

National Earthquake Conference in Adelaide

By Allan McDougall

For some time it has been recognised that in terms of earthquake risk, many key stakeholders have been functioning in discrete “silos” Recognising the need for a collaborative approach to earthquake risk, and acting under the aegis of the Australian Earthquake Engineering Society, Professor Mike Griffith, Associate Professor, Department of Civil and Environmental Engineering, Adelaide University, headed up a team to plan for a two-day conference that was held at the University of Adelaide on 17th and 18th October 2002.

The conference, jointly organised by The University of Adelaide, Primary Industries and Resources SA, Wallbridge & Gilbert Consulting Engineers, and S.A. Disaster Management Services adopted the theme, *Total Risk Management in the Privatised Era*.

Major sponsors for the conference were SAICorp, Emergency Management Australia and Seismology Research Centre, a division of Environmental Systems and Services.

Bruce Esplin, Emergency Services Commissioner, Department of Justice, Victoria was the keynote speaker for the first day. His inspirational address proved a magnificent opening to the conference and as a result he established a benchmarking of sorts that resulted in comments throughout the conference, peppered with the phrase, “As Bruce Esplin said...”

Bruce's address entitled *Emergency Management – Time for Change?* covered future trends in Emergency Management. For emergency managers he gave a timely warning, that our success or failure in managing emergencies will increasingly be judged by how we communicate – with each other, with our political leaders, and especially, with the community.

Jonathan Abrahams, Acting Director, Development, Emergency Management Australia, was keynote speaker on day two. His address was entitled, *Strategic partnerships for managing earthquake risk*. Jonathan's address is reproduced below:

Let's not kid ourselves – the management of earthquake risk is complex. It doesn't matter who we are or what we do, we can't do it on our own. We need people who can provide information on what the risk is. We need people who will make decisions about what needs to be done and we need people who can do something about it. As with many things in life, we need a team to succeed.

1. A common goal

A defining feature of a team is that it is working towards a common goal. What are we trying to achieve collectively? It is symptomatic of our compartmentalised society that for many years different professions have shared common goals but have not been working together effectively to achieve them. This is changing as organisations and professions are becoming more global in their approaches to their business and are looking for partners with whom they can work to achieve shared and other outcomes. In the public sector, these outcomes can be expressed in

terms of the impact on the status of individuals or a group or community. (SCRCSSP, p.xvi)

Emergency Management Australia's vision is *safer, sustainable communities*. This vision is not exclusive to EMA, rather it is one which we share with other emergency managers, other organisations and people working in the field of community safety, and broader still, the vision reflects the aspirations of communities across Australia. Like other emergency management organisations that have adopted similar visions or missions, EMA is stating that we want emergency management to become part of the mainstream strategic and policy agenda and that we have a contribution to make. Furthermore, partnering with organisations sharing this objective will be crucial to our future success, and the safety and sustainability of communities.

2. Teamwork

Management of the risk from earthquakes (and other hazards, for that matter) requires teamwork and a systemic capability. The capability is provided by a wide range of professions and players which includes seismologists, engineers, risk modellers, social scientists, risk communicators, insurance companies, emergency responders, health professionals, social workers, other public servants, businesses, non-government volunteers and citizens, who contribute to the safety and economic, social and environmental sustainability of communities. How do we make a team out of this *community of interest*? First, we need to respect the professions and what they bring to the management of risk. We are all contributors. Second, we need to provide opportunities for dialogue

and broader discussion where people needing information can seek it from others who are willing and able to provide it.

Integration of these contributions is also needed to effectively manage risk. Conferences and forums can help bring people together to share information and knowledge, but it would be desirable if committees and risk management study teams were multi-disciplinary and multi-sectoral to reflect not only community stakeholders but also the people who can help identify, analyse and treat the risk. For example, how does the initial data collected by seismologists become useful for policy and decision-makers, politicians in all spheres of government, business leaders, or individuals? There are some promising trends in this area.

3. A common approach – risk management

Perhaps the most significant development in recent years in emergency management has been to consider the business in terms of risk management. Some people suggest that risk management is just window dressing, changing the labels on what we have always done. Risk management does not mean throwing away the past, as there are only so many ways which risk can be managed – measures which have been implemented in the past will continue in the future. While it might look like a small step, risk management is however a paradigm shift in the approach to our business. The big difference is that risk management provides a broader and at the same time more unifying framework enabling more comprehensive and integrated approaches to be applied and helps to break down professional, philosophical and bureaucratic barriers. In principle, risk management provides a common language with which to identify common objectives, analyse problems and develop more effective solutions with a diverse range of partners than ever before.

4. Managing earthquake risk in Australia

How much is known about earthquake risk in Australia? What are we – the Australian community – doing about it? How can we do it better? As a nation, as communities, as individuals, where should we be focusing our efforts in the future? And more specifically, how can earthquake engineers and others attending the conference make a more effective contribution to managing earthquake risk? The emergency risk management process can serve as useful guide for identifying the roles of various professions and demonstrating the importance of teamwork.

4.1 Setting the context

The context for earthquake risk management has political, social, financial, environmental dimensions, as well as the paradigm in which philosophy and practice is framed eg risk management. To examine the context, we need to look at the systems, values and trends in Australian communities. The trends that are shaping emergency management philosophy and are relevant to the earthquake risk management context include:

- Increased community participation in risk management decision making
- A greater value placed on data, information, knowledge and research to assist informed decision-making
- Adoption of developments in information technology across emergency management
- Widespread adoption of risk management which values risk assessment, prevention, mitigation, response and recovery as measures to manage risk

Political and community attitudes to risk and decision-making are also important considerations. Part of the political dimension is the reaction to contemporary issues and events. This is evident in the rapid and significant Government

response to the terrorist attacks in the United States in September 2001 and the New South Wales Bushfires over December 2001 and January 2002. The message here is that disasters have resulted in changed attitudes, increased funding and enhanced capability development. We need to be ready to put the case to government and the community at the time when they are most receptive to hear them. What can we learn from this? When an earthquake occurs either in Australia or overseas, there is a window of opportunity in which to act and communicate key messages about the earthquake risk in Australia.

4.2 Establishing Evaluation Criteria

In the risk management framework, the common goal can be expressed as managing risk to the safety and sustainability of communities. The earthquake risk management team aims to reduce risk, particularly to life and property, to the lowest level possible, but is also constrained by what is reasonably practicable and acceptable to the community. Constraints include the extent of our knowledge of the risk itself – what do we know about the hazard? How well do we understand the vulnerability and resilience of communities? What has worked in the past – what didn't? Another



Associate Professor Mike Griffith (left) and world-renowned seismologist Bruce Bolt, at the conference

constraint is the effectiveness of the treatment measures available. Do we have the optimum understanding and technology to make buildings safe or to find survivors from collapsed buildings in rubble piles? What are the best ways to communicate risk to different audiences? How well do we manage the mental trauma of people affected by earthquakes? The third limitation is the extent to which the community is prepared to invest in risk reduction measures. At what cost? The community does not have unlimited resources, so where can we have the most effect on managing risk – or alternatively what are the most cost-effective measures to manage risk?

4.3 Identifying and Assessing Risk

The identification and assessment of risk are the building blocks of risk management – a greater understanding will lead to better targeting of resources to areas of highest risk, and to safer and more sustainable communities.

Fundamental to emergency risk management is the description of risk as the interaction between hazards and vulnerability. The current state of Australia's understanding of earthquake hazard is essentially based on the historical record of earthquakes. Geoscience Australia has embarked on a project to map Australia's earthquake hazard based on the technical analysis of geology and topography. Meanwhile social scientists are increasing their understanding of what makes people and communities vulnerable and resilient to disasters. Higher levels of individual and community vulnerability are associated with factors which include poor or declining economic circumstances, being frail aged and very young, seriously ill, poor standards of accommodation, remote location, levels of physical and mental disability, physical and social isolation, higher risk occupations and being on holiday, often living in tents or caravans. On the other

hand, resilience factors include resources, knowledge and information, access to services, involvement in decision making process, personal coping capacities, shared community values, and shared community aspirations and plans. (Buckle, Marsh and Smale, pp37–38)

Clearly in earthquakes, the safety of the built infrastructure is a key risk factor for communities. There are opportunities for earthquake engineers to work with health professionals to determine what aspects of buildings causes death and injuries (for example, structural or non-structural factors such as heavy furniture falling down or sources of fire, or building materials which cause respiratory illnesses) and with emergency managers on understanding the circumstances which lead to entrapment and more effective and safe search and rescue operations.

4.4 Risk Treatment

Risk can be managed in a number of ways. Some of these incorporate the comprehensive approach to emergency management: Prevention, Preparedness, Response and Recovery. The community's risk can be reduced by enhancing capability in each of these areas.

Land use planning and development assessments.

Planners play an important role in determining the suitable use of land for specific purposes. They need information about the hazard from earthquake scientists upon which to base their recommendations regarding land use for approval by the relevant local or state government authority. At the same time, working with earthquake engineers can help local government to assess the suitability of particular buildings, building types and construction standards for particular areas.

Structural/non-structural and critical infrastructure protection.

Given the number of deaths and injuries in earthquakes caused by

the collapse of buildings and infrastructure, the role of earthquake engineers and the building industry generally is of paramount importance in preventing structural collapse. In many respects, the standard of building design and construction could be considered the most effective measure for managing risk of earthquake, based yet again on the understanding of the underlying hazard risk. At the same time, the sustainability of communities also depends on certain buildings maintaining their functionality, so that hospitals, emergency operation centres and utilities can continue to provide services to the community, even if the structures experience damage. This has implications for further involvement of engineers in the design and construction of buildings and for the use of materials that reduce the risk of respiratory illness. There are significant opportunities for earthquake engineers to become actively involved in nascent critical infrastructure protection initiatives, because when an earthquake strikes the impact on the infrastructure will have a significant bearing on the risk to communities.

Personal protection. Recent community education in structural and bush fire is based on the premise that the most effective level of protection for individuals is action that they take to protect themselves. With respect to earthquake risk, a key question is how can it be taken seriously in Australia? Psychologists, behavioural and social scientists have informed our understanding about changing people's behaviours so that they take action that will protect them from risk. This is a particular challenge for earthquake risk in Australia where the lack of awareness results in limited proactive personal protection behaviour. Nonetheless, there is a need to formulate appropriately tailored messages about risk and personal protective measures which are then delivered effectively and



Courtesy: Agence France Presse

Chi Chi earthquake, Taiwan, 1999.

efficiently to, and among, the target audiences. This may include empowering people with information about the earthquake risk in the area where they live or are considering to live, about the security of non-structural elements in the house or at work, protective behaviour during the course of an earthquake and about what to do after the shaking ceases, and if it is safe to do so, where to go after a disaster strikes. It might appear that in the case of earthquake risk, the best time to inform the public will be when an earthquake occurs in the local area or on an anniversary of a significant recent event.

Warnings. The research and further development of systems enabling the short-term prediction of earthquakes is critical for the effectiveness of warning the population of an impending earthquake. If communities and businesses can be given advance notice of an impending earthquake or after-shocks then they can take precautions to reduce their risk. The issuing of warnings requires an understanding of community

behaviours, a risk communication strategy, a system by which to deliver warnings and a clear message of what people and industries should do.

Evacuation. Current understanding of earthquake risk indicates that most injuries occur as people as entering or exiting buildings, so the message is that people should stay where they are during an earthquake. However, when it is safe to do so, it is recommended that people move outdoors and move as far away as possible from buildings. (Noji, p160) Structural engineers could provide further insights into determining whether different evacuation behaviours are required for particular circumstances, for example, is there different advice for the person on the 50th floor versus the ground floor of a high rise building, or someone working in a wooden farmhouse.

Response. Australia has a well-established emergency response system based on the strength of State and Territory emergency

management arrangements, and cooperation between all spheres of government and with the community. The Australian emergency management arrangements are based on an all-hazards approach so that a common set of arrangements are applied to emergencies irrespective of their cause. The challenges to this framework posed by earthquakes are manifold: the potential for catastrophic losses on a community-wide scale; lack of experience with significant earthquakes unlike other hazards such as bushfire, flooding and cyclones; and unlike these hazards, without the warnings or predictions, it will be a cold start for the response system, initiated by immediate personal experience or on the basis of advice from Geoscience Australia's which monitors earthquake activity and forwards information to EMA which in turn notifies the State and Territory emergency management organisations. An event of any significance would quickly exhaust the resources of most States and Territories to respond, putting greater emphasis on the provision

of mutual aid between states, Commonwealth assistance and possibly international assistance. A better understanding of the earthquake risk in Australia would assist emergency managers in determining what further capabilities are required to manage the risk, such as deploying resources to where the most damage is most likely to have occurred and anticipating medical needs due to the number and type of injuries associated with earthquakes. One area where capability is growing is in urban search and rescue (USAR), initiated before 11 September 2001 but given significantly greater impetus as a result of the World Trade Center collapses. The national approach emphasises the interoperability of equipment, common training standards and protocols for the call-out and deployment of USAR teams. Capabilities include the identification and training of structural engineers who are an integral part of the USAR team. It is proposed that early next year specialised training, based on a package developed in New Zealand and adapted for Australian needs, will be offered to engineers who will be available to provide support in USAR operations.

Recovery. Similarly, Australia's recovery system of psychologists, community development officers, non-government organisations, social workers and engineers has enabled communities to recover effectively from disasters. A key role for engineers in an earthquake will be to assess which buildings are safe and which are not to be entered. This may be of great importance to businesses wanting to re-enter their buildings to recover vital records, utility operators maintaining or resuming services, or for householders wanting to collect treasured possessions.

Cooperation with social workers is paramount in communicating the news that homes need to be abandoned, particularly for people

who have lived in the same place for all their lives. Another key challenge which involves engineers will be the provision of suitable temporary shelter for people whose places have been deemed no longer habitable, and then the effective development of permanent housing in such a way as not to repeat the circumstances which led to the first disaster.

5. Conclusion

The management of earthquake risk in Australia presents particular challenges. People around Australia in different professions are rising to these challenges, by improving the understanding of the earthquake hazards, developing our understanding of vulnerability, risk modelling, risk communication, reviewing the building code and developing urban search and rescue capabilities. In its own way and collectively, this work is making a significant contribution to improving Australia's capability to manage earthquake risk.

For the earthquake engineers there are current and emerging opportunities to increase their influence and contribution to the management of earthquake risk, by getting involved in initiatives addressing critical infrastructure protection, urban search and rescue, and the review of the building standards.

While the Australian community is not focused on earthquakes at this time, it is essentially a sleeping issue for most Australians. I should add it's not the only one. However, experience with other hazards indicates that they will be awakened, both physically and psychologically, when the next tremor or earthquakes comes along. The plan to deal with any damage arising from the event will swing into action, but also, as the earthquake risk management team, we need a plan to communicate key messages at political, business and community levels.

In the meantime, we need to continue to work together as a team to manage the complexity of earthquake and other risks to Australian communities. There should be more forums such as the Australian Earthquake Engineering Society Conference that brings people together from different disciplines and sectors to share and develop their ideas and practices, and work towards our common goal.

References

- Buckle, P., Marsh, G. and Smale, S., *Assessing Resilience and Vulnerability*, 2001.
- Noji, E. K., *The Public Health Consequences of Disasters*, Noji, E.K. (ed), Oxford University Press 1997.
- SCRCSPP (Steering Committee for the Review of Government Service Provision, Report on Government Services) 2002, *Report on Government Services 2002*, AusInfo, Canberra.
- Was the conference successful? What criterion does one use to determine this? Surely its success will only be accurately assessed as the years unfold and we see emergency management agencies working in concert with seismologists and construction engineers, particularly in the mitigation arena. It is hoped that eventually, it will be true to say, "Yes this Adelaide conference did herald a genuine start to a collaborative approach to earthquakes!"

Author

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