4.0	Lady Elliot Is. Qld
26	3.1	570km W Augusta WA
30	3.2	127km N Rawlinna WA
October		
01	3.0	Tennant Creek NT
03	3.0	44km WSW Exmouth WA
21	4.8	Tennant Creek NT
23	3.0	Ellalong Colliery NSW
28	3.3	Burra SA
29	4.2	303km NW Dampier WA
September		
10	3.6	Tennant Creek NT
11	3.3	SW Tasman Sea
16	3.9	Kalbarri WA
25	3.0	Churchill Vic
August		
11	3.5	Halls Ck WA
28	3.2	Kununurra WA
July		
06	3.3	Tobin Lake WA
09	3.6	Gascoyne Jn WA
10	3.5	Exmouth WA
11	3.2	Tennant Creek NT
June		
07	3.0	Port Hedland WA
08	3.6	West of Perth WA
10	3.3	Norseman WA
29	3.1	Tennant Creek NT
30	3.7	Tennant Creek NT
May		
08	3.2	Arkaroola SA.
10	3.1	Melrose SA
14	4.0	Exmouth WA
18	3.4	Exmouth WA
22	3.1	Ellalong Colliery NSW
23	2.7	Holbrook NSW
23	3.5	Broome WA
24	3.1	Ellalong Colliery NSW
28	3.6	Laverton WA

magnitude ML 2.9 earthquake east of Mudgee NSW, was felt there. On 30 November at 06:48 UTC a rockburst with magnitude ML 2.4 was felt throughout Broken Hill, NSW. No miners were injured.

The largest earthquake in Australia in December was that in Arnhem Land, 200 km east of Darwin. Depth phases indicate that it occurred at mid-crustal depth (20 km). The Temma, Tasmania, Gooranbat Vic and Jindabyne NSW earthquakes were reported felt but caused no damage. The Eyre Peninsula earthquake was in the middle of a 'hole' in the past seismicity. There were no events of magnitude ML3 or above in WA in December which is unusual.

News items

• **New Risk Society** The new IEAust Society has a mission to contribute to safety, health, environmental protection and productivity by providing a national focus for risk engineering and risk management.

It will be chaired by Mark Tweeddale, professor of risk engineering at the University of Sydney, with local chapters planned for all IEAust divisions.

Enquiries should be directed to Linda Tregonning (06) 270 6555.

(edited from AEES newsletter 3/93)

COURSES & CONFERENCES

• **NZNSSEE Technical Conference & AGM.** 18-20 March 1994, Wairakei Resort Hotel, Taupo NZ. PO Box 312 Waikanae NZ. keynote speaker Prof G Hutchinson. Ph/Fax: 64 4 293 3059

• **IDNDR World Conference on Natural Disaster Reduction.** 23-27 May 1994, Yokohama Japan. IDNDR Secretariat, Palais des Nations, CH-1211, Geneva 10, Switzerland, fax 41 22 733 8695.

• **First World Conference on Structural Control.** Los Angeles, Ca. 3-5 August 1994. Uni S Calif., Los Angeles, Ca. 90089-2531, USA. fax: 213 744 1426 or e-mail: uspanel@vivian.usc.edu

• **The 10th European Earthquake Engineering Conference:** 28/8 - 2/9 1994, Vienna, Austria.

• **Australasian Structural Engineering Conference, 1994,** Hilton Hotel Sydney 21-23 September 1994. AE Conventions Pty Ltd PO Box E181, Queen Victoria Tce, ACT 2600

• **9JEES'94 The Japan Earthquake Engineering Conference,** Tokyo, 12-14 Dec 1994.

• **3rd Int Conf on Recent Advances in Geo-technical Earthquake Engineering and Soil Dynamics,** St Louis, Missouri, USA April 2-7, 1995. Abstracts by Jan 31, 1994 to Prof Shamsher Prakash, Civil Engineering, University of Missouri-Rolla, Rolla MO USA. fax: 314 341 4992 or

e-mail Prakash@novell.civil.umr.edu

• **AEES & NZNSSEE**

Pacific Conference PCEE '95
20-23 November 1995

Melbourne Vic Australia
(copies of flyers from Hon Secretary if available)

Earthquake publications

• *Strain Compatibility for Continental Interiors and Implications for Intraplate Earthquake Prediction.* R.E Melchers University of Newcastle Dept of Civil Engineering and Surveying, Research Report 086.05.1993. (We hope to present a review in the next newsletter).

• *Earthquake tremors felt in the Hunter valley since white settlement* can be purchased for \$18.50 (+ \$1.50 postage) from Hunter House Publications, PO Box 536, Raymond Terrace, NSW 2324. (see review NZNSSEE Bull. 2 1993)

• **AGSO (BMR) Bulletins and reports** on earthquake activity in Australia can be purchased from the AGSO Sales Centre. The Australian Seismological Centre publishes an annual report featuring the year's seismicity with summary, glossary and description of the larger events.

• **Australian Seismicity (1900 - 1992) and Earthquake Hazard maps;** 1:10M scale in colour. (available from AGSO Sales Centre, GPO Box 378, Canberra ACT. \$21 incl postage in Aust.)

AEES'92 Conference Proceedings

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Letter from Skopje (from Dr John Karajas, Macgold WA to Dr David Denham, AGSO)

Dear Dr Denham,

On a recent field trip to the Republic of Macedonia, I had occasion to visit the Institute of Earthquake Engineering and Engineering Seismology, the University of "St Cyril and Methodius", Skopje. During my visit, I met with the Director, Professor Dimitar Jurukovski, and the Deputy Director, Professor Kosta Talaganov. Professor Talaganov kindly supplied me with the attached information* detailing the activities carried out by the Institute as well as the fields investigated in their Post-Graduate Studies Programme.

Through them, the Institute expresses a strong desire to achieve scientific collaboration with Australian co-workers as well as participation by Australian students as post graduates. I was given to understand that the Institute is highly regarded for its work in relation to Earthquake Engineering. On their behalf,

I present the enclosed information on the Institute and extend their cordial invitation to carry out joint activities in the future.

I hope that the attached information is of benefit to yourself and your colleagues in the Geophysical Observatories section of AGSO, as well as to other workers in the field of Earthquake Studies in Australia. I sincerely recommend that further contact be made with the Institute and it is my sincere wish that fruitful interchange emerge from this contact.

* Ed - The Institute was established in 1965, on the recommendation of the UN International Consultative Board for Repair and Reconstruction of Skopje, 2 years after the disastrous earthquake there. Copies of the 2 brochures can be obtained for the Hon Secretary, Kevin McCue, GPO Box 378, Canberra ACT. Charles Bubb visited the Institute in 1970 and has retained strong links with Prof Jakim Petrovski, on the teaching staff there and Macedonian delegate to IAEE.

Incorporation of Seismic Considerations in the New York State Building Code

By Peter Gergely

(from NCEER Bulletin - Apr 1993)

A draft of seismic design provisions for the New York State Uniform Fire Prevention and Building Code was completed in January. They are based, to a large extent, on the New York City provisions which were submitted for adoption last year. Since this is the first time earthquake-resistant design has been considered in the State, many technical and practical issues had to be resolved. NCEER has been represented by Klaus Jacob and Peter Gergely on the Earthquake Code Advisory Committee.

The most important question was the seismic risk (zone) map for the State, (see article by Klaus Jacob) together with a major change in the handling of the soil effect. Establishing ground motion and design force levels is complicated because it is difficult to design for a low probability-high consequence event (Ed - the Australian predicament). In the Eastern United States, the difference between the typical 250-year event and a much longer return period earthquake (say one with a

2 500-year return period) is large. How much of the design should be dictated by the much greater but low probability earthquake? One could guard against collapse due to the large earthquake either by designing for larger forces (greater strength) or by relying on ductility (more complex structural detailing). Only Zone A on the map is classified as a zone of low risk, the rest of the State has moderate risk. Ordinary moment resisting frames are allowed only in Zone A.

One and two-family detached dwellings, which are not more than two stories high above the basement, need not be designed for earthquakes. However, it is likely that the proposed federal insurance bill will require minor "soft" mitigation, such as fastening of water heaters and tying walls to roofs and foundations.

The draft proposal is based on the Uniform Building Code, but there are numerous exceptions. Simple rules were introduced for required building separation. For irregular or tall structures, dynamic force analysis should be considered, but it is not required.

Membership renewal to 30 November 1994

now due!!!!

Late News The first accelerogram has been recorded on an instrument installed in Australian cities under the joint Governments urban monitoring program.

The accelerograph was installed by seismologist Russell Cuthbertson (AEES member) from the University of Queensland's Earth Science Department. It recorded a magnitude 3.0 earthquake 200 km east of Brisbane on 13 December. Only a small earthquake but it gives credibility to the project goal to provide Australian strong motion data.

The instruments, designed and built in Australia by the Seismology Research Centre at RMIT were purchased by AGSO. The Queensland State Government provides funding for their installation and maintenance.