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AEES is a Technical Society of IEAust  
and is affiliated with IAEE

3/2006

# AEES Newsletter

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## President's Column

Welcome and greetings to all our members to the third edition of the newsletter for 2006.

The team from Geoscience Australia (Mark Leonard, Mark Edwards, Trevor Dhu and Trevor Allen) and the Secretariat have worked hard to develop a stimulating annual conference this year in Canberra. We encourage members to spread the word and join us in Canberra over the extended weekend of November 24-26. The annual conference is our flagship event and provides a great opportunity for sharing and discussing the latest developments in seismology, earthquake engineering and related fields such as blast engineering, USAR, insurance, and emergency response management.

There is an ongoing need for AEES to raise community awareness in earthquake education in this country and to develop a response plan for emergency support and reconnaissance missions which could include the development of a register of professionals willing to be trained in undertaking reconnaissance missions and in assisting USAR (Urban Search and Rescue) taskforce teams. In June, some 35 engineers successfully completed a one-day course for Level One USAR training of engineers arranged with the Melbourne Fire Brigade and led by Mike Griffith and John Wilson. Around 10 of the engineers have nominated for Level Two training that involves

further classroom lectures and activities and a number of practical rubble-pile rescue exercises as part of a USAR operational team. We are very appreciative of the great support from our NZ colleagues, Des Bull and Dave Brunson in the development of the Level One and Level Two courses. We plan to continue such training around the country to provide an engineering capability for USAR teams in every state and territory.

The updated Earthquake Loading Standard AS1170.4 and AS3700 Appendix AA (earthquake clauses for masonry structures) have been approved by the various Standards Australia committees and are awaiting publication. However the Standards were not approved by the ABCB technical committee to be listed in the Building Code of Australia at a recent meeting in Sydney. We are currently working through the issues that revolve around the likely cost impact on the building industry from the adoption of the revised Earthquake Loading Standard. The preparation of the Earthquake Loading Standard and Commentary is a major task undertaken by AEES members and hopefully this edition will be published shortly by Standards Australia and *called up* in the BCA as part of the Building Regulations.

The AEES web site under the direction of Adam Pascale from our sponsors ES&S is continually being improved and updated. An excellent new feature is the availability of past AEES conference papers in pdf format for the benefit of members and the public. We welcome your feedback and suggestions to continually improve the web site including the *earthquake engineering web links* page.

The Melbourne Executive Committee (John Wilson, Dee Ninis, Amy Brown, Adam Pascale, Gary Gibson and Nelson Lam, and our Secretariat Kevin McCue) appreciate your support to further develop AEES.

John Wilson  
AEES President

[AEES2006 – Details and registration form at [www.aees.org.au](http://www.aees.org.au)]

## AEES Executive

President John Wilson  
 Secretary Amy Heath  
 Treasurer Dee Ninis  
 Secretariat Kevin McCue

### State Representatives:

Qld Russell Cuthbertson  
 NSW Michael Neville  
 ACT Mark Edwards  
 Vic Gary Gibson  
 Tas Angus Swindon  
 SA David Love  
 WA Hong Hao

Web Master Adam Pascale  
 Newsletter Editor Kevin McCue

Both the membership database and subscriptions are managed by Engineers Australia and ALL members, whether they be members of Engineers Australia or not, will be issued with subscription notices by that organisation. Please direct any enquiries regarding subscriptions to Lois Wurzer at [EA lwurzer@engineersaustralia.org.au](mailto:lwurzer@engineersaustralia.org.au)

The mailing address for other matters has changed! To contact Kevin McCue at the Secretariat see the address top left front page.

Charles Bubb sent in the following for your thoughtful enjoyment:

*Ride through the silent earthquake lands,  
 Wide as a waste is wide,  
 Across these days like deserts, when  
 Pride and a little scratching pen  
 Have dried and split the hearts of men,  
 Heart of the heroes, ride.*

--G. K. Chesterton, "The Ballad of the White Horse"

## Earthquakes in Australia

Earthquakes of magnitude 2.5 or more in the period May to October 2006 located by Geoscience Australia, ES&S or PIRSA are shown in the following table. The largest earthquake was in South Australia in May. No damage was reported.

Date	Time UTC	Lat	Lon	M	Place
May					
01	045925.6	23.14	124.34	2.3	L Disappointment WA
02	024716.0	26.04	137.21	3.6	W Poeppel Corner SA
02	235750.4	30.26	117.72	2.5	NW of Beacon WA
03	134533.1	30.70	138.45	2.8	S of Leigh Ck SA
08	12213.32	17.67	127.85	2.7	N of Halls Ck WA
13	010446.7	27.65	135.72	5.1	E Oodnadatta SA
14	043459.3	33.56	139.24	3.0	SE of Hallett SA.
14	092746.0	18.32	127.31	2.7	W of Halls Ck WA
21	212720.2	33.60	136.58	2.5	Cleve SA
24	213430.5	23.01	130.03	3.9	SE L Mackay NT
24	220044.0	16.53	127.13	2.9	SW Kununurra WA
24	230247.9	22.91	130.05	2.6	SE L Mackay NT
26	073819.3	16.66	128.69	2.9	S Kununurra WA
June					

03	162701.9	16.58	121.71	3.2	N of Broome WA
06	153409.9	25.03	117.44	4.5	Mt Clere WA.
12	224340.0	25.06	117.55	3.9	Mt Clere WA.
15	080159.2	32.09	139.17	3.8	E of Hawker SA.
15	092425.7	32.10	139.18	3.2	E of Hawker SA
15	152001.2	23.00	131.77	2.8	S Yuendumu NT
15	174542.7	32.57	138.22	2.5	Port Augusta SA.
15	180130.4	27.98	146.99	3.0	E Cunnamulla Qld
17	083625.0	32.07	139.17	3.2	E of Hawker SA.
17	204151.3	21.24	132.47	2.8	W Barrow Ck NT
18	131751.3	38.48	146.86	3.2	W Darriman Vic
18	154934.6	34.06	150.42	3.0	W Camden NSW
22	183918.0	12.66	136.35	2.7	SW Gove NT
30	123449.0	34.02	148.74	2.7	S Cowra NSW
July					
02	231951.2	32.34	150.86	2.8	S Muswellbrook NSW
04	160824.3	30.77	121.52	3.2	SE Kalgoorlie WA
07	234813.6	31.38	138.68	4.0	Willow Springs SA
13	044247.3	37.92	145.55	2.6	N Gembrook Vic
15	144806.7	32.88	138.87	2.9	NE Peterborough SA
17	064507.8	34.18	136.93	3.4	NE Pt Lincoln SA
18	110410.7	13.90	133.10	2.5	NE Katherine NT
24	064339.9	34.73	149.27	2.0	N Gunning NSW.
27	103850.9	30.92	139.27	3.9	SE Leigh Ck SA.
28	054923.0	18.1	147.72	3.9	Offshore Ingham Qld
August					
12	022003.3	32.82	138.07	3.5	W of Melrose SA
13	133004.3	34.80	149.14	3.3	Oolong NSW
26	120101.9	34.09	139.25	2.7	SE of Clare SA
29	003734.5	19.71	133.95	3.0	W of Tennant Ck NT
September					
02	154739.1	24.43	116.41	3.5	NW Landor WA
11	184112.1	32.38	118.87	2.5	N of Hyden WA
13	054742.1	22.06	126.55	3.2	Gt Sandy Desert WA
13	143959.7	41.66	146.55	3.0	SW Deloraine Tas
29	124947.0	44.36	145.01	4.4	SW Hobart Tas
October					
01	072412.2	35.55	140.99	3.4	N of Bordertown Vic/SA border
05	212454.7	40.56	143.7	3.0	S King Island Tas
06	120604.9	22.26	113.90	3.0	W Learmonth WA
11	014552.1	19.78	134.01	3.2	SW Tennant Ck NT
11	190126.9	19.82	134.05	2.6	SW Tennant Ck NT
21	095149.6	34.03	149.16	4.2	SE Cowra NSW
22	123600.0	37.87	145.03	2.9	Caulfield Vic

## Other News

### Insurance

from Christian Science Monitor

Looking to reduce payouts for catastrophic losses, Allstate Insurance Co. said it is dropping earthquake insurance to most of its 407,000 quake customers.

Existing policies will be valid until they lapse, and Allstate, which lost \$1.55 billion in last year's third quarter largely because of hurricane Katrina, is working with regulators to find options in states where insurers must offer earthquake coverage.

Charles

### Rebuilding of Tangshan 'a miracle'

From The Standard (China's Business Newspaper) unearthed by David Love.

Saturday, July 29, 2006

The mainland marked the 30th anniversary of the Tangshan earthquake that claimed more than 240,000 lives with residents still in deep mourning and a newspaper hailing the rebuilding of the city as a miracle.

"The great Tangshan earthquake was one of the most devastating disasters the world has known, but the heroism of the Tangshan people refused to die," the city's Communist Party boss, Zhang He, said in a memorial service Friday.

"During the earthquake and its aftermath, the people of Tangshan grouped together and rescued hundreds of thousands of compatriots from danger."

He said the earthquake forged an "unflappable spirit of struggle" that has helped Tangshan rebuild into one of the top 50 cities in the mainland.

The earthquake, measuring 7.8 on the Richter scale, destroyed more than 90 percent of the buildings and one quarter of the city's one million residents died in the quake and the subsequent M 7.1 aftershock that struck 15 hours after the initial jolt.

"Things have really changed for the better in Tangshan over the last years," said Liu Xuemei, 37, a bookseller who lost eight family members in the quake. "But still on July 28, we are not celebrating our survival, we are only commemorating the dead."

Experts say the mainland is not prepared for another big earthquake.

There's little doubt that a major quake will again hit because the country lies on top of three tectonic plates that are constantly shifting against each other.

"Sooner or later, we can't say where, but mainland China will have a magnitude seven or greater earthquake," said Mei Shirong, an expert with the State Seismological Bureau. "It will happen again."

### **Recent World earthquakes**

#### ***New Britain PNG***

USGS PDE

JUL 19, 114858.3 UTC 5.47S 150.68E Depth 28km

New Britain, Papua New Guinea, Ms 6.4 (GS)

The following note is from Clive Collins, GA who happened to be in PNG in the vicinity of the epicentre at the time of this earthquake:

"You might be interested that a crack opened up in the road near Tarobi village (near Cape Reilnitz), New Britain, following the magnitude 6.4 on 19th July. Also, see photo of structural failure in an unreinforced leaf-and-bamboo building (glad I was in my concrete hotel room in Kimbe at the time)."



Photo: Felix Taranu (Rabaul Volcano Observatory)

### ***Bougainville PNG***

U.S. GEOLOGICAL SURVEY

SEP 08, 2006

QED

SEP 01, 101852.3 UTC 6.822S 155.535E Depth 38km

Bougainville Papua New Guinea, MW 6.8 (GS)

Radiated energy  $1.1 \times 10^{14}$  Nm.

At Buin, the earthquake was felt strongly with a rolling effect for a minute. There were cracks on roads, and things fell off shelves, while other things were hung on to prevent falling off. It was reported that floor tiles in a house rose during the shaking.

(Note from Lawrence Ambon Port Moresby Geophysical Observatory, PNG).

### ***IAEE***

The Executive Committee of IAEE is:

President T Katayama (Japan)

Past President L Esteve (Mexico)

Executive vice-President P Gulcan (Turkey)

Directors M Belazought (Algeria), D Hopkins (NZ),

E Faccioli (Italy), S K Jain (India), P Fajfar

(Slovenia), T C Pain (Singapore), L E Garcia

(Colombia), L Wylie (USA).

The 14<sup>th</sup> WCEE will be held in China in August 2008 following the Olympic Games. [www.IAEE.or.jp](http://www.IAEE.or.jp)

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### ***From the States***

#### **South Australia:** from David Love

Prof Mike Griffith reports from Adelaide University Civil Engineering Department that Jerry Vaculik is working on a joint Adelaide-Melbourne University project (funded by ARC) to develop a displacement-based method for assessing the seismic capacity of complex problem and represents a significant advancement of the displacement-based technique developed previously for 1-way vertically bending masonry walls by Doherty, Lam, Wilson and Griffith.

We have a post-doc research scholar (Dr Craig Willis) and a Masters student (Mr Qi Yang) studying the use of Fibre Reinforced Polymer (FRP) strips to strengthen brick masonry walls in bending. Mr Yang has focussed in particular on improving our understanding of the possible de-bonding mechanisms

for surface mounted and near-surface mounted FRP strips.

Based on this work, Mr Yang was able to develop a design procedure which was tested by applying various FRP strengthening schemes to 4 of the full-scale walls that Jerry Vaculik had first tested with cyclic airbag tests. This research is funded by an ARC grant is being supervised by Dr Rudi Seracino (M. Griffith and Dr C. Wu).brick masonry walls in 2-way bending. This is a

#### Western Australia:

Tsunami article from Peter Gregson (see newspaper extract at end of Newsletter).

Ed. 100 years ago this year Australia's largest known earthquake occurred off the west coast of central WA. An isoseismal map was drawn up from newspaper reports by Peter Gregson and the late Ian Everingham (see Atlas of Isoseismal map of Australia earthquakes Part 3, GA (AGSO) Record 1995/44).

#### AEES Annual Conferences

	Year	Place	Theme
1	1992	Sydney NSW	Earthquake Resistant Design and Insurance in Australia
2	1993	Melbourne Vic	Earthquake Engineering and Disaster Reduction
3	1994	Canberra ACT	Survival of Lifelines in Earthquakes
4*	1995	Melbourne Vic	PCEE'95
5	1996	Adelaide SA	The Australian Earthquake Loading Standard
6	1997	Brisbane Qld	Earthquakes in Australian Cities - can we ignore the risks?
7	1998	Perth WA	Meckering 30 years on - how would we cope today?
8	1999	Sydney NSW	The 10th Anniversary of the Newcastle Earthquake - Lessons learnt
9	2000	Hobart Tas	Dams, Fault Scarps and Earthquakes
10	2001	Canberra ACT	Loading Codes in the Real World
11	2002	Adelaide SA	Total Risk Management in the Privatised Era
12	2003	Melbourne Vic	Earthquake Risk Management
13	2004	Mt Gambier SA	Australian Earthquake Engineering in the new millenium - where to from here?
14	2005	Albury NSW	Earthquake Engineering in Australia
15	2006	Canberra ACT	Earthquake Engineering in Australia

- held jointly with NZSEE

Copies of some of the Proceedings are still available, contact Dr Nelson Lam n.lam@civenv.unimelb.edu.au

#### Conferences and Seminars

Readers are encouraged to provide information to the editor on upcoming conferences and seminars.

- **2006 11-15 December** 2006AGU Fall Meeting San Francisco, CA.
- **2007 13 - 15 March 10th International Seminar on Paste and Thickened Tailings Fremantle**

(Perth), WA, **Go with the Flow!** Over 50 abstracts were received for Paste 2007. Check out <http://www.paste07.com/> for event updates.

- **2007 12 - 14 September International Symposium On Rock Slope Stability in Open Pit Mining and Civil Engineering Perth, WA**, Submit your abstract to the ACG before 26 February 2007.

First Announcement and Call for Papers: [http://www.acg.uwa.edu.au/\\_data/page/2168/Flyer.pdf](http://www.acg.uwa.edu.au/_data/page/2168/Flyer.pdf)

- **2007 28 July - 3 August XVII INQUA Congress** 2007, Cairns Convention Centre, Cairns, Australia.

Rising greenhouse gases are driving climatic boundaries beyond the Quaternary envelope; rising tides of humanity are pushing the ecosphere towards an impoverished and uncharted state. The world approaches a crossroad.

In uncharted seas, sailing directions are taken from historical knowledge. Never has the need to understand Quaternary history been greater: history of climate, the biosphere and humankind. Quaternarists are skilled in integrating with other disciplines. The challenges are clear; our goal is that INQUA 2007 enhances our global ability to meet them.

INQUA is the International Union for Quaternary Research. The Quaternary Period spans the last 2.6 million years of Earth history. The Quaternary is an interval with dramatic and frequent changes in global climate; warm interglacials alternated with cold ice ages.

Every four years the international Quaternary community gathers together for the INQUA Congress. This is the largest gathering of its kind of Quaternary researchers. Session themes are broad, and such diverse topics are covered such as palaeoclimate, archaeology, glaciology, the carbon cycle and environmental reconstruction.

- **2007 7 - 9 November 4th International Seminar on Deep and High Stress Mining Perth, WA**, Submit your abstract to the ACG before 18 May 2007. First Announcement:

[http://www.acg.uwa.edu.au/\\_data/page/2168/DeepHighFlyer2.pdf](http://www.acg.uwa.edu.au/_data/page/2168/DeepHighFlyer2.pdf)

#### New Books and Journal Publications

*5th ICEG - Environmental Geotechnics: Opportunities, Challenges and Responsibilities for Environmental Geotechnics* (2-volume set), Edited by Professor H. R. Thomas, Director of Cardiff School of Engineering, Cardiff University

This set of books presents the proceedings of the International Society of Soil Mechanics and Geotechnical Engineering's (ISSMGE) 5th International Congress on Environmental Geotechnics, held in Wales, UK in June 2006. The congress brings together practitioners, academics and the public sector to highlight the latest ideas and developments in environmental geotechnics and related fields.

Consisting of 1658 pages with peer reviewed contributions from over 200 eminent authors from

across the globe, this 2-volume set presents current thinking and practice and demonstrates how issues associated with environmental geotechnics continue to be a major concern for governments, public and private organisations and the worldwide community in general.

£150.00 | 0727734741 | Hardbound | 2006 |

HEARD ISLAND: SOUTHERN OCEAN SENTINEL  
Edited by Ken Green and Eric Woehler

HEARD Island has been forged by fire and ice from the sea floor in one of the most isolated places on Earth. It lies 1500 kilometres from Antarctica, 4000 kilometres from Australia and 3750 kilometres from Africa.

Heard Island is in the Southern Ocean, a sentinel for our current studies on climate change, biological responses and commercial fisheries, and Australia's only active volcano. There is a wealth of information on the physical environment and the plants and animals on Heard Island buried in books, sealers' logbooks, scientific papers, climbing journals and geographical magazines. This book, written by experts in their fields, brings these disparate sources together in 15 review chapters, one on the geology, with associated appendices to form a cohesive story of Heard Island, a Southern Ocean sentinel.

ISBN0949324 98 1  
280pp, Paperback, A4, Aud\$77.00  
Surrey Beatty & Sons  
43 Rickard Road, Chipping Norton 2170, NSW, Australia  
Telephone: (02) 9602 3888 Fax: (02) 9821 1253  
Email: surreybeatty@iform.com.au

**Newsletter articles** (could authors please send the references to any of their relevant research publications – you are usually the first to know).

### ***The Society website/email list***

Dear AEES Members,

The AEES website ([www.aees.org.au](http://www.aees.org.au)) has been overhauled and new content added. Any contribution from you on the following topics is most welcome:

- details of interesting recent publications
- significant research projects in earthquake engineering (in Australia?)
- links to other relevant websites.

Please email me your contributions/suggestions.

The AEES email list is operated by the ES&S Seismology Research Centre, Melbourne. If you would like to register please notify me at [adam.pascale@esands.com](mailto:adam.pascale@esands.com)

Regards  
Adam Pascale

We still need email addresses for the following AEES – surely someone knows of them. Please send to [mccue.kevin@gmail.com](mailto:mccue.kevin@gmail.com):

Mr B H Aldcroft MIEAust CPEng
Mr J L Ballantyne FIEAust CPEng
Mr J Bay Hoon Sang MIEAust CPEng
Mr M J Brock MIEAust CPEng
Mr W M Buckland MIEAust CPEng
Mr C W Chang
Mr K E Christesen MIEAust CPEng
Mr W J Clarke MIEAust CPEng
Mr Daniel Po Kei Tam MIEAust
Mr P J Dimauro MIEAust CPEng
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Mr B R Jones GradIEAust
Mr D Kew GradIEAust
Mr N Lal MIEAust CPEng
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Mr C Shakeri MIEAust CPEng
Mr G N Tankov MIEAust CPEng
Mr J P Thompson MIEAust CPEng
Mr G H Vasilareas MIEAust CPEng
Mr R Vegners MIEAust CPEng
Mr D G Whiting MIEAust CPEng
Mr D J Wilson MIEAust CPEng

### ***Obituary***

**Ed. - Harry T Halverson**, co-founder and former Marketing Vice President of Kinematics Inc., passed away Saturday, October 13, 2001 at the age of 82. Much of Harry's sales and marketing efforts in the early years involved acquainting seismic areas of the world with the urgent need for acquiring strong motion acceleration data. His untiring efforts to promote Kinematics and the SMA-1 contributed, not only to the success of Kinematics, but also furthered the cause of earthquake engineering and earthquake mitigation for the world in general. For his special efforts in promoting the early and widespread installation of accelerographs, Harry was elected as "Honorary Member" (the second from the industry) of the *Seismological Society of America* in April 1994. Even though he retired from Kinematics in 1984, Harry maintained an active interest in seismology and kept two seismographs running on a 24-hour basis at his home near Olympia, Washington. Harry also enjoyed photography and is famous for his "Capitol Collection" photos that hang in the Washington State Capitol. Harry's vital presence will be greatly missed.  
Comment

## **Comment**

Oregon USA's Recipe for Mitigating Earthquakes  
Yumei Wang and William Burns

In Oregon, as in other places, many buildings were built before scientists had developed a basic understanding of the regional seismic hazards. Consequently, many critical facilities are dramatically under-designed by today's building standards with respect to earthquake hazards.

The Cascadia Subduction Zone Fault has had 18 prehistoric earthquakes, the evidence of which is buried in the geologic record. The inevitable future magnitude-9 Cascadia earthquake predicted by past activity and current geology would put thousands of lives at risk.

Oregon is not alone in this problem. Other states and many other countries face similar burdens related to entire communities built using poor seismic design and construction techniques, leaving a legacy of highly vulnerable buildings and infrastructure. Just look at the October 2006 magnitude 7.6 earthquake in Pakistan, which killed more than 80,000 people, largely due to under-designed infrastructure.

It does not have to be this way, however. Oregon's recent development of new earthquake safety policies, which include a long-term state-funded grant program to help rehabilitate high-risk public schools and emergency facilities, serves as a good case study for addressing seismic hazards on a community level. Although Oregon's recent success in public policies relates to earthquake safety, similar approaches could also address issues related to other natural hazards, such as hurricanes, extreme winter storms and landslides.

Roughly three-quarters of the state's public primary and secondary school buildings were constructed before the first statewide building code in 1974 and before scientific advancement in the field of paleoseismology helped establish even more modern building codes in 1993. In fact, roughly 1,600 school buildings are at risk, including several schools built in the late 1800s that are still in use. In the last few years, however, schools have received a boost through well-coordinated legislation.

In 2001, current Oregon State Senate President Peter Courtney (D) championed the passage of state Senate bills that required that public schools (K-12, community colleges and university buildings with more than 250 occupants) meet life safety standards by 2022, and that emergency facilities (hospitals, fire, emergency operation centers and police stations) meet such standards by 2032.

In the 2002 election, voters easily passed ballot measures that changed the Oregon constitution, allowing for "state general obligation" (G.O.) bonds to pay for earthquake mitigation up to a value of one-fifth of 1 percent of state assets. The bonds are slated

to help fund the design and rehabilitation of existing high-risk schools and emergency facilities.

Identifying the many at-risk buildings is not easily accomplished. Furthermore, strengthening the many high-risk buildings can be expensive, challenging engineering-wise, as well as controversial with respect to some community needs. With these issues in mind, Oregonians decided that a workable solution to mitigate the vulnerable buildings would need to last tens of years. The 2022 and 2032 timelines are considered to be a reasonable timeframe to accomplish the task of rehabilitating potentially hundreds of buildings.

Thus by 2002, scientists, policy-makers and Oregon residents had made great strides toward improving earthquake safety. Yet no plans were in place to meet the deadlines set forth in the statute.

In 2004, the Department of Geology and Mineral Industries, using funds from a Federal Emergency Management Agency grant, resurrected the momentum of the recently adopted earthquake safety policies. It convened stakeholders to form the G.O. Bond Task Force. The task force concluded that an overarching understanding of the extent of the problem was needed with respect to the safety of students and the vulnerability of emergency facilities that impact community preparedness.

The task force's plan includes completion of a "statewide needs assessment" by early 2007 for all kindergarten to high schools, community colleges, fire stations, police stations, emergency operation centers and acute-care hospitals. (University buildings were excluded because their needs assessment was previously completed.) It also includes formation of a temporary committee to establish a grant program to distribute earthquake rehabilitation grant funds using state G.O. bond money starting in early 2007. Eligible applicants will be based on the outcome of the statewide needs assessment. Finally, the plan calls for the state to issue G.O. bonds for local authorities and stakeholders to conduct seismic rehabilitation on state-approved high-risk buildings.

Sen. Courtney considered the viewpoints of the G.O. Bond Task Force, stakeholders and citizens, and then crafted the groups' recommendations into four state Senate bills that passed into law in the 2005-2007 legislature. They will help ensure safer communities over the next several decades.

The laws are designed to form a state grant program to distribute about \$1.2 billion of G.O. bond funds for important pre-disaster mitigation activities as identified by the statewide needs assessment. The laws illustrate the state's commitment to helping protect vital community assets. This passage marks an important transition from planning to action, whereby distribution of grant funds for high-risk critical facilities is slated to begin in 2007 and last for decades.

Creating new public policies, such as Oregon's recent earthquake safety laws, is often complex and difficult to accomplish. In the end, however, public policies can be extremely effective to moving toward a state's seismic safety goal, and are thus worth a good pursuit. Oregon's experience of developing well-supported public policies can be used as a framework for other regions, with applications for both hazard- mitigation and nonhazard-related issues.

Wang and Burns led the G.O. Bond Task Force. Both are in the Geohazards Section of the Oregon Department of Geology and Mineral Industries. E-mail: yumei.wang@dogami.state.or.us or bill.burns@dogami.state.or.us.

From GEOTIMES August 2006

## Tsunami surge hit North-West campers

JODI DALY and ELOISE DORTCH

A Rockingham family ran for their lives after two-metre waves caused by the Java earthquake devastated their Shark Bay camp site on Monday night.

Andrew White was preparing dinner at 7.30pm on the beach next to his family's campsite at Steep Point when an unusual sound caught his attention.

He saw two monster waves then ran 6m up the beach yelling to his partner Sandra Baldwin, who was about to put their 14-month-old baby girl Kyra into a tent.

The family, including sons Luke, 10 and Jayden, 12, and friends at a nearby camp ran to higher ground, just escaping the chest-high water that flowed through their camp.

"I hung on to the roo bar of our four-wheel-drive which was lurching around and the water was still rising past my knees," Ms Baldwin said. "A friend's Nissan Patrol was



**Washed away: A 4WD, above, and tent swamped at Steep Point in WA's north.**

carried 10m inland. Weather Bureau oceanographic chief Chris Ryan said Steep Point's location at the most western point on the Australian mainland and facing a deep narrow channel, may have accentuated the height of the tsunami.

In most of northern WA, sea levels rose 10-20cm. Dampier Salt reported a 42cm rise. Exmouth had rises of 30-40cm.

