Urban floodplain land-use. What is 'acceptable risk'?

How do educators maintain credibility in workplace education?

Common law obligations to private dam safety

How community involvement can influence local government planning

historical snapshot

Rubble from the Alpine Way and Carinya Ski Lodge at Thredbo

At 11:35pm on Wednesday, 30 July 1997, 2000 cubic metres of mud and rock shifted below the Alpine Way, a main road above the village of Thredbo in the NSW Alpine region. It travelled down the slope taking with it the Carinya Ski Lodge, and then tumbled down the hill across Bobuck Lane, slamming into an elevated car park and then directly into Bimbadeen Lodge.

Large parts of both buildings were scattered across the site and buried under tonnes of rubble and soil.

Rescue efforts were hampered by further minor slides, and the extremely unstable mass of earth, rock, shattered lodges, trees and vehicles.

Thermal imaging cameras and seismic listening devices were used in an attempt to locate survivors. Fifty five hours after the landslide, rescuers located a survivor buried in a void below three huge concrete slabs, 2.5 metres below the rubble.

Over seven days of exhausting searching, rescuers recovered the bodies of 18 people who died in this tragic disaster which also caused damage worth many millions of dollars.

Source: NSW Fire Brigades http://www.nswfb.nsw.gov.au Queensland Government State Disaster Management Group http://www.disaster.qld.gov.au

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Please note that contributions to the *Australian Journal of Emergency Management* are reviewed. Academic papers (denoted by ⓡ) are peer reviewed to appropriate academic standards by independent, qualified experts.

FOREWORD
AJEM in reflection

by David Templeman, Director General, Emergency Management Australia

The Australian Journal of Emergency Management (AJEM) was first published in the form of a newsletter, *The Macedon Digest*, in March 1986 to fill an identified "information void within the counter-disaster community." It was recognised that a need existed for a publication to provide summaries of activities, research and meetings to "operatives, planners, trainers and researchers in the counter disaster/civil defence field." In 1995 the title was changed to *The Australian Journal of Emergency Management.*

Special issues dedicated to environmental health and disasters (1992), the International Decade of Natural Disaster Reduction (1995), and more recently in 2004, agricultural emergencies and disaster recovery issues have been a feature of AJEM's history.

As a communication vehicle for members of the Australian emergency management sector, the publication facilitates a discourse within the emergency management community to enhance capability, as well as stimulate discussion relating to innovative emergency management practices. AJEM provides an opportunity for practitioners to report, describe events, trends and issues relevant to the field as well as provide a forum for practitioners and researchers to exchange views. As a result AJEM aims to educate and raise awareness of current trends in emergency management while increasing awareness of emergency management issues.

AJEM has secured a national niche. It provides a forum for a range of scholarly and practitioner articles that reflect considerable analysis, considered viewpoints, lessons learnt, and current and future issues.

While AJEM has come a long way in the past 19 years, its commitment to providing access to information and knowledge for the research community and practitioners of emergency management remains unchanged. It is this commitment to provide a journal appealing to all sectors within the emergency management sector that causes some challenges to its Editorial Board.

A recent readership survey clearly indicated that AJEM is largely successful in catering for its varied audience with a blend of articles in each issue. AJEM will continue to provide this balance, maintaining its reputation as Australia's pre-eminent authority on emergency management issues.

AJEM does not focus on single agency or hazard issues, but reflects Emergency Management Australia's (EMA) focus of a multi-jurisdictional, all-hazards approach to emergency management arrangements. The strength of the journal is in its neutrality and the variety of the published material effectively reflects this ethos.

Feedback from surveys conducted of our readership has revealed that AJEM is regarded as the principal or prime source of information for the emergency management sector within Australia. It is the only regular, comprehensive, multi-disciplinary publication of its type and is deemed by its readership as a reliable and credible source of information covering the full spectrum of emergency management. Our readers have stated that it is used in planning, training, education, exercise management, and presentations as well as a wide range of other uses.

Improving emergency management policy and practice in Australia requires the effective transfer and update of innovative practice, backed-up where necessary with carefully targeted research. EMA plays a key role in this area in capturing and transferring research and innovation particularly to reduce disaster-related loss of life, property damage, and economic and social disruption from natural, technological and human-caused disasters in Australia.

I consider AJEM a valuable communication vehicle for the emergency management sector and look forward to its continued success.

David Templeman
Director General

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The Macedon Digest, Vol.1 No.1 March 1986, Pg.1

Educator Jones and the search for 'creds': searching for credibility in workplace education

Phillip Chambers explores aspects of credibility for trainers in the fire fighting industry

Preamble

Adult educator to emergency services colleague, "If we had a few bucks to do ANY research to help us improve (the course we run) here what would YOU want to look into?"

Emergency services colleague, "Our credibility! Without it – we're sunk!"
(Field notes, Chambers 2001–2003)

Abstract

The changing nature of work has and is impacting on emergency services education programs in Australia. University-Industry partnerships are becoming more common and the learning and outcome requirements at management level is becoming more complex. Professionalisation does not bring all good news for the staff receiving training. These training outcomes have become broader and less tangible than the discrete competencies of the students initial trade education. Student discomfort causes these trade professionals to scrutinise the credibility of the academics, and the university, and demands non-trade teachers to prove their relevance in an industry where work can be life threatening.

This paper explores one academic's challenge to find credibility in the fire fighting industry by endeavouring to understand staff values surrounding credibility. It also suggests key approaches to partnerships to improve credibility for universities working in industry settings.

This paper discusses how, within this field based application, the university educator worked to establish credibility in this industry context. It aims to explore the issues that surround credibility as it affects the educational partnerships between fire services and universities, to broaden understandings about the relationship between university credibility and industry, and finally to draw conclusions about what academics can do to enhance their credibility in the emergency services.

Introduction

The nature of work is changing rapidly. Members of the New South Wales Fire Brigades (NSWFB) are not immune to changes affecting the community that they seek to serve. University-Industry partnerships are at the forefront of meeting the demands of these changes. Emergency services across the country are undergoing the professionalisation of their workplace via the introduction of educational programs in conjunction with Universities and other providers. Many senior management in these emergency services organisations see partnerships as providing broader work skills as opposed to discrete vocational competencies in addition to providing career pathways never before available to their staff by the merging of their staff training and professional degrees (Chambers 2003 pp.13 ln. 17–24).

But this is not all positive, there is concern within the NSWFB management that the 'smartening' of the workforce at inappropriate levels will make fire fighting unattractive. University involvement in emergency service education is questioned on this basis. In the midst of this tension of changing ideas about work and education it cannot be overlooked that the core business of emergency services is potentially a life-threatening activity (Moore 1996). This has a sobering effect on the adult educators involved and the issue of credibility is never far from the surface of any discussion. This paper seeks to understand more of the importance of the issue of credibility for academics working in education in the fire fighting services in Australia.

It is important to note that for this paper the focus has been on academic credibility within industry partnerships and specifically within an industry where the actions and knowledge of the individual relate to life-threatening situations and life-saving undertakings. Within this discussion on credibility the situational reference of the academic undertaking all teaching onsite at the NSWFB training facility is important. For students this is seen as the 'university coming to them' and not they joining the university. This has had an impact on the perceptions on who needs to provide credibility. This does not negate the inherent credibility of the university or its teaching staff nor the importance of industry trained students establishing their credibility as

lifelong learners. The interaction between industry and universities is an evolving area in constant change and the study of industry based student credibility as life long learners within this specific situation is a topic to be addressed in future research.

Methodology

This paper discusses aspects of one educator's challenge to 'fit-in' to the industry partners' workplaces in an effort to improve the 'uptake' of the University's involvement in the Station Officer's Promotional Program (SOPP). The journey reported here is drawn from field notes, and archival material created by the writer over an 18-month period, 2001–2003 and is based within qualitative action research undertaken throughout the development of this training program. The underpinning methodology for the research within the area of credibility, and writing of this paper, was based on a "narrative explanation" framework (Richardson 1994). The narrative explained is the insider's (writer's) own perspective on their process of learning.

Participant observer field notes (Merriam 1998) were created. These field notes initially tracked tasks and impressions relating to the work being done by the partnership and also noted important examples relating to the culture of the Brigades. Archival materials, such as course documents, teaching and assessment documents, and student and stakeholder feedback reports developed by the writer were useful in documenting changes in approaches to the delivery of the SOPP.

The data were analysed in terms of a conceptual framework developed around broad theories on credibility and then compared with attitudes and beliefs on credibility shared between fire fighters and adult educators as demonstrated within actions, formal and informal discussions, training feedback documentation, and focus groups (as seen in Table 2). These concepts and attitudes were grounded in ongoing participant feedback and triangulation between data gathered and observed application in the field. Categorisation of field notes was established (Tables 2 and 3) followed by a brief analysis of the students' responses to the actions taken by the eductor and the effects on credibility that were noticed.

This report is concluded by a summary of the research and an analysis of the issue of credibility as it relates to educational programs and perceived impacts on partnerships.

Participants

Within this research several participants and stakeholders were identified. These fell into two main categories:

• NSWFB staff and management, and
• University teachers and representatives.

The primary NSWFB participants were the students – fire fighting professionals seeking promotion, and the promotions teaching team. These students were predominately fit, active men (an industry

NSWFB Station Officers in training appreciate practical approaches to leadership training.

NSWFB Senior FireFighter Spiteri and Phill Chambers share training ideas in the classroom.

phenomenon). Although a highly physical industry, fire fighting is also one where quick, highly complex decisions need to be made under pressure. Due to the life threatening aspect of the work there is also a high level of mutual support and camaraderie within the student cohorts even when students are from geographically disperse centres. As these students are undertaking the course for career advancement there is very high levels of involvement and a willingness to not only do well but to excel. Students are always punctual, in immaculate uniforms and any out of hours work is completed on time and to a high level.

The NSWFB Training Team are themselves qualified and experienced fire fighters with many years in the brigade. Almost all of this staff have undertaken tertiary studies either in education areas or in workplace training and assessment. As such these staff are often able to 'bridge the gap' between the industry and academic understandings and perceptions.

The university teaching staff, academics and program management, involved in this program bring not only their studied knowledge of adult education, curricula development and management skills to the program but also many years of industry (non fire fighting) experience. The objectives of their involvement in this partnership are to assist in the development of academically recognised programs which will articulate into current and upcoming university degree programs benefiting both the University and the emergency services industry.

The issue of credibility

What exactly is credibility? If someone is worthy of belief are they deemed to be credible? Credibility is situated socially and is contextual. What is perceived as credible to one group or society may not be credible to another (Schechner, 1993). What a culture values can be seen as the keys to credibility within that group. Two obvious keys are 'technical' credibility (Collins 1991) and 'experiential' credibility (Boud & Solomon 2000). Universities are expert in credentialing technical learning. Value is placed on the degrees that universities award. However with the strong vocational thrust being placed on education recently (Ball 1999), university graduates are often critiqued in the workplace as having head knowledge but not job skill knowledge. Where university credibility lies in industry is still to be grappled with.

The context: The Station Officers Promotional Program

The NSWFB currently promotes its Leading Fire Fighters to the rank of Station Officer (SO) after the completion of an eight-week off-the-job training course. Entry into the Station Officers Promotional Program (SOPP) is via an entry examination with numbers determined by NSWFB Human Resources. The SOPP accepts approximately 20 candidates per course and so far three separate courses have been completed. The SOPP is an innovation in education for the NSWFB (Childs 2002, pp.107) in that it incorporates a partnership approach to "reshaping mindsets" of modern leadership (Cacioppe 1998) in what Voci and Young (2001) call a "blended learning" approach. The SOPP aims to prepare students for the role of SO by teaching across the three knowledge domains (Chambers 2003) of *Operational Skills*, *Station Administration and Management*, and *Personal Effectiveness*. The latter is the broader learning context.

Credibility in the context of the NSW Fire Brigades

Fire Services personnel are, by nature of the job, practical and value hands-on skills (Alexander 2003). From discussions with individual fire fighters it was noted they also value lived experiences. But what do they value in regard to education and promotion? Jopson (1994) describes fire-fighter values like camaraderie, the positive outcomes for workers of a discontented union (pp.165), and equality, etc., but stops short of articulating explicit values. She points to a long history of workers who were separated ideologically from their management. They were seen as "a cut above" the men and that the "class distinction between the officers and the fire fighters who served under them was very strong and…it stayed that way" (ibid, p.235). There is a clear sense of 'us' and 'them' between the rank and file trades fire fighters and the officers. Promotional

programs, then, can be seen as a focus for industrial disagreements between the union and management. The issue of credibility will never be far from the surface. But what do fire fighters really think credibility is?

Focus group on credibility in the NSW Fire Brigades: constructing a framework

Focus groups, conducted by a research developer in the NSWFB and RCLAST, were used as a work-group debrief on the topic of credibility. The groups were of mixed rank and provided insights into NSWFB cultural values on credibility. Through these discussions a consolidated list of five qualities that made up credibility was developed and outlined in Table 1.

Table 1. Fire Fighter's Guide to Credibility (Chambers 2003b)

Item Number	Quality effecting credibility
Quality 1	Being good at what you do
Quality 2	Doing what you say you will do
Quality 3	Explaining what you are trying to do and why
Quality 4	If you can't achieve your goal – be honest about why and what stops you getting there
Quality 5	A sound operational background

While this was a narrow focus group the broad experience gave a substantial starting point in the search for credibility in the NSWFB. These insights became a more solid frame of reference in this research. It represents an effort to develop a framework for analysing credibility by looking at values that can be jointly understood by professional adult educators and the fire fighting industry partners.

Adult education in the workplace

What do adult educators value? Adult education is activist (Freire 1973) and aims to preference the student(s) above other considerations (Boud & Solomon, 2000). In the workplace, adult education recognizes the experiences of students and offers them value for those experiences towards university degrees (Wagner et al 2001). The adult educator is seen as adaptive, and well equipped to teach and draw out of students the desire to learn by the use of thoughtful and interactive teaching methodologies (Foley 2000).

Comparison of adult education principles to focus group findings

A comparison of these defined fire fighters qualities of credibility (Table 1) with principles of adult education led to a frame for interrogating the data pertaining to

credibility. Table 2 compares the fire fighters' guide to credibility with widely agreed adult education principles.

Table 2. Comparison of fire fighter's guide to credibility with adult education principles

Fire fighters' guide to credibility	Adult education principles
Being good at what you do	Professionalism (Foley, G. 2000)
Doing what you say you will do	Maintaining standards/ Social Pedagogy (Wagner et al 2001)
Explaining what you are trying to do and why	Demystification (P. Freire 1973)
If you can't achieve your goal – be honest about why and what stops you getting there	Reflection & Action (J. Dewey 1916)
A sound operational background	Applied approach (A. Makarenko 1951)

It was perceived that this alignment would make the interrogating the field notes a very focused exercise. The clarity of the framework meant that entries that were ambiguous or unimportant previously might take on new levels of significance in the light of the comparison between a fire fighter's view of credibility and the similar principles of adult education.

Table 3 shows events cited from the field notes had an impact on the credibility of the SOPP and the credibility of university involvement. These entries follow the three distinct phases of developing an off-the-job educational course. These phases are:

- planning the program;
- delivering the program teaching and assessing; and
- reviewing the program.

Phase 1 field note entries relating to the categories *applied approach*, and *demystification* and *maintaining standards*, were common. *Professionalism* was also noted an undertone.

Phase 2 entries relating to the categories *professionalism*, *reflection* and *action*, *applied approach*, *demystification* and *maintaining standards*, were all represented.

Phase 3 entries relating to the categories *reflection* and *action*, *applied approach* and *professionalism* were common.

Table 3. Categorising from the field notes

Category	Type of event and/or entry in field notes	Brief description	Examples of relevant field note entries
Professionalism	Being good/relevant at what you do in every facet of your work.	• Quality presentation increased • standing as a quality teacher/lecturer • Even on topics the class may have disagreed with, a good presentation helped • Understanding students needs (learning needs etc.) for engagement on various topics	• Good feedback reports from students • Agreeing to disagree with students rather than bearing down on their opinions • Facilitating appropriate relevant humour • Applying RPL where possible
Applied approach	Having an applied practical approach to the material being taught or presented to the class	• Getting involved in practical training • Getting involved in socialisation (acculturation) • Being non-judgmental about the creation of knowledge	• Going into the Hot Fire Cell • Shell Refinery training • History, existing partnership • "Being there" early – being around
Demystification	Communicating not obfuscating	• Using 'plain English' in the classroom. • Applying professional humility	• Admitting limitations, mistakes and errors • Not having to be the total course expert
Reflection & Action	Thinking about processes and taking appropriate actions	• Learning from mistakes • Adaptation (refining) of resources • Ensuring feedback data becomes useful information	• Changing learning materials to be more appropriate • Saying sorry quickly for errors, mistakes, course problems etc
Maintaining standards (Social Pedagogy)	Preferencing students and the integrity of the course processes	• Applying VET rules of evidence etc to in house subjects • 'Walk the talk' – do what you teach	• Dealing with HOT issues: "What's in house – stays in house." • Ensuring study/research time

Table 4. Responses to actions and effects on credibility

Category	Example Actions	Response: Students/ stakeholders	Effect on Credibility
Professionalism	Class teaching technique	Skills were taken as expected but teaching style appreciated	Positive
Applied approach	Getting involved in practical training and socialising	Was unexpected	Very positive
Demystification	Explaining approaches and theory in plain English	Was unexpected and appreciated	Positive
Positive Reflection & Action	Listening to concerns and making adjustments	Was unexpected and appreciated	Positive but ambiguous – sign of weakness?
Maintaining standards	Practicing the 'people skills' facilitated in class	Was taken as expected	Positive

Phase 1 – Planning the program

Phase 1 was with industry colleagues. There was no contact with students due to industrial conditions and a pre-entry exam process that selected students on the basis of a ranking system finalised two weeks prior to the first program commenced. It was discussed and agreed that the delivery and assessment by the University would be in non-operational subjects such as leadership, management, team development, training and education processes. In addition, some subjects could be co-taught. The co-delivery subjects were along administrational and station management lines where content was considered dry and uninteresting. These would have been industry taught subjects but suggestions of certain interactive delivery methodologies caught the attention of industry partners so a co-teaching approach was adopted.

Phase 2 – Delivering the program teaching and assessing

Entries show the eductor was, at times, in an uncomfortable environment personally and professionally. Some class content was deemed less applicable which added to the pressure the educator to be credible. Other entries showed an easing of the pressure due to the 'people' side of the categories. Those sorts of things moved into the adult educator's comfort zone where students' ideas in the class are facilitated to develop (Foley, 2000. p.49).

Phase 3 – Reviewing the program

The reviewing phase was primarily with colleagues but also with limited contact with students. A more explicit assessment schedule was created for the subsequent classes. This tightening flagged some major improvements for the candidates. Among other things it indicated more rigorous class assessment policies which preference student needs for information about the assessment outcomes above previous models.

Students' and stakeholders' responses to actions and perceived effects on credibility

Table 4 relates categories and actions to the responses by students and the effect that those actions and responses had on the perceived level of credibility.

It can be seen that the application of those categories caused a positive effect on the teacher's and University's credibility – the variance being the category, *reflection* and *action*, where the response was positive but ambiguous. It is often the case that when a university challenges the perception of the academy held by students it can cause them to be "uncertain" and "challenging" to their mindsets (Houlbrook, in Wagner et al 2001).

Summary analysis

One can summarise that if the university educator makes an intentional effort to work within the five categories identified in Table 2, then they can expect a generally more positive response to the perception of their credibility while working within the fire fighting industry. Another significant finding was the two keys of credibility noted in the earlier discussion also found resonance in this study. The writer experienced 'respect' when operating as a 'professional', but also 'inclusion' in the group when operating in an 'applied approach'. Ironically however, with 'inclusion' came testing that could have had a detrimental effect on credibility. These need to be negotiated and the teacher–student relationship maintained to reduce ambiguity and risk of damage.

Conclusion

It continues to be the case that emergency services education will be under pressure to meet the demands of a changing workplace with the resultant industry-university partnerships and a professionalisation of emergency services training. The need for frontline management staff to be broadly equipped in complex skills such as various forms of leaderships will continue to grow. In reality these partnerships may not be welcomed into working cultures that may perceive themselves to be 'under threat' by the outside world. Those perceived as being part of this 'outside world' will have to work hard to establish their credibility. This paper provided some initial insights into one academic's endeavours to establish and maintain credibility as a non-fire fighting 'outsider' but integral part of the NSWFB education team.

New questions have emerged from this research. If university-industry partnerships of any kind are to succeed how will they grapple with the issues surrounding credibility? How do educators respond to industry demands on their credibility that not only force them out of their comfort zone, but also out of their ethical zone? What impact will a potential loss of credibility have on the ability of universities to stay competitive in the education market? How does the training site (i.e. onsite at the place of business) affect the need to establish academic credibility and how does this compare with the educational institutions' demand for adult students to establish their credibility as life long learners? These questions are worthy starting points for future research.

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Phillip was a part of the original planning team for the New South Wales Fire Brigades', Station Officers Promotional Program (SOPP). The SOPP is now run by the NSWFB and assisted by ESL&D in an industry partnership, promoting Leading Fire Fighters to Station Officer through a blended, off-the-job professional development program. Phillip is currently working on his thesis on "Professional development programs – from the learners' perspective"

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R

Using video during training to enhance learning of emergency incident command and control skills

McLennan, Pavlou, Klein and Omodei use video technology to enhance learning by participants during incident command and control training

Abstract

In this paper we consider issues associated with training in emergency management incident command and control skills. Critical aspects of training activities are noted and the importance of feedback which promotes reflective self-appraisal is noted. Use of video, particularly head-mounted video-cued recall, in training exercises is discussed.

Introduction

How can emergency services personnel be assisted to become more effective incident controllers? In this paper we describe an approach to training which we believe can contribute to the learning of incident command and control skills.

Few would dispute that exercising effective command and control on the emergency incident ground involves complex psychological skills associated with judgement and decision-making. It is only relatively recently that issues to do with the nature and acquisition of the complex skills involved in judgment and decision-making have been addressed by researchers. Anders Ericsson (Ericsson & Charness, 1994; Ericsson & Lehmann, 1996) argues that acquiring any high-level, complex skill is almost entirely a matter of intensive, reflective practise of the skill over a lengthy period of time. If Ericsson is correct, then this implies that incident command and control skills cannot simply be taught in a didactic manner, they can only be acquired via some active process of engagement with command and control tasks. We propose that in order to be effective, training in incident command and control skills must involve four elements:

1. Providing a simple, robust conceptual model of incident control processes.
2. Opportunities to actively practice incident control in a setting which adequately simulates the psychological demands on an incident controller.

3. Providing feedback about the effectiveness of command and control decisions, communications, and actions.
4. Facilitating reflection and self-appraisal.

In relation to the first point, we believe that there is scope for advances. The few models proposed seem to suffer from one or more of several shortcomings that include:

(a) absence of a theoretical foundation;
(b) lack of empirical support:
(c) excessive complexity; or
(d) lack of specificity.

Gary Klein's Recognition-Primed Decision (RPD) model (Klein, 1989) is probably the most influential conceptual account of incident control decision-making. However, it is limited in scope to 'typical' situations and, as such, fails to address decision processes involved in unusual and complex incidents (McLennan, Omodei, Holgate, & Wearing, in press). Concerning the second point, we believe that too much attention has been devoted in the past to fruitless attempts to replicate physical aspects of the incident ground (eg, water, smoke, appliances) with insufficient explicit attention to the psychological demands which typically confront incident controllers: ambiguity, uncertainty, poor quality information, changing and conflicting demands and priorities, limited resources, information overload, and unexpected developments. In relation to point three, our observations in Australia and overseas lead us to conclude that far too frequently feedback to participants following an incident command and control exercise is seriously deficient. There is not enough time made available, the feedback is haphazard and unsystematic, insufficient care is taken to ensure that participants understand the feedback, and participants are overloaded with input and are unable to retain important 'take home' messages. Finally, the mere provision of feedback does not necessarily lead to acquisition of knowledge. Unless a participant is psychologically open to, receptive of, and reflective

Miniature video camera in fibreglass shroud mounted on a MFB safety helmet.

about the feedback messages, existing beliefs will probably remain unchanged. Practice does not necessarily make perfect, it may simply make permanent.

In the remainder of this paper we describe a relatively simple and inexpensive video replay procedure aimed at enhancing the effectiveness of learning from incident control simulation exercises. The procedure was developed for use in the Melbourne Metropolitan Fire and Emergency Services Board (MFESB) Senior Station Officer Promotion Course Number 31, conducted under the supervision of Philip Klein.

The starting point for our thinking was the commonplace observation that candidates for promotion from Station Officer to Senior Station Officer bring with them a diverse range of prior informal learning, and consequent beliefs, about incident command and control acquired more or less haphazardly through their previous fire brigade experiences. In the training environment they will, of necessity, bring their existing beliefs to bear on any incident control problem presented. Feedback which conflicts with these beliefs is likely to be resisted and rejected, privately if not publicly. We reasoned that if initial incident command and control training simulations emphasised and facilitated a stance of reflection and self-questioning, then this would probably lead to more ready consideration and acceptance of corrective feedback. Our previous experience of replaying video

footage captured by a miniature camera in an incident controller's safety helmet suggest that use of such footage may assist in this process (McLennan, Omodei, Rich, & Wearing, 1997).

When an individual watches a conventional video replay of him or herself engaged in a task taken from an external perspective, the result is frequently self-consciousness, evaluation anxiety, and defensiveness leading to biased selectivity in what is recalled. However, when the same individual watches a replay of video footage taken from his or her own visual perspective (using a head-mounted camera) while a task was undertaken there is minimal self consciousness, there is a high level of psychological re-immersion in the original task activity, and the individual is usually able to recall in great detail the underlying mental events that generated the task activities. Head-mounted video footage to cue recall of decision and judgment processes has been used in training settings (McLennan, Omodei, Rich, & Wearing, 1997) and also in post-incident operational debriefing (McLennan, Omodei, & Wearing, 2001; Omodei, Wearing, & McLennan, 1997).

Based on this previous experience a procedure was developed for the incident control training component of the promotion course which would incorporate, first, the use of head-mounted video footage and, subsequently, conventional video footage to provide feedback to participants.

Methodology

Participants: There were 12 (male) candidates for promotion from Station Officer to Senior Station Officer. They had between 10 and 20 years of experience in the MFESB, and between four and 12 years experience as Station Officers.

Equipment: A Sony DXC-LS1P CCD colour "lipstick camera" was mounted in a protective fibreglass shell fitted over a standard Bullard Firedome safety helmet. The camera was connected via a cable to the camera control unit and a 12-volt power cell, both secured in a small "bumbag". A microphone was located under the rim of the helmet and both video and audio were recorded by means of a Sony CCD-TR1E video Hi8 Handycam also carried in the bumbag.

Procedure: Prior to each candidate being assessed on his incident command skills by means of a practical examination, candidates spent five days undertaking a range of role playing simulation exercises in which each took the role of incident controller (IC). During each exercise the candidate in the IC role listened to the initial radio turnout message, heard the wordback message from the first-on-scene appliance, and assumed control of the incident.

In each exercise, scripted role players provided reports and carried out the IC's instructions. After the incident had developed for about 15–20 minutes an instructor assumed the role of a senior officer who had arrived on scene to take charge and the candidate was required to brief the (notional) superior officer on the situation. This handover briefing concluded the exercise.

During the first three days of the training period, the candidate who was the IC for an exercise wore the helmet-mounted camera system. Each participant wore the helmet camera between two and four times over the three days. Immediately following an exercise there was a brief post-incident discussion involving the IC, instructors, and other participants during which the most salient events of the exercise were noted. The IC then moved to a small room nearby for a video-cued recall debriefing and sat in front of a TV monitor. The IC and debriefer each wore a small tiepin microphone. Both microphones were connected to a video-audio mixing unit. An 8-mm video player/recorder to replay the helmet camera footage also fed into the mixing unit. Outputs from the 8-mm video unit and both tiepin microphones were copied onto half-inch videotape on a VHS recorder.

Prior to a video-cued replay debriefing, each IC was instructed: "*We are going to watch a replay of footage of the exercise taken from the helmet camera. As you watch, I want you to take yourself back to being in the role of the IC. I want you to recall as much as you can of what was going on in your mind when you were managing the incident. I want you to speak these recollections out loud – just begin talking and I will pause the tape so you have plenty of time to recall as much as you can. Your recollections will be recorded onto a VHS copy of the original footage of the incident as you saw it and all the radio and voice communications, plus your recollections of the things that were going on in your mind that "drove" your actions, decisions, and communications. You can then replay this tape with your instructors and fellow candidates to get their feedback and suggestions.*"

The 8-mm (helmet cam) tape was rewound to the beginning of the exercise and the image paused. The IC was then instructed: "*Now, as you watch this picture of the start of the exercise take yourself back – what do you recall thinking just as the exercise was about to begin?*" This began the recall process. When the IC finished verbalising his initial recollections, the tape was started and the cued recall session continued. The debriefer encouraged the IC to recall as much as possible, occasionally using non-directive probes, and when necessary reminding an IC to recall rather than to engage in self criticism.

At the end of the replay, the IC was asked: "*Now that you have watched the incident run through, if you could magically turn the clock back and do it again, what, if anything, might you do differently and why?*" The IC's response to this was also recorded. At the end of the recall session, the candidate was handed a copy of the VHS tape copy of the original helmetcam footage incorporating his cued recollections. This tape was replayed subsequently by the candidate so that instructors and fellow candidates could discuss his management of the exercise and provide detailed feedback. Each candidate experienced between two and four video cued recall sessions.

For the final two days of the simulation exercise program, the helmet-mounted camera was not used. Instead, the candidates were videoed using a conventional hand-held camera. Immediately at the end of each exercise, instructors and other participants in the exercise provided detailed feedback to the candidate. These feedback sessions were also video-recorded. A copy of the (external) video footage of the exercise and feedback was then given to the candidate to replay as often as desired.

At the conclusion of the five-day simulation training program each candidate completed and returned (anonymously) an evaluation questionnaire concerning the usefulness of both the helmetcam video-cued recall debriefing and the external video footage.

Results

The helmet-mounted video footage of each IC's field of view (plus voice and radio communications) during each simulated incident proved a powerful cue for candidates to recall in considerable detail the bases of their incident control decision-making. Candidates also identified uncertainties, self-questioning, and self-doubt during the course of an exercise. Instructors commented that the experience of undertaking a video-cued recall session appeared to be associated with candidates being more willing to consider critical feedback suggestions about improvement. The instructors also commented that the video-cued recall sessions seemed to assist candidates to be more analytical and less defensive in reviewing their performances as captured by external video.

The combination of the helmet-mounted video-cued recall to explore the psychological bases of their decisions followed by the conventional external video footage capturing their command, control, and communication behaviours was evaluated very positively by the candidates as contributing significantly to enhancing their incident control skills. Their responses to the evaluation questionnaire were uniformly positive (detailed results are available from the first author). Nine of the 12 candidates wrote comments on their evaluation questionnaires. Seven comments were positive statements about the benefits of the recall sessions and being able to watch replays of the video footage. Two candidates made positive comments but said that the field of view for the helmetcam needed to be wider to catch all the action. This is simple to address by changing the camera lens.

Several candidates (those above average height) commented verbally that the safety helmet was somewhat of a distraction. The mobile control unit used for the exercises has a very low ceiling and taller candidates bumped the helmet on the roof. It is not usual for safety helmets to be worn inside the mobile control unit. In future, for incident command and control exercises, instead of the camera being mounted inside a safety helmet it could be fitted to a lightweight mounting so as to be less bulky overall. Such a lightweight camera mounting is currently being used for research in training hospital operating theatre personnel.

Discussion

Of course, the nature of the trial does not permit a conclusion that the combination of head-mounted (internal perspective) video and hand-held (external) video footage is superior to other approaches to incident command training. In order to determine this, a randomised experiment would have to be carried out and there are obvious difficulties in doing this as part of a promotion course. Nonetheless, candidates and instructors had taken part previously in incident control simulation exercises with conventional (non-video) post-exercise feedback and they reported very favourably on the use of both the video procedures. They also offered spontaneous comment about the advantages of having video footage of their feedback to review subsequently, rather than having to rely totally on their memory of the feedback content.

There are costs associated with using the procedure described for incident command and control training. The cost of the camera system is likely to be of the order

A simulation exercise in progress: a BA team is about to search a smoke-logged building.

of $2,000. Some minimal technical expertise will be required to fit the camera and an associated microphone to a suitable head or helmet mounting. If one is not already available, a small video-recording unit must be purchased. A backpack or bumbag, TV monitor, 8-mm and half-inch video player/recorders, tiepin microphones, a mixing unit, and RCA cables are also required. Two personnel are required in order for head-mounted video cued recall debriefings to be conducted as part of a training course: one to manage the camera system and one to conduct the cued recall debriefings – the debriefer needs some preliminary instruction in the debriefing procedure, especially in maintaining a non-evaluative stance in order to facilitate candidates' recollections (a Manual is available from Jim McLennan). Apart from these considerations, cued recall debriefings take time – about three times the duration of the original exercise. This time has to be built-into the training program, either at the expense of other activities or by extending the length of the course.

Notwithstanding the above, we recommend consideration of the approach to incident command and control training officers who are progressing to levels where they could (at least initially) be incident controllers at serious emergency situations. As Murray (1994, p. 21) noted in the UK context: "After Junior Officer training there is little to guide the officer who progresses through the ranks and gains increased responsibility on the fireground." While advances in computer-generated simulations, such as *VectorCommand* and computer-video supported simulations such as *MINERVA* and *HYDRA*, will continue, such systems have their own drawbacks – notably relatively high purchase, start-up, development, and ongoing updating costs; and uncertain psychological fidelity. The video-based approaches we have described represent a relatively "low tech" extension of conventional role-playing simulation for incident command training with significant enhancement of the feedback component of such training.

[Postscript: All 12 candidates were passed as eligible for promotion as Senior Station Officer]

The opinions expressed in this paper are those of the authors and do not necessarily represent the views of the Melbourne Metropolitan Fire and Emergency Services Board.

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The need for private dam safety assurance policy – demonstrative case studies 10 years later

Pisaniello and McKay research and examine private dam safety and suggest methods to address areas of concern

Abstract

Farmers in Australia have often overlooked the common law obligation to review/design dams in line with current standards because of high engineering consulting costs. This leaves them vulnerable to litigation if their dam fails and the downstream community susceptible to unacceptable risk levels. The seriousness of this problem was demonstrated by a case study undertaken 10 years ago in the dam safety policy-absent State of South Australia. The paper presented here follows up previous research by testing whether giving more time, awareness and encouragement to farmers addresses the problem to any extent. This has been tested in the "still" policy-absent State of South Australia and the "now" policy-driven State of Victoria. In each of the two States, 10 hazardous private reservoirs have been investigated for spillway adequacy in line with state-of-the-art practice. The investigation follows the release of an innovative Australian developed cost-effective spillway design/review procedure which was available and promoted in both States to minimise cost burdens to dam owners and encourage better dam safety management. The case studies clearly demonstrate that farmers require more than awareness and encouragement in order to ensure they properly look after their dams.

Introduction

In Australia, as in most countries, owner obligation exists under common law to take reasonable care of dams according to current prevailing standards. Hence, owners should review their dams, and take appropriate action where necessary, to minimise the risk of failure and avoid liability for possible consequences of failure (McKay & Pisaniello, 1995).

Unfortunately, no dam can be made 100 per cent safe as there is an incomplete understanding of the

uncertainties associated with natural and human factors, materials behaviour and construction processes. Therefore, there is a risk of failure at every dam. The adverse consequences at some dams are such that risks need to be checked and, if necessary, reduced to modern acceptable standards. Also, owners must ensure uncertainties are balanced against competent technical judgement.

However, farmers in Australia often overlook the common law obligation to review/design dams in line with current standards because of high engineering consulting costs. This leaves them vulnerable to litigation if their dam fails and the downstream community susceptible to unacceptable risk levels. This problem was demonstrated 10 years ago in South Australia, as reported in Pisaniello and McKay (1998a). The research reported here follows up and extends the previous research by (1) testing in South Australia, whether giving more time, awareness and encouragement to farmers has addressed the problem to any extent, and (2) comparing the situation to Victoria which recently became a dam safety policy-driven State.

How dam safety is now managed in Australia

Most government dam-owning agencies have assumed the responsibility of evaluating public dams in terms of risk in accordance with current guidelines, and subsequently have either undertaken or are in the process of implementing appropriate action to reduce the risks to modern acceptable standards (Pisaniello and McKay, 1998b, p.263).

Unfortunately, there is a policy vacuum in Australia on private dam safety policy, except partially in NSW (*Dams Safety Act, 1978*), Victoria (*Water Act, 1989*) and Queensland (*Water Act, 2000*), but even their policies are not pervasive (for example they only address the problems associated with hazardous dams, usually the larger, more significant on-stream dams, without giving due consideration to the problems associated with the multitude of smaller off-stream catchment dams nor the supervision over the management of these structures). In Queensland, a dam will generally only be "referable"

(that is, made subject to the dam safety provisions of the *Water Act 2000*) if it is more than eight metres in height *and* 250 ML in storage capacity and, following a 'failure impact assessment', it is found to have a downstream population at risk (PAR) of two or more people (see Part 6 of the *Water Act 2000*). Dams smaller than this can also be failure impact assessed, but only if it is reasonably believed by the Chief Executive (CE) responsible for the *Water Act 2000* that the dam's PAR is two or greater [per s 483(2) and (3)]. If the assessment proves correct, then the dam may be declared referable. In effect, smaller, yet hazardous dams which pose a downstream threat to only one "apparent" person and/or to significant downstream property, government infrastructure or the environment may go unsupervised in Queensland. Based on Pisaniello and McKay (1998b), this 'referable' criterion in Queensland appears too lenient and discretional compared to world standards. Overseas practices have blanket-regulated dams as small as 1.8 metres (Michigan) and with a minimum storage capacity of only 25 ML (UK) following experience with a number of disastrous small dam failures.

Another concern is that since most private dams are relatively small in size, they seemingly represent a "low" hazard to their immediate downstream inundation area, hence, the community accepts them designed to the lowest of standards. Unfortunately, when these dams are considered cumulatively in a large catchment of, say, a large, highly hazardous public reservoir, then they each represent quite a significant incremental flood hazard as their cumulative failure can significantly increase the risk of failure (via the "domino effect") of the public reservoir downstream. The effect of additional flooding in the connecting river systems can also be severe. This was demonstrated in a recent flood study of the Kangaroo Creek Dam in the Torrens catchment of South Australia (Lange Dames Campbell (SA) Pty. Ltd. & Snowy Mountains Engineering Corporation, 1995).

Webster & Wark (1987) report that owners of private dams are wary of any controls which are likely to add significantly to their costs. Consequently, private owners, in general, are either ignoring, underestimating or simply remain unaware of the risks and hazards associated with their dams and are frequently guilty of not maintaining the structures. Too often owners look only at the benefits gained from their dams and not the hazards the dams could generate. As a consequence, potential hazards to neighbouring residents and properties exist, placing people and community infrastructure at unnecessary risk. This was demonstrated by Pisaniello and McKay (1998a), and the case studies reported in this paper further demonstrate the potential seriousness of this problem.

Victoria is the only Australian State to acknowledge and attempt to address the problem of generally low/significant hazard, off-stream farm dams. It has addressed farm dam safety by firstly recognising it to be a problem (together with the recent issue of equitable water allocation and capacity sharing), and then "partnering" with the farming and downstream community to execute a law reform process. A Farm Dams Irrigation Review Committee established in early 2000, released a discussion paper *Sustainable Water Resources Management and Farm Dams* seeking submissions from the community. The paper addressed capacity sharing issues for off-stream dams and recommended that potentially hazardous dams be regulated. From the responses received, over 70 per cent were in favour of regulating potentially hazardous dams (Victoria State Government, 2001). As a result Victoria recently incorporated dam safety provisions to its *Water Act 1989*. In particular, section 67 now applies to significant "off stream" dams and requires owners to obtain a licence to operate their dams. Under section 71, licence conditions include dam safety requirements (for example, standards of construction, surveillance, operation and maintenance). Rural Water Authorities set up around the State have been assigned the responsibility of administering the Act and the licensing requirements (Department of Natural Resources and Environment (DNRE) Victoria, 2002).

A further significant step in Victoria has been the publication of the booklet *Your Dam, Your Responsibility – A guide to managing the safety of farm dams* (DNRE Victoria, 2002). This targets the smaller yet hazardous dams usually ignored in most jurisdictions and informs dam owners of their responsibilities and potential liabilities. The publication also advises the multitudes of non-hazardous dam owners that, even if a dam does not require an operating licence, it is in the farmer's best interest to ensure the dam is safe and well maintained otherwise the life of the asset could be severely diminished. The publication details, in simple language, and illustrates the necessary processes to keep any farm dam in a good safe condition. It provides a template dam safety emergency plan that is simple to understand and comply with.

However, even in Victoria (as well as the other States) there is still a need for a mechanism to minimise review costs to private owners and, in turn, encourage better dam safety management. Such a mechanism has been developed in the form of a regionalised cost-effective spillway design/review procedure.

Overall, States that fail to establish some form of safety assurance policy on the management of potentially hazardous private dams are, in effect, unconsciously devaluing the lives of people living downstream of these dams compared with the lives of those living downstream of public dams to which attention has or is being given.

Encouraging better private dam safety management via a cost-effective spillway design/ review procedure

Dam owners should review the spillway flood capabilities of their dams and upgrade if necessary, to avoid liability for possible failure consequences (McKay & Pisaniello, 1995). To encourage dam owners to do this, a simple and cost-effective flood capability design/review procedure has been developed. This procedure was first developed by Pisaniello (1997) and is now applicable in south eastern Australia. The procedure (illustrated in Figure 1) is in line with current best practice, thereby promoting consistency and uniform standards. Full details of the procedure

are available in Pisaniello et al (1999), Pisaniello et al (2000) and Pisaniello and McKay (2003).

The procedure involves using regionalised relationships based on simple hydrological/hydraulic variables for predicting reservoir flood capability (illustrated in Figure 1 for South Australia). The procedure is;

- applicable to reservoirs on small rural-type catchments (up to around 20 km^2);
- is compatible with any design flood standards, and
- is based on easily derived variables only (example spillway width and height, reservoir area, catchment area), deeming it quick to use yet accurate in its output.

Figure 1. Reservoir Flood Capability Design/Review Mechanism incorporating ANCOLD (1986 and 2000a) Criteria: South Australia (after Pisaniello et al. 1999).
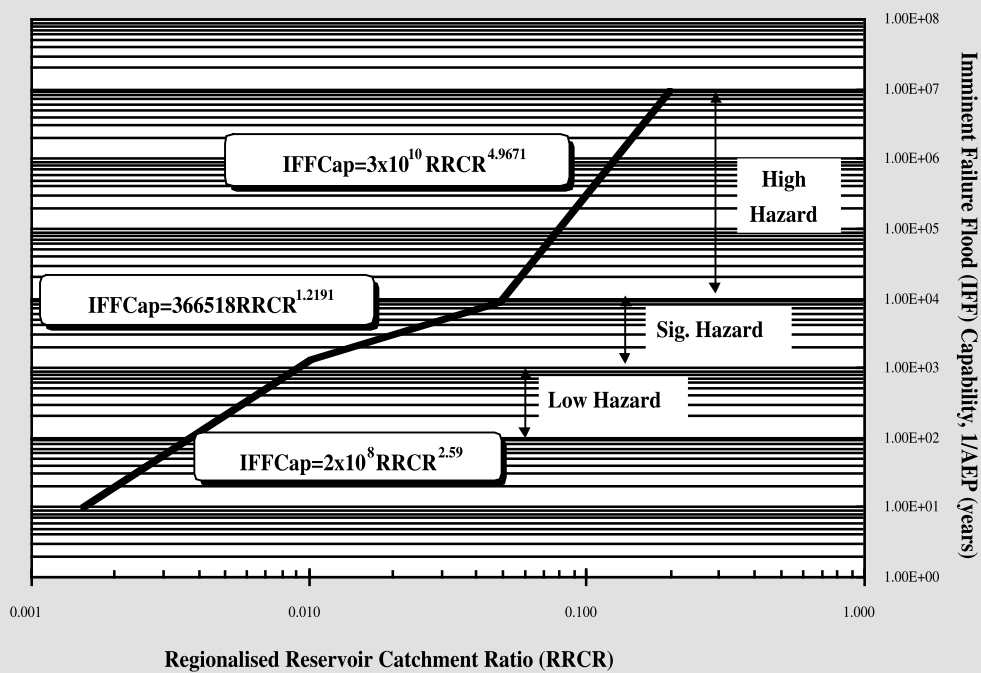
$$RRCR = \frac{SC}{97.805 \cdot CA^{0.7747}} \cdot \sqrt{\frac{\sqrt{RA \cdot SH}}{1000 \cdot CA} \cdot \frac{\log\left\{\frac{97.805 \cdot CA^{0.7747}}{5.2404 \cdot CA^{0.7453}}\right\}}{\log\left\{\frac{5.2404 \cdot CA^{0.7453}}{4.0985 \cdot CA^{0.7799}}\right\}}}$$

where:

SC = spillway overflow capacity (m3/s)

CA = catchment area (km2)

RA = reservoir area when Full (km2)

SH = max. spillway overflow height (m)

ANCOLD (1986) criteria on Recommended Design Floods (RDF) for dams, which for the most-part coincide with ANCOLD (2000a) 'fallback' acceptable flood capacity criteria (see Table 1), have been incorporated into Figure 1 to establish the principal design/review tool. The Hazard Category in Table 1 is determined using ANCOLD (2000b) which provides a more quantitative assessment of hazard (compared to ANCOLD 1986) based on a matrix of both population at risk (PAR) and severity of damage and loss. These parameters can be determined from the 'dam failure flood affected zone' which is readily estimated using a simplified procedure for smaller dams as outlined by ANCOLD (2000b).

Table 1. ANCOLD (1986) and ANCOLD (2000a) "Fallback" Recommended Design Flood Exceedance Probability Standards

Incremental Flood Hazard Category*	Annual Exceedance Probability
High	PMF to 1 in 10,000
Significant	1 in 10,000 to 1 in 1000
Low	1 in 1000 to 1 in 100

* Determined using ANCOLD (2000b) *Dam Failure Consequence Assessment Guidelines*

Acceptable flood capacity determined from Table 1 can be compared to the actual Imminent Failure Flood (IFF) capability of an existing dam (obtained from Figure 1) to determine whether its spillway is adequate. If the spillway is not adequate, the process can then be applied in reverse (that is, "design mode") to determine an appropriate size spillway. Pisaniello et al (2000) demonstrates the simple application of the procedure with a simple worked example. It should be noted that ANCOLD (2000a) now refers to IFF as the Dam Crest Flood (DCF).

The main benefit of the procedure is its simplicity, which dramatically reduces the great effort and resources that are normally required for conducting a state-of-the-art reservoir flood capability evaluation and/or design. For example, the consultant fee for undertaking such an evaluation and/or design for an embankment dam on a relatively small catchment is normally around AU$10,000. The procedure has the potential for reducing this fee to around AU$200. This fee is nominal when compared to the actual dam construction cost of around $1000 per ML (Boehm, 2002). This is important as it:

- encourages all private dam owners to provide for flood capability review of their dams on their own initiative which is important in States where dam safety assurance policy is either absent or of low level (for example, South Australia and Western Australia);

- provides many owners of small, low hazard dams with an affordable means of preserving their asset against the high incidence of flood failure. The risk of failure of public reservoirs due to cumulative failure of small dams is also reduced;

- encourages the "proper" flood design of all new private dams which in the case of most farm dams, is otherwise left to construction contractors who lack the expertise to provide satisfactory service in this area; and

- addresses the concern for government that an adequate private dam safety assurance policy may place unacceptably high cost burdens on rural communities.

The availability and benefits of the mechanism have been widely promoted over the last three years throughout South Australia and Victoria using promotional brochures and mailouts, and the relevant government agencies have been informed.

Spillway adequacy case studies in South Australia and Victoria

In South Australia, concern over the need for private dam safety assurance policy has been expressed by many over the past 20 years. For example, Pisaniello and McKay (1998a) makes reference to a Flood Warning Consultative Committee report of 1990. More recently, a flood study of the Kangaroo Creek Dam, in the Torrens catchment of South Australia (LDC & SMEC, 1995), found that the peak inflow to Kangaroo Creek would increase fourfold if all the small dams in the catchment failed at the same time (reasonable assumption for an extreme flood event), compared to the flow estimated if the dams remained intact. In such an event, the design flood of Kangaroo Creek Dam would be exceeded. The study thus recognised the need for "controlling the standard of construction of farm dams and their spillways."

A poorly designed spillway as it undercuts and weakens the dam wall: the potential exists for the wall to collapse at any time, particularly during a significant overflow event.

In contrast, Victoria is the only State to acknowledge and address the problem of generally low/significant hazard off-stream farm dams. As a result of the recent law reforms, the amended *Water Act (1989)* sees the dam owner responsible and liable for damage caused by their dams. Under the *Water Act (1989)*, all dams require a licence to 'take and use' water and, at the same time, potentially hazardous dams require an operating licence that contains conditions relating to surveillance and dam safety. Administration of these laws has been in progress for the last two years.

Case studies procedure

As part of case studies for an ARC Discovery Project investigating private dam safety management practices in South Australia and Victoria, the modern flood capabilities were determined of a sample of 10 hazardous private reservoirs in each State. A brief outline of the procedure is as follows:

- The 10 dams in each State were selected on the basis that they be 'referable' in size and rated as either 'significant' or 'high hazard' in accordance with ANCOLD (1986 and 2000a) guidelines. In South Australia, the 10 dams included five of the same dams investigated 10 years ago (Pisaniello and McKay, 1998a) in order to test whether time eventually sees farmers take necessary action, given they were previously informed of the deficiencies and the need for remedial action.

- Each of the dam sites were visited and spillway/embankment sizes were measured using appropriate survey equipment. Catchment and reservoir areas were determined from 1:10,000 and 1:25,000 scale topographic maps and aerial photos.

- The sample dams were all embankment-type structures and had typical spillways that were free flowing and weir-type in nature. The maximum wall heights of the dams ranged from 5m to 11m; their storage capacities ranged from 50 ML to 250 ML; and the size of their catchments ranged from 0.5 km^2 to 6 km^2.

- The spillway design/review procedure, already described, was used to determine the Dam Crest Flood (DCF) capability of each dam, being the flood which, when routed through the reservoir results in a peak storage level equal to the lowest elevation on the non-overflow crest (as recommended by ANCOLD (1986 and 2000a) for embankment dams).

- The DCF capability of each dam was determined for both an upper bound and lower bound 'start' storage level case:
  — Upper bound case – initial storage level assumed 100 per cent full.
  — Lower bound case – initial storage level assumed 33 per cent full.

The lower bound case was checked to eliminate uncertainty. The case study results are illustrated in Tables 2 and 3.

Case studies results and analysis

The results of the case studies were analysed by comparing them against ANCOLD criteria (illustrated in Tables 2 and 3) for South Australia and Victoria respectively.

ANCOLD (1986 and 2000a) guidelines recommend that unless normal operating conditions indicate otherwise, a 100 per cent full 'start' storage level should be assumed when assessing spillway flood capability of embankment dams. The comparisons in Tables 2 and 3 demonstrate that regardless of the 'start' storage level assumed, many hazardous private reservoirs with inadequate spillway capacities do exist in both South Australia and Victoria. The risk of failure from overtopping is consistently unacceptable for 90 per cent of the total sample in both States. In particular, the flood capabilities of 50 per cent of the dams in South Australia and of 80 per cent of dams in Victoria do not even satisfy the required criteria for low hazard dams.

For the five dams investigated 10 years ago in South Australia, Table 2 demonstrates that not much has changed in a positive way. Only two of the five dams have slightly improved (possibly due to the spillways becoming slightly larger as a result of being cleaned out by the owner or from erosion), but the improvement is far from being enough to satisfy the ANCOLD guidelines. For the other three dams, the situation has deteriorated. This comes about either from the spillway mouth "silting up", the dam owner allowing large debris to pile up and block the spillway, or the dam owner reducing the spillway depth in order to gain extra storage capacity (such a practice was noted often by Pisaniello, 1997).

These disturbing results reinforce the fact that owners are not taking action in terms of analysis and upgrading of their structures, and that the need for some form of private dam safety assurance policy in South Australia is urgent. One of the problems is that the typical probabilities required for design floods are beyond the average farmer's comprehension, and so some form of regulation is needed to reduce the risk to downstream communities to generally acceptable levels. Pisaniello (1998b) can provide government with the necessary policy guidance in this area. For Victoria, the results demonstrate that while their recent policy and law reform is a step in the right direction, efficient and effective administration of the policy is just as important.

Conclusion

There is a clear need in States where hazardous private dams exist to ensure that owners review and maintain their dams in line with current acceptable practice and take appropriate remedial action where necessary. This was demonstrated 10 years ago and has been re-affirmed. Giving more time, awareness and encouragement to farmers addresses the problem

Table 2. Comparison of flood capability results for South Australia with ANCOLD Guidelines and results for five of the dam reviews from 10 years ago

Dam No.	Minimum Hazard Rating (High/Sig.)	IFF if 100% FULL 1/AEP (years)	IFF if 33% FULL 1/AEP (years)	ANCOLD Guidelines IFF Range 1/AEP (years)	Acceptable under ANCOLD Guidelines? (Yes/No)	100% FULL IFF Results for 5 dams as reviewed 10 years ago (years)	Any improvement for the 5 dams of 10 years ago? (Yes/No)
1	High	110	1050	PMF–10,000	No	320	No, become worse
2	High	280	1700	PMF–10,000	No	80	Slight, but far from meeting ANCOLD guidelines
3	Sig.	90	2600	10,000–1000	No	1400	No, become much worse
4	High	310	1992	PMF–10,000	No	150	Slight, but far from meeting ANCOLD guidelines
5	High	210	1500	PMF–10,000	No	2750	No, become much worse
6	High	20	860	PMF–10,000	No	n/a	n/a
7	Sig.	90	2000	10,000–1000	No	n/a	n/a
8	Sig.	5,500	50,000	10,000–1000	Yes	n/a	n/a
9	Sig.	25	790	10,000–1000	No	n/a	n/a
10	Sig.	20	585	10,000–1000	No	n/a	n/a

Table 3. Comparison of flood capability results with ANCOLD Guidelines: Victoria

Dam No.	Minimum Hazard Rating (High/Sig.)	IFF if 100% FULL 1/AEP (years)	IFF if 33% FULL 1/AEP (years)	ANCOLD Guidelines IFF Range 1/AEP (years)	Acceptable under ANCOLD Guidelines? (Yes/No)
1	Sig.	10	100	10,000–1000	No
2	Sig.	20	250	10,000–1000	No
3	Sig.	10	150	10,000–1000	No
4	Sig.	20	290	10,000–1000	No
5	High	20	330	PMF–10,000	No
6	Sig.	2,247	7,644	10,000–1000	Yes
7	Sig.	10	130	10,000–1000	No
8	High	10	150	PMF–10,000	No
9	Sig.	25	400	10,000–1000	No
10	Sig.	420	1600	10,000–1000	No

An under-designed spillway; its size is clearly too small for this 100 ML impoundment. The spillway is also badly maintained as the owner allows physical obstructions, including a walkway bridge and sandbags, to be present across the spillway restricting its potential capacity.

to a minimal extent. Adequate assurance can only be provided through the implementation of appropriate policy which requires the backing of law-makers. The results of the case studies reported here should encourage such backing in South Australia and other policy-absent jurisdictions. The policy and laws implemented in Victoria serve as a good example for others to follow. However, effective and efficient administration of laws is also vital as evidenced by the Victorian case study.

Acknowledgements

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Urban floodplain land-use – acceptable risk?

Allison Godber uses results from her research of potentially flood-affected areas of the Carrara-Merrimac Floodplain (Guragunbah) and the Nerang River catchment to assess "acceptable risk"

Abstract

There has been little research to examine how the flood standards adopted as 'acceptable risks' by decision makers such as local government (and communicated via a technical language) are interpreted by other stakeholders, and whether the formal standards can be accurately labelled 'acceptable risks'. This paper presents a study, based on a Queensland local government area – the Gold Coast City Council (GCCC), examining the flood risks perceived 'acceptable' by the stakeholders. These stakeholders include local government, the residents and the development industry within a potentially flood-affected urban area of Guragunbah and the surrounding suburbs within the Nerang River catchment.

Introduction

In Australia, the development of hazard-specific legislation, policy and guidelines aim to minimise community exposure to the adverse effects of natural hazards. This occurs under policies of ecologically sustainable development land-use planning processes, which must also now involve the assessment of hazard-risk. However the development occurring in potentially hazardous environments, for example urban floodplains susceptible to flooding, continues to occur as a result of contemporary land-use planning and risk management processes. Why is this an outcome of past and present risk management and land-use planning processes?

For land-use planning purposes local governments select levels of flood risk or exposure they consider to be 'acceptable' for the community and land-use, hereafter referred to as acceptable risk. One example is the 1-in-100-year design flood for residential land that represents a minimum level of flood-risk exposure for residents. However, local governments are not the only stakeholders to make decisions regarding acceptable flood risk. The development industry and residents of the floodplain also decide on a level of flood risk they consider acceptable. How well are the consequences of formal levels of acceptable risk understood by these stakeholders and are they really 'acceptable'?

Background

Unlike other Australian States, such as New South Wales, floodplain management in Queensland has traditionally been a local government responsibility. Under current management arrangements, local governments make significant decisions regarding the levels of flood risk other stakeholder groups, such as residents, are exposed to. A State Planning Policy (SPP) specifically related to land-use within hazardous areas such as on floodplains and flood affected land (*Mitigating the Adverse Effects of Flood, Bushfire and Landslide*) came into effect on 1 September 2003. The SPP proposes local government adopt the 1-in-100-year or 1 per cent flood as the defined flood event, representing the minimum level of flood risk and associated consequences residents of a site should be exposed to as shown by Queensland Department of Emergency Services (2003).

Case study region: Guragunbah and the Nerang River catchment

The area surrounding the Guragunbah urban floodplain, located within the lower catchment of the Nerang River system on the Gold Coast, provides the case study of this research (map 1). The case study area has experienced minor flooding on many occasions during the last 20 years, with moderate to major flooding occurring on three occasions (1912, 1956 and 1974). Population growth during the 1960s and 70s saw the area converted into a variety of land-uses including residential, tourist and commercial development. With the last moderate to major flood occurring in the early 1970s, the majority of development and population growth within the case study area occurred during

Looking northeast across the floodplain during flooding in 1974 (Photo courtesy of O. Harvey).

Map 1. Gurragunbah urban floodplain

Base map reproduced with the permission of the QLD Department of Natural Resources and Mines; adapted from GCCC (2003).

relatively minor and flood-free periods. The GCCC and former Albert Shire Council carried out a thorough examination of the Nerang River catchment in the early 1990s, resulting in the *Guragunbah (Carrara-Merrimac Floodplain) Structure Plan* (GCCC, 1998) and the designation of the floodplain as a special development area.

The identification of the floodplain as a special development area, as represented in Gold Coast City Council (2003), has allowed land-use regulations to be applied to other flood-affected areas on the Gold Coast. The management and associated land-use planning regulations established for flood-affected areas suggest the local government has acknowledged the flood hazard situation faced by the city and adopted levels of acceptable flood risk for the community based on their own technical assessments and balancing of the flood hazard and urban land-use. The proactive approach to flood risk adopted by the GCCC provides an opportunity to study an area, acknowledged as hazardous, and examine what flood risks are considered acceptable by the stakeholders (local government, the development industry and residents). This then provides an opportunity to examine how accurately the standards and associated consequences adopted by local government reflect the stakeholders' perceptions of acceptable flood risk.

The study

Based on Council planning documents (meeting minutes and technical reports) and interviews with stakeholders,

a descriptive model was established to illustrate how the case study Local Government is making decisions regarding acceptable flood risks within a potentially flood-affected area (Guragunbah and the Nerang River catchment). From the resulting model, it was possible to identify four main stakeholder groups that make decisions regarding a level of acceptable flood risk:

- **Local government –** represented by hydraulic engineers, town planners, statutory planners and local area representatives;
- **Risk managers –** represented by members of the Disaster District Control Group, Local Government Counter Disaster Committee and Flood Strategies Section of the GCCC;
- **Development industry –** represented by major corporate landholders and developers; and
- **Floodplain residents –** represented by households within the residential and commercial developments on the floodplain.

Representatives from each stakeholder group were consulted regarding their perceptions of flood risk; acceptable flood risk; and the consequences associated with the formal standards adopted by local government.

Methodology

The research findings outlined are based on data collected during 2002 from a sample of 130 randomly selected residential households within the floodplain and 16 representatives from local government and development industry stakeholder groups. The data were collected via structured interviews with representatives from local government and the development industry, and a structured written questionnaire to randomly selected residents in order to specifically measure acceptable flood risk. Three levels of flood risk (minor, moderate and major) were identified for the area, based on the Bureau of Meteorology risk categories (Bureau of Meteorology. 2000), information from the local government, and reports by the local media. The minor, moderate and major flood events were then matched to their corresponding probabilities of occurrence (example minor or 1-in-10-year flood, moderate or 1-in-50-year flood and major 1-in-100-year flood), which allowed the potential consequences associated with the formal standards to be identified.

To examine how the residents who are potentially exposed to flooding interpret formal standards and their associated impacts and consequences, flood risk was presented to each respondent within the floodplain resident stakeholder group in three ways:

1. by standard numerical terms such as 1-in-100-year flood and per cent Annual Exceedence Probability (AEP) – the likelihood that an event of particularly magnitude has of occurring each year) as presented in policy;

2. by scenarios using simple language to describe potential impacts of minor, moderate and major flooding. The severity of the flood was not disclosed

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to respondents to allow the evaluation of probabilities at a later stage; and

3. by photographs corresponding to minor, moderate and major flood events in the area. The locations of the photos were identified, but the dates and flood severity were not identified to allow the evaluation of probabilities at a later stage.

The survey questions and the interviews were based around four themes:

• the flood risks that stakeholders perceive to exist;

• the flooding that stakeholders consider to be acceptable;

• how the formal standards of acceptable risk are currently interpreted; and

• stakeholder perceptions of how other stakeholders perceive flood risk.

Results

The majority of stakeholders acknowledged the potential for flooding on the Gold Coast and within the Nerang River catchment but there were variations in:

• the degree of personal risk or exposure perceived by the stakeholders;

• the flood risks considered acceptable by other stakeholders;

• the way in which land-use standards and flood risk information are interpreted; and

• how the stakeholders perceive each other's perceptions of acceptable risk and responsibilities for flood risk education and mitigation.

The local government

Local government representatives acknowledged the urban flood risk situation on the Gold Coast and recognised the potential for moderate to major flooding within the Nerang River catchment. The risks from flooding, approached from a quantitative perspective, were considered management issues or site-constraints that could be assessed and, to a degree, mitigated. While land-use regulations and development standards can ameliorate the level of immunity land has from specific levels of flooding, the local government acknowledged the risk can never be entirely removed. The 1-in-100-year flood was adopted as the 'design flood event' for the city and the formal standards of acceptable risk for specific land-use such as residential and commercial, were established through a quantitative process modelling local flood behaviour, examined land-use function and the ability of the land-user to evacuate. Local government planners and decision-makers communicate information regarding flood risk and land-use in technical or engineering terms generally accepted within the hydrological engineering and floodplain management sectors. A 'whole-of-community' approach to flooding is adopted by local government, where stakeholders are encouraged to assess their own levels of flood exposure, access available education

material and undertake mitigation. This approach becomes questionable if there are variations in the way flood risk is communicated by the stakeholders and residents do not believe they are at risk from flooding in the first place.

The development industry

The majority of development industry representatives acknowledged the urban flood risk situation on the Gold Coast and recognised the potential for moderate to major flooding within the Nerang River catchment. Flood risk was approached from a quantitative perspective and as a site constraint that is assessable and can (to a degree) be mitigated. Despite this acknowledgment, some representatives did not consider their development sites to be potentially exposed to flooding, particularly if they considered their land to be elevated above levels specified by the land-use standards. When establishing levels of acceptable flood risk, the development industry representatives follow a process similar to local government and model the potential impacts that specific flood events may have on their sites. Acceptable flood risks were measured and communicated in quantitative terms (the 1-in-100-year flood for residential land). However there was some disagreement surrounding the interpretation of the 1-in-100-year event and whether developing above the flood level associated with this flood can eliminate risk. The development industry representatives considered flooding to be a 'whole-of-community' issue, although some of the interviewees suggested it was not their role to educate residents about flood risk. At the other end of the spectrum it was suggested that if developers had knowledge of the flood history and potential of their site, they had a duty to disclose such information to residents.

Figure 1. Impact from flooding residents would be prepared to accept at their location
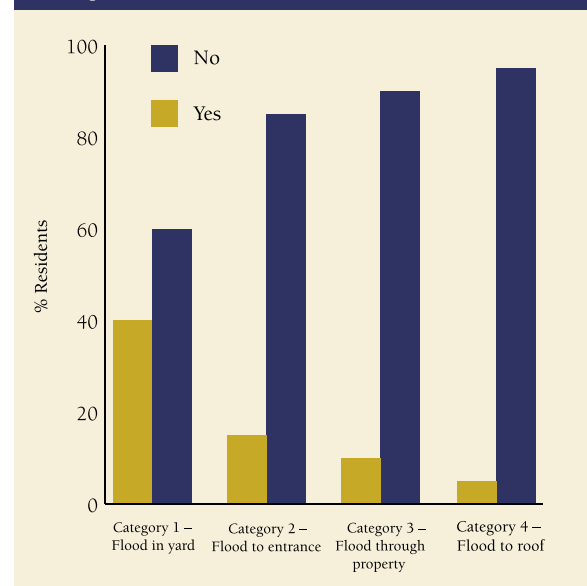
Looking northeast across the floodplain in 2002 – development today (Photo courtesy of O. Harvey).

Residents of the floodplain

The majority of residents did acknowledge the potential for flooding on the Gold Coast although they did not consider themselves to be personally 'at risk' and had minimal local flood experience. The residents were generally unaware the area they lived in was a floodplain and did not consider the land-use standards adopted by local government to be acceptable. The impacts from flooding associated with the minor, moderate and major events were presented to the residents graphically in the form of scenarios and photographs. The residents were asked if they would be prepared to accept the potential flood impacts to their properties (see figure 1).

It was possible to equate the residents' responses to the actual flood event probabilities depicted by the photos and scenarios. The residents had difficulty interpreting the technical land-use standards, and were unsure of the impacts and consequences statements such as '1-in-100-year flood' or '1 per cent AEP' represented. The residents were more likely to consider flooding as an acceptable risk when presented this way, as the majority believed a 1-in-100-year flood occurred only once during a one hundred year period. When pictures and scenarios were used to represent the flooding associated with the formal standards, the same risks (example the 1-in-100-year flood) became unacceptable. The majority of residents were unable to recall any land-use planning strategies developed to counter flood risk on the Gold Coast. Local government was perceived as answerable for flooding on the Gold Coast and few residents considered it their responsibility to assess their exposure to flooding, access information or undertake flood mitigation.

Emerging questions for local government

The results of this study suggest stakeholders external to local government (such as residents and a proportion of development industry representatives) do not necessarily understand the consequences of flooding represented by the formal standards and may misinterpret their level of exposure. The results also signify variations in the flood risks perceived acceptable by the stakeholders, particularly when the potential consequences associated with events such as the 1-in-100-year flood are described. The residents and a section of the development industry misinterpreted the formal standards, particularly when the information is presented via technical expressions (1-in-100-year flood). When presented with flood risks expressed as statements such as '1-in-100-year flood' the stakeholders were willing to accept flood risk. On the other hand, when the potential consequences and impacts of flooding were graphically presented to the stakeholders, the formal standards (1-in-100) were not acceptable. The formal levels adopted by local government, on behalf of the community, may not actually represent acceptable flood risk. In fact, the extent to which the formal standards are misinterpreted suggests stakeholders may potentially be exposed to risks greater than they perceive acceptable.

The results identified a number of significant issues in the development and management of land-use within the floodplain and potentially flood-affected areas. The next stage of the research involves taking the issues outlined back to local government representatives

(GCCC) for comments from a practical perspective. These include:

- **issues regarding the way flood risks are perceived** – many of the residents and some of the development industry representatives underestimated the flood risks they may be potentially exposed to on this floodplain. The residents and some of the development industry representatives believed locating above the flood heights associated with the formal standards (1-in-100) removes all flood risk;

- **issues regarding acceptable levels of flood risk** – the stakeholders underestimate each other's perceptions of acceptable risk. The 1-in-100-year flood did not represent acceptable risk from the perspective of the residents potentially exposed to flooding. A level that is greater than the 1-in-100-year flood should be adopted as the defined flood event for residential land (for example the 1-in-200-year flood);

- **issues regarding land-use planning and management** – the residents were not aware of land-use planning measures and formal standards of acceptable risk (1-in-100). The residents underestimated the consequences associated with the formal standards (1-in-100); and

- **issues regarding who is responsible for education and mitigation** – the residents believed local government is responsible for informing them about any flood risk and taking the necessary action to eliminate risk. The majority of development industry representatives did not consider it their role to educate residents about flooding and believed local government has responsibility for ensuring mitigation. Local government considered education and flood risk mitigation issues that the entire community is responsible for.

Conclusion

It may be possible for local government to address the issues potentially preventing more effective floodplain management by presenting flood risks graphically (through photos or detailed scenarios that can be directly related to the stakeholder's location) and outlining the consequences associated with formal standards such as the 1-in-100-year event. They could consult with stakeholders regarding acceptable flood risk during the processes to establish formal standards and take flood risk education and mitigation out into the community rather than placing emphasis on the community to access information and mitigate flood risk.

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Sometimes it's a big ask, but sometimes it's a big outcome: community participation in flood mitigation

Alison Cottrell describes community involvement by residents to participate in flood mitigation planning

Abstract

There are often calls for more community or citizen involvement in planning of all types, including hazard mitigation (Brody 2003, Burby 2001, Gregory 2000, Pisaniello 2002, Tarrant 1997/1998). There are statutory requirements for community involvement in risk management planning in a number of countries, including Australia (Burby 2001, Department of Justice Canada 2000, Handmer and Parker 1992, Kennedy 1991, New South Wales Government 2004, Walker 1979, Zamecka and Buchanan 2000). Reasons for supporting community involvement include informing and educating the community about issues, tapping into community knowledge and possible solutions, understanding community preferences for hazard management equity, and achieving practical and effective outcomes (Godschalk et al 2003). However, there has been considerable debate on the efficacy of citizen involvement in hazard mitigation planning (Burby 2001) particularly from the view of planners and agencies actively seeking citizen involvement.

This paper reports on the level of commitment by local residents to overcome the problems of flooding in their area. Over the period from 1987 to 1998, members of the community gathered information to assess the extent of flooding in their area as well as potential technical solutions to the problem. They then lobbied local government to recognise the extent of the issue and find solutions.

This example of citizen-initiated participation in flood mitigation planning is largely from the perspective of the participants. It suggests that more effective outcomes are the result and planners and agencies need to be mindful of the amount of time and energy people will devote to a task they perceive worthwhile. In doing so, the aim is to remind us that encouraging community participation requires responsibility on our part to recognise and respect efforts undertaken by individuals and communities. A number of key issues are identified.

The flood issue

The Lakes Development in Townsville is part of a flood mitigation system using natural drainage flows and associated salt pans combined with modified sites to collect water in basins so rain water does not lie on residential properties. The original works commenced in the 1970s and have been modified at various times since.

The system begins at the suburb of Aitkenvale and there are 11 storage basins. The Lakes Development includes basins 10 and 11 in this system. These 'lakes' feed into the Woolcock Street Canal which flows into Ross Creek and finally, into Cleveland Bay.

Woolcock Street Canal is fed by two holding lakes and flows onto Ross Creek and onto Cleaveland Bay.

Local residents gather to discuss land development planning in their suburbs.

Over the years, the ponding system's effectiveness has been reduced by increased residential, commercial, industrial and transport system development. The Lakes Development was the main focus of the community action reported here.

The Woolcock Street Drainage Canal was originally designed because of flooding prior to 1980. Concerns were raised about the capacity of the Canal, particularly after Woolcock Street, which runs parallel to the Canal, was upgraded to take more traffic and raised in the process. This action prevented rain water effectively draining into the Canal, leading to it being dammed in the lakes that were basins 10 and 11.

From the 1980s developments were proposed to turn basins 10 and 11 into lakes and for high density housing to be established on the shores. This included a shopping centre, caravan park and petrol station. The development of high density housing around these lakes raised the issue of implications for flooding, as well as amenity for existing residents. Residents lobbied the issue for several years. Finally, an investigation of the effectiveness of the system was called by the Townsville City Council (TCC) as a consequence of long-term community action that intensified after a major flooding event of January 1998 in Townsville. Subsequently, $26 million worth of infrastructure development has been undertaken in stages, based on a report (Maunsell & McIntyre 1999) and funded by the TCC, State and Federal governments.

The major actors

There were two main phases of activity. The first phase, in 1987, centred on the development of the holding ponds as lakes with high density residential development. The second phase was in 1998 after heavy rainfall in Townsville resulted in major flooding of areas not previously affected.

Over time, the main adjutants in the residents' action group varied, but at least one person, a long term resident of 50 years and a retired union organiser, remained highly involved throughout the activities. During both phases other professionals, including medical practitioners and a retired academic, played prominent roles in negotiating with councils and agencies. Both men and women were on committees, and it was predominantly the women who were involved in letterboxing and networking with neighbours. These people came with a variety of skills. As well as living locally for lengthy periods of time and having personal experiences of the area and its flooding patterns, they had professional skills that equipped them for dealing with public officials and agency representatives. The union organiser and the academic both had a history of advocacy including experience in campaigns for Aboriginal citizenship and wage rights. Fordham (1999) suggests that elites in agencies often assume lack of skills on the part of community members. This serves to not only overlook potential resources in the community, but to deny people their expertise, perhaps sometimes unwisely.

The activities undertaken

The types of activities undertaken by the residents to understand the flooding issue and lobby local government included:

- letterboxing residents about notices of meetings;
- writing to residents with updates on information and results of meetings with the TCC;
- forming of committees during the two key phases of the activities;

- gaining media attention by inviting them to public meetings and writing to the newspapers;
- meeting with council representatives;
- meeting with other professionals in the city to provide their perspective and gain support for their case;
- writing letters to members of the council, members of State and national Parliaments;
- collecting and keeping records of flood levels, rainfall data, history of development of the area;
- keeping records of meetings;
- inviting council staff and representatives to see the impact of the flooding on their homes; and
- conducting a survey of residents to assess the extent and impact of flooding.

During the first phase the retired union organiser became involved when the TCC proposed the Lakes Development in the mid 1980s. At this time he obtained copies of the plans to turn the holding ponds into lakes and build high density housing. By 1987 the initial burst of resident activity occurred. A series of four-storey apartments was planned along with a possible floating restaurant. Initial reaction was that the apartments would cut off prevailing breezes, there would be an increase in traffic density and that flooding could be an issue. Those who lived on the shoreline of the development were approached personally with between 50 and 80 people attending meetings.

Initially, the TCC refused to amend plans and a public campaign was mounted first with residents in the community and then with community groups, unions and environmental groups. Consequently the TCC was forced into discussions on four occasions, where meetings were attended by council representatives included the Mayor. Press reports at the time confirmed there was a public perception of lack of due process in the calling of tenders. Among the residents were a number of professionals who developed their own re-design of the TCC's tender. The group of citizens lobbied companies that tendered and the community group's proposals were seriously considered by all of the companies. The tender submission time was extended by Council, and the successful tender's proposal was very close to what the community group had wanted. The success of the community pressure at the time was due to the variety of expertise in the community.

The first of the lakes was almost complete when in early December 1987 there were two falls of rain, the first of 20mm and, later in the month, another fall of 30mm. By this stage the lake was full. Clearly the efficacy of the lake to act as a holding pond was not adequate.

Community activity between 1987 and 1997 was sporadic. Rainfall for the area was researched and evidence of flooding was documented, along with erosion of banks, mosquito breeding sites, and retaining wall collapses. Some activity in recording impacts increased after the second lake area was developed in 1992. Land use changes were monitored and objections to minor developments were made, including the development of car parks in the flood mitigation zone. Concerns over the efficacy of the Woolcock Street Canal were formally raised with Council in 1997. During this time, the TCC acknowledged the concerns raised by residents but residents felt little progress was evident.

In January 1998, Townsville experienced a very unusual high rainfall event. Many people in the area near the Lakes development were affected by flooding either for the first time or to an extent they had not previously experienced. After a recovery period, resident action commenced with vigour in November 1998. A series of public meetings was held at a local school with hundreds of local residents attending. Gradually people from a variety of suburbs, not just local areas, attended the meetings.

According to one resident, as they obtained information they shared it. Comments included *"communication is so important. We letterboxed – it was the early morning walkers who were mainly womenfolk because their husbands had to work. We letterboxed every house in the area. We talked to people all the time. We sought the help of experts and it was always freely given."*

Another active community member commented, *"We consciously set out to do a survey. Whenever we saw a person in a front yard we would talk. They had so much to share. Frequently we went back or they came to us. In the survey we set out to establish the actual flood levels in the streets to get the extent of the damage in a broad sweep and to check on their insurance situation and what they thought ought to be done to eliminate the problem."*

The Townsville City Council is implementing the recommendations of the Report as funding permits.

The lighter side of a serious situation; children play in the floodwaters of the Townsville flood.

A printed survey went to 1500 homes in the area. On the basis of the information gained from the survey, the flood committee believed they now had more comprehensive and authoritative information than their local government about the impact of flooding in the area. The Lakes development was identified as the cause of flooding and residents felt that floods were now more frequent with a greater impact since the development.

The survey served as a catalyst. The residents' committee initially felt Council had set out to and compete with the committee for community meetings.

According to one committee member, *"We immediately put out a leaflet which welcomed the council's decision to call a meeting and called on everybody to be there."*

About 400 residents, the Mayor and the principal drainage engineer were part of a very angry meeting. The residents challenged the competence of Council engineering staff to handle the problem on the basis of their own detailed experience. The Mayor promised an independent inquiry, and agreed to set up a consultative committee to involve the residents. This resulted in a report by an independent engineering company (Maunsell and McIntyre, 1999). The report reviewed information from a 1980 study, residents' suggestions, and their own research, to recommend a flood mitigation strategy extending into the next local government area. The value of the total amount of works was $33 million. The strategy was presented as a series of projects to be achieved over a period of time which recognised the funding constraints for the local governments.

Once the *Maunsell McIntyre Report* (as it came to be known) was released, the representatives on Council's flood mitigation consultative committee mobilised residents to collate their submissions for presentation. The committee members were very pleased with the report because, *"instead of there being nothing we could do, there were 14 things that could be done"* as a result of the *Maunsell McIntyre Report*. The TCC agreed in principle to meet the recommendations of the Report, and have honoured that agreement, as funding has permitted.

The residents were stunned to realise how successful their actions had been. However, the retired union organiser claimed: *"But it still rattles on, you have to keep an eye on the Council and make sure that they don't allow developments that interfere with the mitigation program."*

There were five key issues indentified from interviews with members of the residents' flood mitigation committee.

Key issues identified

- The incremental nature of incidents that finally result in a major hazard to a community;
- Characteristics of the organisation in control of planning and mitigation;
- Agency control of community participation;
- The cost to the individuals participating; and
- The benefits of community participation.

Incremental events

The members of the community involved could see that flooding in their area was becoming frequent and extensive over time. However, local government dismissed their claims until the major flooding in 1998 which lead to broader community action. The community action became credible because, over time, residents had accumulated the necessary information. This accumulation was, at times, sporadic but in response to amenity issues related to increasing urban density as well as the flooding issue specifically.

Organisational characteristics

In this case study, there is a perception by community members that the local government body had a poor corporate memory for its planning for flood mitigation. The view was that local council ratifies flood mitigation strategies, but seems to 'forget' why they were planned and allows other activities to supersede established priorities. This is due partly to a lack of corporate consistency. A lack of whole of organisation approach to planning seems to result in various departments being responsible for different activities which sometimes conflict. In this case, the development of Woolcock Street in the 1980s had a direct impact of blocking flood mitigation pathways. The development of the housing for the Lakes Development led to further flooding issues. In other cases, applications for variations to the building code allowed encroachment onto flood mitigation areas.

Convincing government bodies to assimilate broader perspectives requires persistence on the part of community members. As Fordham (1998) indicates, agencies and their representatives tend to be focussed on community participation as a process to obtain acceptance of their own views, reduce conflict and to gain legitimacy. Members of the community are clearly focussed on the outcomes and bring to the discussion issues of risk, ethics and decisions about directions of a project (see also Kasperson, 1986).

Broader context

The active members of the residents' flood mitigation committee recognised that it took the unusual and major flooding event of 1998 to activate enough people to get Council's attention. Additionally, there was the recognition that a council election was due and therefore pressure could be exerted by the community. However, the money needed to fund the mitigation plans was only possible as a consequence of a newly instituted Australian Government initiative for flood mitigation which involve Australian, State and local government funding.

Cost to individuals

The cost to individuals of community participation in these issues is not trivial. In one person's case it was over 20 years of following through on what was happening in his area. For others it was bursts of activities over months at a time, talking with residents, meeting with council representatives and collecting information to mount a substantive case. The time, energy and capacity to bear the confrontations with government officials and representatives should be acknowledged. Despite the success of their campaigning, the anxieties they feel over personal losses from the flooding experience remain with residents.

Agency control of community participation

Despite the fact that residents initiated their involvement and informed themselves rather that waiting to be told about issues, control remained with the local government body and its agencies. Arnstein's (1969) ladder of citizen participation has at the highest level 'citizen control'. However, this control is still in the hands of agencies. It is power that is delegated, with the clear implication that agencies still have the power and the right to intervene should they wish. In the case of the flood mitigation group this right was clearly exercised. The local government and its agencies shifted between an enforced consultation with the residents to placating them, to finally acting on their advice. This supports Fordham's (1998) assertion that a technical elite assumes responsibility for identifying and solving problems in the arena of flooding. This does not deny that these elites may be required to face hostile residents on behalf of their agencies. The participants in this residents' action group freely admit that they made agency representatives uncomfortable, but equally, residents were also made uncomfortable by the way they were treated by agency and government representatives. Agencies and their representatives are clearly uncomfortable with the idea of losing control of the process. However, very little of the literature on community participation actually suggests community control. For example, Dusenbury et al (2002) suggests "the highest level of participation asks citizens to help define the issues and develop alternative proposals to address problems" (see also Court 2001, Gregory 2000).

Benefits of community participation

Participants recognised they personally stood to gain from their action and recognised their contribution to the broader community. They also acknowledged the generosity of others in providing assistance, particularly professionals with expertise relevant to the issue. The contribution of local knowledge by residents is an important component of the community contribution. Their role in convincing government agencies to take a more thorough approach to flood mitigation should be recognised.

Conclusion

While the longer-term benefits to those intensively participating in community action can be perceived as personal reward for their efforts, their contribution to the broader community should not be underestimated. As a consequence of residents' actions, the improvements to flood mitigation in the Townsville region are likely to be significant. The test will come at the next major event. Overall, the potential risk to the community of flooding should be significantly diminished by the results of this community action.

This study supports the notion that extensive and early community consultation is an important component of effective flood mitigation programs and that, according to Fordham (1998:27), "Planning for floods is a complex endeavour even when, as is often the case, the decision-making parameters are restricted to the scientific and technical dimension. However, the reality is more complex than this and even the most technically competent proposals can fail to win the support of the communities at risk if other, social and cultural, dimensions have been excluded or included too late."

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R

Needs of an actual community post disaster – Hornsby Ku-ring-gai

Darryl Dixon considers aspects of recovery preparedness by a local community

Abstract

This paper features the Hornsby Ku-ring-gai area of New South Wales and outlines the potential needs following a serious emergency event. The Hornsby Ku-ring-gai area is a group of suburbs, situated on the North Shore of Sydney, New South Wales. Although it is a well established community that has numerous resources can it adequately restore itself after an event such as a bushfire?

'Its not whether you get knocked down; Its whether you get up'.
– Vince Lombardi (1913–1970)

Introduction

No matter what emergency or incident arises, there will be a recovery period for the community affected. The recovery period may be a short period of time (less than a week) or a long period of time (up to twelve months or more).

Emergency Management Australia defines disaster recovery as the "co-ordinated process of supporting disaster affected communities in the reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well-being" (EMA, 1996 p.xi). The amount of preplanning and resources the community has essentially determines the length and complexity of the recovery phase for return (if possible) to a pre-event lifestyle.

Tourist locations such as Bobbin Head are affected as a result of Bushfires to the area. Concern is also placed on tourists being "locked in" if the two main access roads are closed suddenly due to bushfires.

The Ku-ring-gai area has a vast amount of bushland, some *60%* is National Park or reserve land. One of the most serious hazards for the area is bushfires. As recently as January 2004, a bushfire took hold in the Ku-ring-gai National Park where some 1,400 hectares were burnt and a combined total of 400 Rural Fire Service Officers fought the blaze that affected local residents.

With bushfires a regular occurrence in the area it is appropriate to look at bushfire recovery. The reaction and requirements of the community after the incident occurs are of major concern as understanding and controlling recovery contributes to minimise recovery time. Essentially the community reduces in function for a period of time and that amount of time depends on the availability of resources and co-operation from within the community.

Level of vulnerability

History of bushfires in the area is common due to the proximity of the Ku-ring-gai Chase National Park. Bushfires are generally reported relative to the amount of land it covers. The 1994 bushfires covered 75 per cent of all bushland in the Sydney metropolitan area. The majority of the bushland is situated on hillsides and remote areas that fire fighters cannot easily access in emergency situations.

Heat produced from these fires can also be very intense with temperatures up to 200 degrees Celsius recorded at the front of some fires during the 1994 season. This results in emergency teams having to fight the fire from a distance and not focusing directly on the areas required.

In late July 2000, seven people were killed during a back burning exercise conducted as a fuel reduction initiative. The fire went out of control in a section of the Ku-ring-gai National Park at Mt Ku-ring-gai (Stevenson 2001).

Bushfires are seasonal and the majority occur in the summer and autumn seasons when the bushland surface is fuel loaded with high amounts of dry leaves and vegetation. The likelihood of a fire in Ku-ring-gai is quite high considering back burning has been suspended or reduced for some time in several areas. Previous fires in the Berowra Valley Bushland Reserve in the north west of the area have been linked to arson by teenagers (ABC 2002).

What can be done to change it and who is responsible?

Essentially everyone in the community is responsible for bushfires in their area. However these can be broken down into two distinct areas – legislative and moral responsibility. Through the combined activities of community and organisations the vulnerability of the area to bushfires is considerably reduced.

Legislative responsibilities can be found in various State Acts including *NSW Fire Brigades Act*, *Rural Fire Service Act*, and the *State Emergency Rescue Management Act (SERM)*. Other examples of delegated responsibility are found in emergency management plans such as the *State Displan* and the *Hornsby Ku-ring-gai Displan*.

Bushfires are the responsibility of the NSW Rural Fire Service section 207a of the local Displan that states "dealing with outbreaks of fire and taking measures as may be practicable to prevent outbreak of fires". It also notes section 52 of the *Rural Fires Act* that allows for the formation of the Ku-ring-gai Bush Fire Management Committee.

Photo: Dianne Thompson

While nature recovers post bushfire, there needs to be greater co-ordination for community recovery.

Moral responsibilities include entire communities becoming involved by being fire-smart and implementing preventative measures like fire proofing houses, clearing ground fuels from around the house, planting a combination of fire resistant plants on their property, clearing gutters, and removing flammable items from around the house (eg. door mats, woodpile, and obvious flammable materials such as paper, boxes, crates, hanging baskets, and wooden garden furniture). They can also join the Static Water Supply (SWS) Marking System and prepare firebreaks.

Local councils can also amend various building codes to reduce the construction of residential areas in fire prone regions. The NSW Rural Fire Service (RFS) runs educational services aimed at all members of the community, from school lectures to information brochures on fire protection. Outside of the fire season the RFS conducts hazard reduction operations to minimise fire fuels and dry leaves from parklands close to homes. Through these prevention tactics community vulnerability to bushfires is mitigated significantly and a greater awareness of emergency services roles develops.

What does the local emergency plans state about recovery?

The local Displan has very little on the topic of recovery management following a disaster or incident. It does state however that there is a need for a co-ordinated recovery following a disaster. Specific information contained on the one page dedicated to recovery management states that "the two councils (Hornsby and Ku-ring-gai) oversee the operations and the chairman of the recovery committee is the local emergency management committee (LEMC) chairman". It also identifies six areas of need following a disaster such as a bushfire. These are:

- the tasks and responsibilities of participating organisations;
- co-ordinating arrangements;
- procedures for informing the public and media;
- assessment of resources required;
- emergency relief funding; and
- special requirements like large scale accommodation (*Hornsby Ku-ring-gai Local Displan 1998*).

There appears to be a lack of understanding of the importance of recovery management by the LEMC. However there is a supporting plan called the *Local*

Table1. Lifeline Delegations		
Life Line	**Specific Damage or Action**	**Co-ordinating Authority**
Engineering	Power	Energy Australia
	Gas	Integral Energy
	Communications	Telstra, Optus
	Water, Sewerage, sanitation	Sydney Water
	Transportation issues	RTA, State Rail
Community	Schools	Dept Education
	Hospitals	Health Dept
	Food Supplies	St Vincent De Paul, Salvation Army
	Employment	Centrelink
	Economic development	Chamber of commerce, Centrelink
	Fuel Supplies	Not assigned
	Banking	Centrelink
	Emergency Services	NSW Govt Agencies
	Environmental issues	Environmental Protection Agency
	Administrative support	Hornsby Council
	Small business advice	Chamber Commerce, Hornsby Council, Dept of Fair trading
Individual	Psychological needs	Health Dept, Private practitioners as required
	Support groups	Dept Health, Salvation Army
	Assistance and advice	Centrelink, Dept Health
	Legal , insurance, referral advice	Centrelink,Hornsby council, Dept Health
	Emergency Housing	Salvation Army, Ku Ring Gai council, Dept Housing, Centrelink

Disaster Welfare Plan. This 13-page document outlines the mechanisms to co-ordinate the provisions of welfare services to those effected by disasters and to define the roles and responsibility of the services being provided. Although this document provides adequate information, it appears ambiguous and only lists essentials such as catering, accommodation, clothing, financial and welfare centres. This assists the community following a bushfire, but it only scrapes the surface of the total needs of the community such as engineering lifelines items like transportation, restoration of services (electricity, communications) and community lifelines such as schools, hospitals and commerce. Overall the two

documents could be more effective in relation to recovery management.

Information in the following table has been sourced from agencies and officials to determine exact requirements for all possible scenarios following a severe bushfire in the area. It should be stressed that some of these delegations are not "concrete" in that they are not officially documented or arranged by the LEMC. Therefore an agency could no longer provide a specific service and this not be known until the recovery phase has begun. These services should be defined in the various emergency plans as a matter of priority to ensure the quick restoration of facilities to the community, as longer delays will

greatly affect the status quo of a community.

Table 1 offers a combination of material gained from local and State emergency plans and from previous incidents that have occurred in the Ku-ring-gai area. It serves as a guide to assist recovery planners and community recovery committees to indicate the range and types of services that can be used during recovery processes and the principal sources of those services. Knowing who provides particular resources and how they can be arranged prior to an emergency will allow a quicker recovery time for the affected area. When the recovery committee is established and decides what is required, they can simply look at

Table 2. Damage of severe bushfires		
Consequence	**Measure**	**Effects**
Area Affected	Square Kilometres/Suburbs	250 square kms of bushland. All suburbs in area can be affected.
Deaths/Injuries	Number of people killed, injured and nature of death/injury. Psychological effects	Numerous, depending on area affected. Previous history of nine deaths in Ku Ring Gai. Injuries include breathing difficulties eg asthma, heat stroke, burns to body. Both human and animal life affected.
Disruption of services	Service disrupted, location, time to restore	All of area affected with main roads over crowded/closed, power loss to homes, loss of water pressure. Emergency services in greater demand.
Damage	Type and degree, value	Homes destroyed or severely damaged. Bushland destroyed in both national parks.
Economic	Monetary value lost	Several million dollars worth of homes, property, disruption of businesses. Insurance, people not insured causing hardship.
Social	Psychological effects, morale, housing problems	People out of work, housing destroyed, people killed or injured causes psychological problems. Morale affected if continual bushfires affect area.
Environmental	Severity, scale	Severe damage to all bushland possible. Flora and fauna affected. Several years to restore or eliminated.
Potential Problems	Various areas	Loss of tourism with parkland damage. Main roads congested if not closed. Emergency services requiring assistance. Schools and vulnerable people require relocation.

their information tables and task the appropriate recovery action.

Who is responsible for various recovery needs?

The following matrix is a brief look at the actual damage that can occur following a severe bushfire in the area. In order to determine who is responsible for the various recovery needs, we need to ascertain what damage has actually been done to the community. Without knowing the extent of the damage to the community it is almost impossible to determine the various recovery needs such as the individual community and engineering lifelines that residents rely on in the pre-diaster state.

This is an example of the destruction that can occur in the Ku-ring-gai area following a bushfire. It is interesting to note that the last major bushfire in the area was in 1994 and that significant damage to infrastructure and the majority of the community

was subject to major recovery and priority needs that form the three major "lifeline" categories.

As can be seen from the above table, the Ku-ring-gai area is highly vulnerable after a severe bushfire. Planning for the recovery phase is a high priority. As numerous lifeline services are severed after a bushfire in the area, common sense would dictate a quick and logistical operation to restore pre-disaster conditions, including arrangements to prevent further simular events.

What effect does damage have on community?

We can break the reactions of communities into two areas, those of physical and psychosocial effects. Physical effects are facilities needed by a community to adequately operate on a daily basis and the psychosocial effects deal with the individual. At the onset of a disaster such as a flood, the community may be unable to organise the

removal of facilities and resources to minimise damage. The community therefore will ultimately lose some of their resources that will affect their recovery phase. Some of the physical losses the community may face include essential services, residential and commercial areas, community facilities, entertainment and environmental damage.

There are numerous physical losses that may be incurred from a disaster, however it is rare that a community would lose all of these resources for a long duration. The event may decommission a resource for a period of time; for example a flood may render housing unliveable and land inhospitable for crops until the floodwater subsides.

The longer these services are unavailable, the longer it will take for a community to become self-reliant post incident. People would be required to go without or travel to other communities in order to fulfil their requirements.

Firefighters battle blazes in the Ku-ring-gai bush (Northern suburbs of Sydney) every year.

The essential services likely to be affected include gas, electricity, water, telephone, sewerage, hospitals, and infrastructure including roads and public transport.

No matter what type of incident the community is subjected to, all people will be affected in some way. Being able to predict or understand their reactions at the onset of a disaster will assist with an easier recovery period.

In essence there are around 12 types of responses an individual will go through, ranging from the natural shock, to anger at the event, wanting to lay blame for the incident and denial that the event even happened. Following from these responses are personal psychological effects, such as paranoia, nightmares and Post Traumatic Stress Syndrome. Until recently emergency service workers have been ignored in this area as they have been stereotyped as strong and resourceful as opposed to survivors who might be viewed as helpless and lacking resources (Short 1979).

Repair time

The repair time during the recovery phase varies greatly depending on the severity of the bushfire. To date the area has not been subject to complete devastation. The 1994 bushfires were the most severe in local history, therefore a comparison can be made based on previous recovery times. Homes that were destroyed were rebuilt within 12 months, transportation was in pre-fire conditions within one week, and local businesses were affected for up to three months until the community was financially stable. Essential requirements such as water, sewerage, gas, electricity and communications were restored within four days after technicians were allowed into affected areas. As numerous service depots for many of the lifeline requirements are based in the local area the restoration time was greatly reduced.

Conclusion

Obviously the threat of a bushfire in the Ku-ring-gai area is very high no matter what prevention and recovery measures are in place. Not only are government and voluntary agencies responsible for the provision of recovery management, the community itself has a large portion of the accountability to help themselves to help each other.

Welfare agencies and essential services in the Ku-ring-gai area need to update their local Displans to incorporate adequate recovery measures. The current version being used lacks the thoroughness and detail required to compile the lifeline /responsibility chart.

Overall the disaster plan and the sub-plans are deficient in relation to recovery management. They only scrape the surface of the specific needs of the community such as the lifeline items like transportation and restoration of services. Recovery allows an early restoration of lifelines. Without them the community cannot restore itself to pre disaster operational status. Consideration of recovery arrangements is a priority and requires commitments from the local government and local agencies whose charters and governing laws define their core business of serving the community.

Acknowledgements

The Sydney – Newcastle Freeway (F3) is often closed due to severe smoke and bushland fires surrounding the road during peak seasons. As this is the only main roadway linking Sydney to Newcastle, extensive delays occur.

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Survivor Tokelau?

by Joanne Laurence, A/Assistant Director International Engagement, EMA

In February this year, the tiny island if Tokelau experienced a devastating cyclone. Joanne Laurence led a United Nations Disaster Assessment and Coordination team to assess damage. She provides an insight into the experience.

Can you picture a place more vulnerable than three tiny specks in the ocean, no more than two meters above sea level and in places less than 90 meters wide? This is the tiny country of Tokelau. Administered by New Zealand but moving toward increased levels of self government, it has a unique, warm and vibrant culture, considered to be the most traditional Polynesian community in the Pacific.

Unfortunately it is also in the cyclone belt and on 26 February 2005, the island was struck hard by *Tropical Cyclone Percy*, causing widespread damage and cutting off communications to some islands for more than a week.

In response to a request from Tokelau's Government I led a United Nations Disaster Assessment and Coordination (UNDAC) team to complete an independent assessment of the cyclone damage. Working together with Samoan Red Cross representatives, a marine ecosystem specialist from the South Pacific Regional Environment Program, and a remarkable group of dedicated individuals from the Government and community of Tokelau, we spent a week on Tokelau's three atolls.

Our first challenge was to get there, as Tokelau is one of the most remote communities in the world. After flying to Samoa, our team camped out on a cargo barge, which

was the only form of transport to the islands. Following a difficult 36 hours on a flat-bottomed boat in open ocean (in the wake of a cyclone), we gratefully reached the first atoll and were conducted on foot around the inhabited islands and to particularly devastated areas.

No cars, no TV, no guns, no hot water, 36C and 90 per cent humidity by 7am, inhabited by dengue-fever bearing mosquitos and biting ants. One of our guides soon dubbed our trip as "Survivor Tokelau".

It soon became clear that the cyclone had caused extensive damage. Though there was some impact to homes, public buildings were the worst hit. Hospitals and

Extensive damage occurred to plants and seawalls around the islands.

Beach erosion exposed house foundations and moved water tanks on Nukunonu.

schools already getting by with minimal equipment had lost much of what they had, and in many places the remainder was water damaged and likely to corrode or rot. Food and other supplies in warehouses were washed out to sea and much of the staple food crops were destroyed and will take years to recover. With the addition of damage to the marine environment, food source security has been considerably undermined.

Village Councils, an important level of government, showed great concern at the vulnerability of their communities in the discussions we conducted as we travelled around. Their concern over the loss of the sea walls around much of the coast is heightened as it was these very walls they credit with having saved them and their property from being swept away.

The people of Tokelau are remarkably self-motivated and much is already being done to address these concerns. A lot of hard work has gone into to marshalling their own resources and several donors are assisting them to promote the recovery process. The damage assessment report compiled by the UNDAC team has been taken up by several agencies and under the direction of the Tokelauan administration is being used to guide the reconstruction process.

NOTES FROM THE FIELD
Exercise Orchid Alert CBR Crime Scene

by Don Patterson, Assistant Director Special Capabilities, EMA

Queensland recently conducted an Investigation and Consequence Management Exercise (ICMEX) *Ex Orchid Alert* that included a Chemical Biological and Radiological (CBR) forensics segment to practice operational procedures in response to a CBR contaminated crime scene. The exercise occurred at the Army's Land Warfare Centre at Canungra Qld, and involved the use of four disused married quarters to portray a series of scenarios. There were over 70 participants in the exercise, involving persons from Queensland Police Forensics, Victoria Police Forensics, NSW Police Forensics, Queensland Fire and Rescue Service, Queensland Chemical Unit, and Queensland Ambulance.

Scenario

The activity was based on an incident that initially involved reports of strange smells coming from the disused buildings. This was investigated by Queensland Fire and Rescue Service (QFRS) who identified a number of dead 'persons' inside and outside four buildings. They had identified a chemical laboratory where 'terrorists' were attempting to make Sarin, Nerve Agent. In making the Sarin, the terrorists had used Phosgene as Sarin precursors. An accidental release of materials had killed the chemist and the other terrorists located in adjacent buildings.

The QFRS crew withdrew upon discovery of the bomb-making facility in one of the buildings.

This was subsequently rendered safe by the Police Bomb unit.

Queensland Police Forensics, with assistance from New South Wales and Victoria Police Forensics personnel, responded to investigate the crime scene.

All forensics team members were initially briefed on the situation at a briefing area adjacent to the crime scene, with the forensics entry team being given a more detailed brief at a command site prior to dressing and entering the buildings. Radio communication was maintained between the team leader and the command site and team members were equipped with still and video cameras.

Forensics personnel receive initial briefing.

Four-person crime scene team in Level A protection.

Imagery of crime scene is downloaded and available for subsequent briefings of relief crime scene teams.
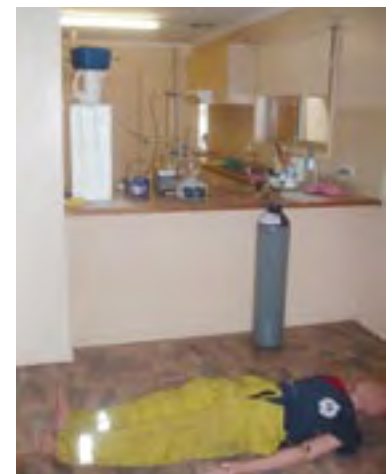
Terrorist Sarin lab and 'dead' terrorist.

Participants operated as four-person crime scene teams and initially operated in Level A personal protective ensembles (PPE) provided by QFRS. This was subsequently revised to Level B slash suits once initial reconnaissance was conducted and hazard levels identified.

Team members remained in the scene for about 20–25 minutes (limit of air supply) then exited and were decontaminated. Team members were then debriefed and visual coverage of the crime scene was downloaded and used in subsequent briefings.

Key observations were:

- CBR crime scene investigations, when conducted over extended periods, will be resource intensive in personal protective equipment;
- teams must have clear objectives as their working time is limited to their air supply;
- CBR crime scene investigation procedures for sampling triage require further refinement and should be agreed nationally; and
- procedures for the handling and recording of contaminated evidence are additional challenges including the need to maintain a chain of custody.

Exercise Orchid Alert provided an opportunity to practice a number of operational CBR forensics procedures and allowed participation of forensics teams from three States. The lessons learned will help improve preparedness to respond to CBR incidents.

In Profile: *Bruce Esplin*

Emergency Management is everybody's business

This quarter, Victoria's Emergency Services Commissioner, and Chair of the 2003 Victorian Bushfire Inquiry, Bruce Esplin, gives a satellite view of the major challenges facing the emergency management sector.

With an impressive career spanning nearly twenty years in the sector, Bruce Esplin is no stranger to all levels of emergency services provision and management in Australia.

Where we came from

He believes that emergency management in this country gestated as a reactive, natural-disaster-focused discipline provided by, more or less, para-military type groups. The initial model could be described as characterised by a paternalistic and authoritarian approach – emergency service organisations working for the community, not working with the community.

Esplin maintains this model left us a legacy of community expectation that emergency management is 'a given' with little contribution from the community.

"In recent times we have learnt that we need to move away from this model," he says.

Reminiscing on the emergency management sector of a mere decade ago, Esplin said people thought the field was a *black art* practiced by emergency managers. The rest of the government had very little knowledge about it.

He cites three seminal turning points that evolved emergency management in Victoria and Australia into its current form.

The first point was the recognition, after Ash Wednesday, of an all agencies/all hazards approach to emergency management through the creation in 1986 of the Emergency Management Act.

He maintains that there were lots of heroes in Ash Wednesday but there were very significant system failures too and it was recognition of these failures that resulted in better legislation, more resources and better ways of doing business.

The second point was the Longford Gas Crisis that starkly highlighted that a critical infrastructure or an essential service failure could be a significant emergency. The consequences in Victoria were substantial. The incident impacted way beyond the traditionally-accepted police and emergency services response. It needed a coordinated, whole of government response.

There were also a number of events in the Pacific area at the time. The power grid problems in Brisbane and Auckland and the Sydney Water issue all come immediately before the Year 2000 transition that he said heightened notions of risk management, business continuity and disaster recovery planning.

On a third and more contemporary note, he cites the advent of the risk of international terrorism. He said a number of people were already contemplating terrorism at the time but the events of 911 and subsequently, Bali, Madrid, the Jakarta Embassy bombing and more recently, London, have highlighted the fact that each jurisdiction needed a very sophisticated, whole of government, coordinated set of arrangements to deal with all sorts of events be they natural disaster, critical infrastructure or terrorism related.

From his perspective, legitimising emergency management as everybody's business and having it viewed as a whole of government responsibility is one of the proudest achievements for emergency management in Victoria.

Victoria now has a dedicated Committee of Cabinet for Security and Emergencies, and a very senior officer level whole-of-government group chaired by the Secretary of the Department of Premier and Cabinet.

Esplin thinks emergency management faces a number of significant challenges.

Sustaining volunteerism

He views volunteerism as both an amazing strength for the emergency management system but also as a potential weakness.

Some of the key challenges he says that currently face the volunteer 'sector' manifest in a number of

questions (i.e. How do we support volunteerism and how do we nurture it? How do we make it easy for people to be volunteers and contribute their support to the system? How do we provide an environment in which they are protected and how do we keep volunteerism going and how do we build in a sense of not just being comfortable with the numbers we have now but how we increase them into the future?)

"I think if you were to replace all our wonderful volunteers with paid staff, the figures would be mind boggling. When you think about just how many people there are in the Volunteer sector, it makes for very fascinating figures. The Country Fire Authority conducted research some years ago that indicated that to replace volunteers with paid staff would cost in excess of $500 million," he said.

Increase in litigation

Continuing this line of thinking, a key concern is the changing community expectations of emergency service providers. He thinks we currently live in, if not the reality, then certainly the perception of, a society more prone to litigation. This thinking drives the way a lot of emergency services people perceive their business and their views of the exposures of that business.

Changing community expectations

In Victoria he said they are trying to build a *Working with the community/ Working with industry* approach to emergency management.

"I guess we've created a society where, in some parts, people don't pick up the responsibility for themselves. They think that ringing 000 will immediately provide an emergency response and pull them out of the situation they are in."

Community and media

In his area they do a lot of work to educate the wider community

and they are doing it through methods such as *Bushfire Blitz* and *Community Fireguard* run by the CFA. The public land managers, the Department of Sustainability, Environment and Parks of Victoria are working to put in place more aggressive engagement processes.

According to Esplin, Emergency management is all about community engagement.

"There are some people and organisations that see community education as a new job but I describe it as a different way of doing your existing business. It is not another workload but a different way of doing what you are required to do."

"I think you can engage a community through more fundamental processes of having government workers actually talking to their communities in the areas that they work and I think this is critical to building public confidence."

Sometimes when events overwhelm resources, he maintains that if you are open and honest with the community, the community will accept that it is okay and you will not be judged harshly.

"I think communication with the community is absolutely critical and I guess the reviews we have completed focus on what happened to us during the Longford Gas Crisis where the then Premier was very open and honest with the community about how long we were likely to be without gas and what we were going to do about it."

"That was mirrored again by Rudi Guiliani, the Mayor of New York during 911, who day after day and multiple times within that day went to the community of New York with a basic set of messages – what we know, what we do not know, what we are doing and what we would like you to do as a member of the community. I think that was a fantastic way of working with

the community during an absolute crisis" he says.

He says, "I see communication and openness and a true partnership with the media (not managing the media but having a genuine partnership with them) as being critical as we move forward.

"One of the critical mantras that I have worked to is that the community need not be the passive recipient of services, it should be an active participant – putting in place its own safety strategies. We should think of communities as partners not people on whom we bestow services. The mantra is important to me when communicating at a personal, organisational and State level" he says.

A disturbing emerging phenomenon he cited was terrorists using the media as a weapon. He believes this trend now requires us to educate the media to ensure they understand how to balance the use of media as a weapon with the public's right to know.

Capacity building

Building the community's capability to plan and prepare for events such as terrorist attacks or catastrophic disasters on the scale of the Tsunami on Boxing Day he believes is another key challenge.

He questions how we build a capability and a set of plans and arrangements to respond to something that the community hope will never happen.

"Even if we had the answers, we would still need to consider how much planning, how many resources, how much capability would be enough?" he says.

He maintains that this kind of thinking means rather than considering how much it costs to do something, we now need to consider what the cost will be if it is not done.

Demonstrating benefit

Esplin said, "I think the challenge for police and emergency services in this current environment is to build more databases or more evidence-based business capability."

"In my role with the 2002/3 Bushfire Enquiry, I was critical of the fact that local knowledge was not appropriately used – I still believe this is a real challenge for us."

He thinks for organisations to survive and prosper in the future they need to demonstrate what they contribute to sustaining the community (i.e. on economic, environmental and social sustainability scales).

As we develop our many great national and state-level systems, he believes we need to build strength into the local building blocks such as the local brigades and local units. This approach he says will take us into the future with a renewed level of capability.

Building objective data sets to demonstrate the business case for local initiatives he believes is crucial.

Changing demographics

Esplin advocates that changing demographics in Australia are creating another set of problems. He believes we need to keep our rural communities vibrant and alive.

He gives examples of the existence of small communities where the post office may be gone, the bank might have closed, the railway line might not go there any more and the football and cricket teams have moved to a bigger town.

He maintains that Australia will probably find, particularly in Victoria, that civic organisations will be the only organisations left to be the backbone of these communities – organisations such as the CFA, the SES, the CWA and the Red Cross.

As a consequence of these demographic changes he believes Governments need to view emergency services organisations as more than just a response to emergencies. These organisations need to be seen as the fundamental fabric of rural communities.

"If these organisations go, there will be little else holding rural communities together" Esplin says.

Sustainability through balance

He laments that a lot of time is spent worrying about the *vulnerability* of communities but he gets excited when he suggests more research into creating *resilient* communities.

"The key things we need to determine are: What do we do to make a community more sustainable? What do we do that has an impact on the environment? What do we do to protect the economy?" he says.

Part of the problem he perceives is that a lot of people in our communities feel disenfranchised – they do not feel like they have a voice. He emphatically rejects the notion that people cannot make a difference and even goes as far as to challenge communities to have their voice heard. He thinks we need to create a willingness to speak up, address the problem and encourage communities to contribute to the solution.

Another thing Esplin is quite passionate about is that emergency management policy, like all public policy, should be the subject of public debate.

"I think it is all about balance and we really need to understand that public debate is a good way of finding where the right balance point is – balance points do move around too. There isn't really a fixed or static approach to this. For example, the debate at the

moment around should we tighten up the laws to prevent terrorism is a classic case of balance – how much infringement in civil liberties are we prepared to accept to protect against terrorism" he said.

He does not know where the balance is, but thinks the public has to debate the issue.

The future

According to Esplin, everyone in Government and emergency management is so busy that sometimes it is hard to step back and take a broad view. He thinks the emergency management arrangements in States, Territories and the Commonwealth need to include some body or group whose responsibility it is to take not just a helicopter view but maybe a satellite view and look more broadly into the future.

"I'm a strong advocate of the need to have an 'over the horizon' group empowered to cogitate on the future, to look widely into the future and come up with some of the things that are currently unheard of and to think through the unthinkable. I think that would be a great way forward" he says.

In summary

When asked if he had any take-home messages for AJEM readers he said:

"In my judgment the measure of a community is how it reacts in adversity. I would hope that the Australian community would react in the same way that New Yorkers did in 911 and that Londoners did in the more recent bombings. We need to engage with communities at a level beyond what we have done historically."

BOOK REVIEW

Source: Wendy Steinhacker, Editor Natural Hazards Research and Applications
Information Center, University of Colorado

**Natural Hazards Research
and Applications Information
Center, 2003.
Beyond September 11th: An
Account of Post-disaster Research**

ISBN 1-877943-16-9

The terrorist attack on September 11 2001, resulted in a disaster that was unusual in U.S. experience in a number of ways: the densely developed and populated disaster site (In New York City); the type of buildings and infrastructure that were damaged; the fact that the disaster was the result of an intentional act; and the sheer scope of the emergency response that was needed.

These characteristics provided an unprecedented opportunity for the natural hazard research community to help better understand what happened through programs such as the University of Colorado at Boulder's Natural Hazards Research and Applications Information Center's Quick Response research program and the National Science Foundation's Small Grants for Exploratory Research. Both programs enabled scholars to enter the field quickly to collect perishable data in the days and weeks after September 11.

This volume, *Beyond September 11th: An Account of Post-disaster Research* collects the findings lessons, and recommendations of this post-September 11 disaster research.

Consisting of 20 selections by researchers who received grants to investigate questions arising in the wake of the disaster, each piece takes a distinct view on topics ranging from engineering to behavioural science. Also included are a summary of what this post-September 11 research tells us, an overview of "quick response" as a research method, and a report of the preliminary observations made by researchers and first responders at a workshop held only a few months after the disaster.

Based on findings from these studies, the book includes numerous conclusions and recommendations for the improvement of public policy and disaster response. Some of the recommendations on ways to better cope with terrorist attacks include:

- law enforcement and investigative personnel need to be integrated into disaster planning, training and exercises because they will have a central role in terrorist disasters;

- more media attention to the broader political, social, religious, and other aspects of September 11 and similar disasters could help Americans better understand the terrorism risk and the consequences of preventative actions the country might take;

- researchers and practitioners need to communicate information on the best protective actions people can take in response to terrorism so proper warnings and instructions can be formulated; and

- a consistent policy is needed that balances the public's and the research community's need to know versus the need to keep information and databases about critical infrastructure systems secure.

Also available for electronic download at http://www.colorado.edu/hazards/sp/sp39/.

Editorial comment provided by the Editor, Natural Hazards Research and Applications Information Center at the University of Colorado.

EMA Update

Emergency Management Australia provides national leadership in the development of measures to reduce risk to communities and manage the consequences of disasters. EMA Update keeps AJEM readers abreast of the courses and activities that assist in this aim.

KNOWLEDGE MANAGEMENT & BUSINESS

Community Awareness

The flood advice booklet, *What to do Before, During and After a Flood*, has been revised and reprinted.

For further information contact Cate Moore
Phone: 03 5421 5296; email: cate.moore@ema.gov.au

EMA Library

In order to improve remote client access to library resources the EMA library website has been enhanced to include a selection of topical bibliographies as well as online library membership application and information request forms. Free access to full text databases is also available to Australian library members through the website. The online library catalogue now contains complete records of library journal holdings and key websites have also been added. Access to the library catalogue and a full range of library services can be found at www.ema.gov.au/library.

For further information please contact the library
Phone 03 5421 5246; email ema.library@ema.gov.au

AusDIN Portal

The AusDIN Portal is now at prototype stage and refinements are being made to usability, navigation and audience types. Arrangements for collecting links are well under way. It is envisaged that Stage 1 will go live around October 2005. Further information on this multi-jurisdictional initiative is available from www.ema.gov.au/AusDIN.

Disasters Database

The first phase of the EMA Disasters Database enhancement project is now complete and the report on the design of an all-hazards data framework will be published on the website shortly. A significant review and validation of data has taken place, along with some minor changes to the interface. A scoping project to add a GIS type interface to the database search and reporting functions is also under way.

For further information contact John Haydock
Phone: 03 5421 5297; email: john.haydock@ema.gov.au

e-learning

EMA's flexible delivery program has taken another step forward with the use of IBM's *QuickPlace* in the *Business Continuity Management* course and the *Graduate Certificate in Emergency Management*.

For further information contact John Haydock
Phone: 03 5421 5297; email: john.haydock@ema.gov.au

EDUCATION & TRAINING

Graduate Certificate in Emergency Management

The EMA Graduate Certificate in Emergency Management is specifically designed to provide professional development at postgraduate level for people across the emergency management function. This would include people from areas such as emergency services, health, local government land management agencies, education and human services. The program has a strong conceptual and analytical focus and is comprised of four modules over two years.

The Graduate Certificate is recognised by a number of universities as a pathway into Graduate Diploma and Masters programs.

Applications are being called for people who want to enrol in this program for 2006. Please refer to the EMA website under Education and Training for the details.

For more information contact Mike Tarrant
Phone 03 5421 5219; e-mail michael.tarrant@ema.gov.au

EDUCATION & TRAINING CONTINUED

Advanced Diploma in Public Safety (Emergency Management)

The first enrolment of participants in EMA's Advanced Diploma program is well underway. We are about to call for nominations for the next intake. In this program there is an emphasis on keeping the cohort together to enhance the learning experience. As such the group commits to stay together for two years to complete the 11 competencies required for qualification. These competency units are encompassed within five themes, entailing six separate weeks of on-campus attendance and two units covered through distance mode. Our target group are people working full time as emergency management officers but who do not have sufficient field experience to achieve the qualification through RPL. Please monitor our Education and Training website for the call to nominate.

For more information contact Dianne Cooper
Phone 03 5421 5274; e-mail dianne.cooper@ema.gov.au

Remote Indigenous Communities Advisory Council (RICAC)

The needs of Australia's indigenous communities have received increased recognition by the emergency management sector in recent years. Remote indigenous community needs were identified as a key issue by the Council of Australian Government's (COAG) review of Natural Disaster Mitigation, Relief and Recovery Arrangements. Given the importance of this area the Australian Emergency Management Committee (AEMC) considered it appropriate to formalise the current Remote Indigenous Communities Steering Committee into the AEMC Remote Indigenous Communities Advisory Council (RICAC) in mid-2003.

The membership of RICAC is made up of two representatives from each State and Territory including indigenous representatives, a representative from the Office of Indigenous Policy Coordination (OIPC) and an EMA representative. The role of the Council is to provide advice to the AEMC on issues relating to remote indigenous communities.

Over the next six months the RICAC is focussing on progressing the Ministerial Council's resolution to develop a national strategy addressing emergency management in remote Indigenous communities.

Consultations are occurring with key stakeholders at both Government and community level, in a range of locations throughout five State/Territory jurisdictions. The outcomes of the consultation process will be incorporated into the development of the national strategy. Consultations in July and August were held in diverse locations including Horn Island, Ceduna, Derby, Darwin, Perth and Sydney.

For more information contact Andrew Coghlan
Phone 03 5421 5240; e-mail andrew.coghlan@ema.gov.au

EMERGENCY MANAGEMENT LIAISON GROUP

Bushfire Awareness And Preparedness Day Initiative

Since the Prime Minister's announcement of the Bushfire Awareness and Preparedness Day initiative, EMA has consulted extensively with State, Territory and Australian Government agencies as well as peak bodies such as the Australasian Fire Authorities Council and the Bushfire CRC.

These consultations have highlighted the importance of community education and awareness, which is a key issue raised in both the McLeod and Esplin reports, and in the Council of Australian Governments (COAG) National Inquiry on Bushfire Mitigation and Management, 2005. Agreement was reached that due to geographic and climatic factors, a single national day of bushfire awareness and preparedness would not be feasible or effective. Instead, a decision was taken to enhance community bushfire awareness and preparedness by aligning with bushfire seasons to complement current State and Territory bushfire awareness programs.

For further information contact Li Peng Monroe
Phone 02 6256 4610; email lipeng.monroe@ema.gov.au

Australian Emergency Management Committee

The Australian Emergency Management Committee (AEMC) met on 4 August 2005.

The AEMC has responsibility for managing national strategic emergency management issues and policies. AEMC is the peak group supporting the Augmented Australasian Police Ministers Council (A/APMC) on emergency management issues.

EMERGENCY MANAGEMENT LIAISON GROUP CONTINUED

In encouraging effective national emergency management the AEMC considered arrangements for co-ordination of national security and consequence management. New opportunities for improved emergency preparedness, response, recovery and co-ordination are emerging with the development of technology and innovation. Reports on the collection and use of spatial and non spatial data and strategic directions were considered.

A number of mitigation arrangements were deliberated on including progress by the Catastrophic Disasters Emergency Management Capability Work Group and receiving an update on progress with COAG Natural Disaster Mitigation Programme. Reports on both flood and bushfire mitigation and management were considered.

In recognition of the importance of volunteers the AEMC are perusing a number of options to provide tangible support to both volunteers and employers of volunteers. A report was provided on the second Emergency Management Volunteer Sector Summit held in April 2005.

Reports were also received on the Working Together to Manage Emergencies Program and implementation process. AEMC considered indigenous service delivery and capacity through the important work of the AEMC Remote Indigenous Communities Advisory Committee (RICAC).

The *Urban Search and Rescue Concept of Operations* (USAR) concept of operations report was considered. This report was developed by EMA in close consultation with the States and Territories to further enhance USAR capability.

Exercises are an important element of preparedness and two multi-jurisdictional national exercises were noted. *Exercise Eleusis* will concentrate on management of an outbreak of zoonotic disease. *Exercise Mercury '05* is a counter-terrorism strategic exercise, with a focus on consequence management contributing to co-ordination between NCTC and AEMC responsibilities.

For further information contact Scott Milne
Phone 02 6256 4691; email scott.milne@ema.gov.au

DEVELOPMENT

Research and Innovation Program

The EMA Research and Innovation Program aims to facilitate the capture and transfer on innovative practice and disaster research outcomes across the emergency management sector. Eighty-nine applications for funding in 2005–2006 were received this year and, following panel assessment, four were offered funding. These include:

- Project 01/2005 – Development of a model for civilian disaster medical assistance teams.
- Project 02/2005 – Cultural Diversity – To establish guidelines on understanding of the cultures, strengths and needs of non-Christian faith communities.

- Project 03/2005 – The development of clinical practice guidelines for acute stress disorder and Posttraumatic Stress Disorder.
- Project 04/2005 – What is recovery and what helps people recover? An investigation into medium and long-term community recovery after disaster.

For further information contact Sue Collins
Phone 02 6256 4616; email sue.collins@ema.gov.au

COMMUNITY DEVELOPMENT

Working Together to Manage Emergencies

The Australian Government policy initiative, "Working Together to Manage Emergencies", announced in September 2004, recognises the need to develop self-reliance at both the community and local government levels to build national preparedness for disasters of all types by providing practical support and recognition.

EMA has consulted extensively with State and Territory Governments, other Australian Government agencies, the Australian Local Government Association, and the various sectors that are key components of emergency management in Australia. EMA has developed guidelines to implement the initiative through the Local Grants Scheme and the National Emergency Volunteer Support Fund.

Several nationally significant projects were funded through the initiative in 2004/05. These include:

- $473 000 to the Australian Local Government Association to undertake a stock-take of emergency management responsibilities at the local government level and to develop tools to assist local governments to meet their obligations;
- $120 000 to the Remote Indigenous Communities Advisory Committee to develop a national strategy addressing emergency management in remote indigenous communities;

- $50 000 to the Australian Emergency Management Volunteer Forum to enhance their website to assist communications between member agencies and to attract new volunteers to the emergency management sector;
- $50 000 to the Australian Council of State Emergency Services to assist in the conduct of the 2005 National Disaster Rescue Competition; and
- $118 000 to the Australian Red Cross to enhance the National Registration and Inquiry System through additional volunteer training and acquisition of supporting equipment.

Work has commenced to implement the funded initiatives.

Local Grants Scheme and National Emergency Volunteer Support Fund applications for the financial year 2005/06 closed on 29 July 2005 and applications are currently being assessed. Successful projects will be announced in November 2005.

Applications for funding in financial year 2006/07 will be sought in early 2006. To receive emailed, faxed or mailed information, phone (02) 6256 4733, e-mail cd@ema.gov.au or visit the web site www.ema.gov.au/communitydevelopment.

The Attorney-General, the Hon Philip Ruddock MP, is welcomed by Munupi community elders Lydia Barak (left) and Maurice Rioli at Pirlangimpi on Melville Island in August, on his visit to announce EMA funding for a review of remote indigenous communities emergency management needs.

PLANNING & OPERATIONS

Urban Search and Rescue Capability Development Project

The Australian Government has formed a partnership with all States and Territories to augment national Urban Search and Rescue (USAR) capability.

Emergency Management Australia is working with the Department of Prime Minister and Cabinet, State and Territory First Ministers Departments and Emergency Services Departments to develop capability in the following areas:

- Equipment caches to those jurisdictions with less developed capability;
- Augmentation of others to support a national capability model;
- Training for rescue personnel;
- Development of training for task force Commanders;

- Development of training for senior decision makers in Government; and
- Supporting policy and an operational concept for national capability.

The Australian Government will acquire the bulk of the materiel assets and the States and Territories will design and deliver the bulk of the training.

Equipment procurement will comply with *Australian Government Commonwealth Procurement Guidelines* and *Attorney General's Department Chief Executive Instructions*. Interested parties should refer to EMA or Aus Tender web sites.

For further information contact Assistant Director James Gustus
Ph 02 6256 4618; email james.gustus@ema.gov.au

Procurement Manager Rheannon Nicholson
Ph 02 6256 4688; email rheannon.nicholson@ema.gov.au

PM congratulates EMA's tsunami workers

Shown with the Prime Minister at the reception are from left: Joanne Laurence, Kate Keane, Taru Farrelley, Judith Reeves, Trevor Jenner, Janelle Keyes, Kathy Hilgert, Carly Panagiotopoulos, and Debbie Cowell.

Prime Minister John Howard personally congratulated a number of Emergency Management Australia staff at Parliament House recently, during a special reception recognising the efforts of Australian Government officers involved in the Boxing Day tsunami response.

Many Australian Government people attended the 20 June reception. The Prime Minister and the Leader of the Opposition praised the immediate and responsive contribution by a range of departments and agencies in the weeks after the massive earthquake and resulting tsunami off the west coast of Sumatra.

Within hours of the disaster, EMA's Director General David Templeman, activated the National Emergency Management Coordination Centre, with more than 30 staff called in from holidays throughout the following weeks.

CONFERENCE DIARY

Conference details are sourced from the EMA website.
For more information about these and future conferences, visit www.ema.gov.au

INTERNATIONAL

1–10 September

Location	Tromso, Norway
Title	11th International Conference and Field Trip on Landslides (ICFL 2005).
Details	The ICFL's goal is to provide a favourable environment for scientists, engineers, and planners concerned about landslides to meet to discuss and exchange ideas about landslide processes, investigations, and monitoring. Topics will include landslides in quick clay, snow and slush avalanches, slides in other types of soils, impact of climate change, rock slides, risk evaluations, and landslide generated flood waves.
Enquiries	ICFL05 Secretariat, Department of Civil and Transport Engineering, Hogskoleringen 7A, NO-7491 Trondheim, Norway; tel: (+47) 7359 4602 e-mail: ICFL05@ivt.ntnu.no web: http://www.ivt.ntnu.no/ICFL05/.

6–8 September

Location	Bologna, Italy
Title	Third International Conference on River Basin Management, Including All Aspects of Hydrology, Ecology, Environmental Management, Flood Plains, and Wetlands.
Details	The purpose of this conference is to bring together practicing engineers, environmental managers, and academics to discuss recent advances in the overall management of riverine systems, including advances in hydraulic and hydrologic modeling, environmental protection, and flood forecasting.
Enquiries	Rachel Green, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO407AA, UK tel: +44 (0) 238 029 3223 e-mail: rgreen@wessex.ac.uk web: http://www.wessex.ac.uk/conferences/2005/rm05/.

6–9 September

Location	Portsmouth, United Kingdom
Title	RSPSoc 2005: Measuring, Mapping, and Managing a Hazardous World.
Details	This conference will cover the use of photogrammetry and remote sensing in measuring, mapping, and managing today's wide range of hazards. Day one of the conference will be held as a joint event with the National Environment Research Council (NERC) and includes the NERC Earth Observation Conference 2005. Sessions are planned on global-scale hazards and climate change, ocean-atmosphere changes, meteorological hazards, flood hazards, the coastal zone, disaster relief, slope instability, soil erosion, wildfires, and more.
Enquiries	Richard Teeuw, University of Portsmouth e-mail: richard.teeuw@port.ac.uk web: http://www.rspsoc.org/.

6–9 September

Location	Sacramento, California
Title	2005 Conference of the Floodplain Management Association
Details	The technical component of this year's conference, "Flood Risk Management: Structural and Non-Structural Solutions. How Much Is Enough?" will include floodplain management issues, floodplain mapping, coastal issues, postdisaster recovery, mitigation planning, public education and outreach, and more.
Enquiries	web: http://www.floodplain.org/.

7–11 September

Location	Mexico City, Mexico
Title	The 15th Mexican National Conference on Earthquake Engineering
Details	"Mexican Earthquake Engineering 20 years after the September 19, 1985 Earthquake: What Have We Accomplished?" is the theme of this conference, which is designed for anyone interested in earthquake engineering research, teaching, design, and construction. This gathering will bring together professionals from a broad range of disciplines committed to reducing the impact of earthquakes on the built and natural environment, including geology, seismology, geophysics, geotechnical engineering, structural engineering, architecture, emergency response planning, and regulation.
Enquiries	Maria Antonieta Rico-Lopez, Sociedad Mexicana de Ingenieria Sismica, A.C., Camino Sta. Teresa No 187, Local 9, Col. Parques del Pedregal, Delegacion Tlalpan, 14020 Mexico, D.F., Mexico tel: +(52-55) 5606-1314 e-mail: smis@data.net.mx web: http://www.smis.org.mx/. To access information in English, click on "Eventos proximos," "XV Congreso Nacional de Ingenieria Sismica," and then "English."

11–14 September

Location	Minneapolis, Minnesota
Title	APWA International Congress and Expo/ The Best Show in Public Works
Details	This annual Public Works event will feature education sessions on emergency management, stormwater/flood control, engineering/construction management, snow and ice, and more.
Enquiries	Dana Priddy or Diana Forbes at the APWA, 2345 Grand Boulevard, Suite 500, Kansas City, MO 64108 tel: (800) 848-2792 e-mail: congress@apwa.net web: http://www.apwa.net/meetings/congress/2005/.

11–14 September

Location	Boise, Idaho
Title	2005 WSSPC Annual Conference
Details	The objective of this conference is to revisit the National Earthquake Hazard Reduction Program goals and what the goals support – reduced exposure to loss of life, infrastructure, economies, and resources – in light of national realities: western earthquakes, rural earthquakes, and earthquakes in cash-strapped states and communities.
Enquiries	web: http://www.wsspc.org/Events/ac2005/.

12–14 September

Location	Bologna, Italy
Title	Second International Conference on Sustainable Planning and Development (Sustainable Planning 2005).
Details	This conference aims to address the subjects of sustainable planning and regional development in an integrated way as well as in accordance with the principles of sustainability. The conference will provide a common forum for all scientists specialising in the range of subjects included within sustainable planning and development.
Enquiries	Katie Banham, Conference Secretariat, ECOSUD 2005, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO40 7AA, UK tel: 44 (0) 238 029 3223 fax: 44 (0) 238 029 8253 e-mail: kbanham@wessex.ac.uk web: http://www.wessex.ac.uk/conferences/2005/spd05

12–14 September

Location	Denver, Colorado
Title	ESRI Homeland Security GIS Summit.
Details	This summit will focus on GIS tools, datasets, and partnerships that can support organizations in the areas of emergency preparedness and public safety. It will feature current efforts and initiatives and future requirements for operational best practices. Anyone with responsibilities in safety, budget planning/funding, policy development, partnerships, GIS data, imagery, or other government, nongovernmental, or private sector knowledge experts are encouraged to attend.
Enquiries	e-mail: hssummit@esri.com web: http://www.esri.com/events/homeland/.

12–14 September

Location	Seoul, Korea
Title	The Sixth Asia-Pacific Conference on Wind Engineering (APCWE-VI).
Details	The APCWE conferences are held every four years as the regional conference of the International Association of Wind Engineering. The main objective of the conference is to exchange wind engineering information among interested scientists and engineers from around the world. This year the conference will focus on "Emerging Technologies in Wind Engineering."
Enquiries	Secretariat, APCWE VI, c/o TP Conference Consultants, PO Box 33, Yuseong, Daejeon 305-600, Korea; +82-42-869-8451 e-mail: apcwe@bomun.kaist.ac.kr web: http://apcwe-vi.kaist.ac.kr/apcwemain.htm

12–16 September

Location	Utrecht, The Netherlands
Title	5th Annual Meeting of the European Meteorological Society (EMS), 7th European Conference on Applications of Meteorology (ECAM).
Details	Themes of the EMS meeting will cover a broad number of subjects from research to technology related to applied atmospheric sciences. The central theme of the ECAM is meteorology and customer value with the intent of providing a platform where meteorological institutions, meteorological providers, and users of meteorological services can exchange their ideas, results, needs, and demands.
Enquiries	EMS Secretariat, Institute of Meteorology, Free University of Berlin, Carl-Heinrich-Becker-Weg 6-10, 12165 Berlin Germany tel: +49 30 7970 8328 e-mail: ems-sec@met.fu-berlin.de web: http://www.copernicus.org/ems/2005/.

12–16 September

Location	Charleston, West Virginia
Title	National Floodproofing Conference III.
Details	This triennial conference will build upon its predecessors with a focus on floodproofing techniques, materials, floodproofing and elevation contractors, current issues and programs, new federal tax implications, and the various means of funding floodproofing projects.
Enquiries	ASFPM, 2809 Fish Hatchery Road, Madison, WI 53713 tel: (608) 274-0123 e-mail: asfpm@floods.org web: http://www.floods.org/Conferences,%20Calendar/nfpc3.asp.

13–15 September

Location	Gaithersburg, Maryland
Title	Technical Conference on the Federal Building and Fire Safety Investigation of the World Trade Center (WTC) Disaster.
Details	The objective of this conference, which is open to the general public and technical experts from industry and academia, is to present the technical foundation for the NIST recommendations for improving building and fire codes, standards, and practices and to solicit feedback on the Draft NIST Investigation Report from the technical community outside of the investigation team, with an emphasis on spurring action on recommendations.
Enquiries	Teresa Vicente tel: (301) 975-3883 e-mail: teresa.vicente@nist.gov web: http://wtc.nist.gov/media/Sept13ConferenceAnnouncement.htm.

14–16 September

Location	Lisbon, Portugal
Title	IABSE Symposium: Structures and Extreme Events.
Details	Notwithstanding the remarkable progress in the last decades regarding the development of structural codes and methods of analysis, it is still difficult to respond appropriately to extreme events, which today remain a kind of last frontier in structural engineering. This conference will stimulate structural engineers to give more thought to such problems and provide information and guidance on how to deal with them.
Enquiries	IABSE Lisbon 2005, Organizing Committee, c/o LNEC, Av. Brazil, 101, P-1700-066 Lisbon, Portugal tel: +351-21-844 3260 e-mail: iabse.lisbon2005@lnec.pt web: http://www.iabse.ethz.ch/conferences/lisbon2005/

17–18 September

Location	Bangkok, Thailand
Title	Integrated Planning Against Risk: Exploring Interfaces Between Disasters and Development.
Details	This seminar about "The Management of Risk and Vulnerability after the Trauma of Relocation" will focus on South and Southeast Asia. It will examine comparative experience in the design of management and relief measures for the rehabilitation of communities and population after their displacement by natural disasters such as tsunamis, supercyclones, and earthquakes and the rehabilitation of households and communities after their displacement by major infrastructure projects such as reservoir development and urban transport improvements.
Enquiries	web: http://www.swansea.ac.uk/cds/research/ESRCseminarprog6.htm.

18–21 September

Location	San Diego, California
Title	Fall World 2005.
Details	This conference will focus on all aspects of disaster recovery, contingency planning, and business continuity. Attendees will gain knowledge and information through sessions, workshops, exercises, and networking opportunities. An exhibit hall will showcase the latest trends, products, and services in the industry. Among other things, attendees can participate in a real-time disaster simulation (limited to 200 participants).
Enquiries	tel: (314) 894-0276. web: http://www.drj.com/conferences/sd2005/.

18–23 September

Location   Beijing, China

Title   8th Symposium of the International Association for Fire Safety Science.

Details   This scientific conference for the global fire safety science community will feature everything from fundamental breakthroughs to new best practices. Papers and posters will be presented in all areas of fire safety science.

Enquiries   CFPA, 5th Floor, No. 19A, Huawei Xili, Chaoyang District, Beijing 100021, P.R. China
tel: +86-10-8778 9259
e-mail: iafss2005@126.com
web: http://2005.china-fire.com/en_index.htm#.

19–22 September

Location   Boston, Massachusetts

Title   Probabilistic Risk Analysis: Assessment, Management, and Communication.

Details   This course brings together nationally and internationally known experts from different disciplines to teach probabilistic risk assessment, management, and communication. Using a practical and integrated approach that combines lectures with case examples and hands-on computer exercises, this program teaches the methods needed to manage risk in today's variable and uncertain world.

Enquiries   Harvard School of Public Health Center for Continuing Professional Education, CCPE Department A, 677 Huntington Avenue, Boston, MA 02115
tel: (617) 384-8692
e-mail: contedu@hsph.harvard.edu
web: http://www.hsph.harvard.edu/ccpe/programs/APRA.shtml.

19–23 September

Location   Washington, DC

Title   Oceans 2005 MTS/IEEE.

Details   This annual technical and professional conference is a forum for ocean scientists, engineers, industry end users and suppliers, technologists, educators and researchers, policymakers, and the public around the world to present their latest research results, state-of the-art technologies, future concepts, and innovative ideas as they pertain to the future of our oceans. Plenary themes are homeland maritime security; global observation and exploration; emerging ocean science, technology, and engineering; ocean education and outreach; and proactive global cooperation and engagement.

Enquiries   web: http://www.oceans2005.org/.

19–24 September

Location   Las Vegas, Nevada

Title   Association of Engineering Geologists Annual Conference.

Details   The technical program for this conference features landslides and slope stability, engineering geology of problem soils, earthquake/seismic hazards, environmental site assessments (regulatory aspects), hydrogeology, and environmental risk management and remediation. Field trips, short courses, symposia, and a teachers' workshop round out the event.

Enquiries   email: Jim Werle at jwerle@converseconsultants.com or Barbara Luke at bluke@ce.unlv.edu;
web: http://www.aegweb.org/.

20–21 September

Location   Beijing, China

Title   2005 General Conference of the International Risk Governance Council (IRGC): Implementing a Global Approach to Risk Governance.

Details   The intent of this conference is to provide specific ideas for implementing improved governance strategies for major transboundary risks. Risk areas of discussion will include critical infrastructures, emerging technologies, natural disasters, and changes in the environment.

Enquiries   IRGC, 7–9 Chemin de Balexert, Chatelaine, CH-1219 Geneva, Switzerland
tel: +41 (0)22 795 1730
web: http://www.irgc.org/.

22–24 September

Location   Rapid City, South Dakota

Title   Eighth Annual Conference on Innovations in Disaster Mental Health.

Details   This conference will examine research strategies and methodology in disaster psychology in an effort to promote innovative approaches and collaborative agreements that will yield more definitive results. Its goal is to assemble a group of experts in the field of disaster and trauma research to discuss the ways in which they have successfully implemented their research protocols.

Enquiries   Disaster Mental Health Institute, The University of South Dakota – SDU 114, 414 East Clark Street, Vermillion, SD 57069
tel: (605) 677-6575, or (800) 522-9684
e-mail: dmhi@usd.edu
web: http://www.usd.edu/dmhi/conference.cfm.

25–29 September

Location	New Orleans, Louisiana
Title	Dam Safety 2005.
Details	This annual conference offers attendees professional development, a trade show, issue forums, networking, and technology transfer opportunities. Session topics at this year's event will include seismic issues, dam failures and incidents, emergency preparedness, and more.
Enquiries	ASDSO, 450 Old Vine Street, Floor 2, Lexington, KY 40507 tel: (859) 257-5140 e-mail: info@damsafety.org web: http://www.damsafety.org/.

26–28 September

Location	Kuwait
Title	Kuwait First Remote Sensing Conference and Exhibition.
Details	This conference is an opportunity for scientists, engineers, professionals, program managers, experts, and policy makers from the Middle East and North Africa to explore the trends and achievements in remote sensing, exchange ideas, and present and discuss recent developments and applications. The conference is designed to meet the scientific, technical, and business needs of the remote sensing community.
Enquiries	Promedia International e-mail: info@promedia-international web: http://www.kuwaitremotesensing.com/

2–8 October

Location	Santiago, Chile
Title	IASPEI2005.
Details	This General Assembly of the International Association of Seismology and Physics of the Earth's Interior (IASPEI) will provide an opportunity for geoscientists from all fields to present and discuss the recent advances in the Andean environment.
Enquiries	Diana Comte, Department of Geophysics, University of Chile e-mail: dcomte@dgf.uchile.cl web: http://www.igm.cl/iaspei/iaspei.htm

4–7 October

Location	Vancouver, British Columbia
Title	18th Emergency Preparedness Conference: Community Resilience; A Future for All.
Details	This conference will emphasize community resiliency in the face of disasters through community involvement and planning by building on the action plan that delegates developed at last year's conference. The goal of the action plan was to provide tools that will help communities become disaster resilient. The program will include six workshops: Public Awareness and Education, Psychosocial Impact on Responders, Volunteer Management, Community Health Care Resources, Critical Infrastructure, and Community Emergency Programs.
Enquiries	Emergency Preparedness Conference, 900 Heatley Avenue, Vancouver, British Columbia V6A 3S7, Canada tel: (604) 665-6097 e-mail: info@epconference.ca web: http://www.epconference.ca/.

5–7 October

Location	Auckland, New Zealand
Title	AFAC & Bushfire CRC Conference 2005 "Fast Forward"
Details	A conference to explore the potential world of innovation and technology in the fire industry. How can we fast forward to the future today? Do we want to? Do we have any choice? What are the challenges facing us? What are the opportunities open to us? Are we facing ethical and moral dilemmas?
Enquiries	web: http://www.afacnz2005.co.nz

9–13 October

Location	Bonn, Germany
Title	The Sixth Open Meeting of the Human Dimensions of Global Environmental Change Research Community.
Details	The theme of this meeting is "Global Environmental Change, Globalization and International Security: New Challenges for the 21st Century." It aims to promote a better understanding of global transformations, to identify the resulting opportunities and challenges, and to develop appropriate responses. This entails a critical assessment of what the community has achieved to date as well as the development of a forward-looking action plan that links human dimensions research into contemporary policy debates on future actions of the global community.
Enquiries	web: http://openmeeting.homelinux.org/.

11–13 October

Location	Moreton-in-Marsh, United Kingdom
Title	Fire Related Research and Developments-Annual Conference.
Details	This annual event attracts researchers and practitioners across the fire community to discuss latest research projects on fire-related issues. The 2005 event includes a special U.S.-U.K. symposium with international panels discussing management and leadership issues within fire services.
Enquiries	Anne Eyre e-mail: anne.eyre@traumatraining.com web: http://www.fireservicecollege.ac.uk.

16–19 October

Location	Salt Lake City, Utah
Title	Geological Society of America Annual Meeting.
Details	At this annual meeting, geoscientists, educators, and policy makers from around the world will come together to share the latest advances and discoveries and work to improve the understanding and application of science in society. This year's program features more than 20 sessions focused on education-related topics and a plethora of sessions addressing geologic hazards, resource utilization, and environmental policy.
Enquiries	Adolph Yonkee e-mail: ayonkee@weber.edu web: http://www.geosociety.org/meetings/2005/.

17–20 October

Location	Bartelsville, Oklahoma
Title	Tall Timbers 23rd Fire Ecology Conference: Fire in Grassland and Shrubland Ecosystems.
Details	The purpose of this conference is to provide an international forum for discussion of research and research needs in the area of fire ecology. It will present the current state-of-the art research and management efforts and bring to light areas where new research and management information is needed in grassland, shrubland, and grassland-woodland ecosystems.
Enquiries	Kaye Gainey, Tall Timbers Research Station, 13093 Henry Beadel Drive, Tallahassee, FL 32312 tel: (850) 893-4153 e-mail: kaye@ttrs.org web: http://www.ttrs.org/23FEconference/.

17–28 October

Location	Asuncion, Paraguay
Title	IAI Training Institute on Vulnerability Associated with Climate Variability and Climate Change in the Americas.
Details	Climate change and variability is a global threat that is likely to adversely affect natural and human systems and undermine long-term economic development prospects. The cooperation among climate experts, natural resource and risk managers, and decision makers is needed to improve an integrated understanding of the environmental processes taking place and their socioeconomic impacts to provide end users and decision makers with useful information and better tools to deal with these changes and the potential negative impacts. The central objective of this training institute is to help develop and strengthen local and regional capacity (human resources) to deal with vulnerability associated with climate variability and climate change in the Americas.
Enquiries	tel: +55 12 3945 6866 e-mail: i2005-v@dir.iai.int web: http://www.institutes.iai.int/.

20–21 October

Location	Lake Buena Vista, Florida
Title	2005 IBHS Annual Conference on Property Loss Reduction.
Details	This annual congress on property loss reduction brings together professionals in the insurance industry, emergency management, government agencies, and academic institutions to discuss the latest developments in natural hazards mitigation.
Enquiries	IBHS, 4775 East Fowler Avenue, Tampa, FL 33617 tel: (813) 286-3400 e-mail: info@ibhs.org web: http://www.ibhs.org/congress/.

25 October

Location	Detroit, Michigan
Title	2005 International Code Council Annual Conference.
Details	This conference will feature the Final Action Hearings, the Education Program, the Annual Business Meeting, the International Code Council Expo and networking opportunities among peers from the building safety and fire prevention fields.
Enquiries	web: http://www.iccsafe.org/news/annual/2005Conference/.

26–27 October

Location	London, United Kingdom
Title	Extreme Natural Hazards.
Details	This meeting will focus on extreme geophysical and astrophysical hazards, including earthquakes, supervolcanic eruptions, tsunamis, near Earth objects, and giant landslides. Speakers will discuss the frontiers and challenges in the science of extreme natural hazards as well as related topics, such as prediction, forecasting, monitoring, and technological innovations. The meeting will assess the role of the international scientific community and how these efforts can be better coordinated, integrated, and funded to improve the ability to anticipate and mitigate the effects of extreme events. Issues of the accessibility of relevant science to poor nations with limited scientific infrastructure and expertise will also be discussed.
Enquiries	Hannah Jemmett tel: +44 (0) 207 451 2575 e-mail: discussion.meetings@royalsoc.ac.uk/ web: http://www.royalsoc.ac.uk/event.asp?id=3177&month=10,2005.

29 October

Location	Kuala Lumpur, Malaysia
Title	Information Security Convention 2005 (ISC2005).
Details	ISC2005 is Malaysia's first information security exhibition and conference, offering cutting-edge security technologies, products, and services, as well as the latest know-hows and global trends. ISC2005 is organized by the Ministry of Science, Technology, and Innovations Malaysia under the banner of its information security arm, National ICT Security and Emergency Response Centre.
Enquiries	Contact Karen Dass at karendass@protemp.com.my

1–4 November

Location	Lisbon, Portugal
Title	250th Anniversary of the 1755 Lisbon Earthquake.
Details	The 250th anniversary of the 1755 earthquake and tsunami presents the opportunity to bring together scientists, engineers, historians, philosophers, urban planners, architects, economists, and policy makers to foster an integrated view of our global perception of natural disasters and how society must deal with them.
Enquiries	Rua do Embaixador, 13-2, 1300-215 Lisboa, Portugal tel: +351 21 364 94 98 e-mail: info@mundiconvenius.pt web: http://www.mundiconvenius.pt/2005/lisbon1755/.

3–6 November

Location	Fort Collins, Colorado
Title	International Technical Rescue Symposium 2005.
Details	This event will bring together representatives from across the spectrum of rescue disciplines, including mountain rescue, park services, water rescue, outdoor recreation, fire service, and rescue teams to share news and views on advances in equipment and techniques, technical problems, and other issues of mutual concern.
Enquiries	web: http://www.mra.org/ITRS_Brochure2005.pdf.

7–10 November

Location	Seattle, Washington
Title	American Water Resources Association (AWRA) 2005 Annual Conference.
Details	In addition to this annual conference's traditional focus on multidisciplinary subjects, this year's event will offer sessions that address a mix of contemporary issues, such as the effects of natural catastrophes on water supplies and human health, the renewed interest in large water projects, dam decommissioning, and the increased risk to the nation's water supplies from terrorism and the steps taken to counteract it.
Enquiries	Patricia Reid, AWRA, PO Box 1626, Middleburg, VA 20118-1626 tel: (540) 687-8390 e-mail: pat@awra.org web: http://www.awra.org/meetings/Seattle2005/

9–10 November

Location	Moreton-in-Marsh, United Kingdom
Title	6th International Disaster and Emergency Resilience (IDER) Conference and Exhibition.
Details	IDER is the conference and exhibition where best practice for readiness, response, and recovery for disasters and major emergencies are identified and implemented.
Enquiries	Andrich International, 51 Market Place, Warminster, BA12 9AZ, UK tel: +44 1985 846181 e-mail: ider@andrich.com web: http://www.andrich.com/ider/.

10–11 November

Location	Wairakei, New Zealand
Title	Planning for a Volcanic Crisis
Details	This course will provide a background in the volcano hazards that affect NZ. It is aimed at anyone with an interest, or role, in assessing, managing or communicating the risks associated with volcano events.
Enquiries	web: http://www.naturalhazards.net.nz/courses/volcano_course.html

12–16 November

Location	Phoenix, Arizona
Title	IAEM 2005 Annual Conference and EMEX.
Details	The purpose of this annual conference is to provide a forum to discuss current trends, topics, and the latest tools and technology in emergency management and homeland security, and to advance IAEM committee work. Sessions encourage stakeholders at all levels of government, the private sector, public health, and related professions to exchange ideas on collaborating to protect lives and property from disaster. Members of IAEM, disaster professionals, and other officials with a role in homeland security and emergency management are invited to attend.
Enquiries	IAEM, 201 Park Washington Court, Falls Church, VA 22046 tel: (703) 538-1795 e-mail: info@iaem.com web: http://www.iaem.com/events/annual/intro.htm.

16–18 November

Location	Mumbai, India
Title	World Conference on Disaster Reduction
Details	This is probably the first-ever international conference on disaster reduction that focuses on corporate sector's role & responsibility. It will be held in India with an objective to connect government agencies, relief organisations, corporate world and the communities. The Conference emphasises on the crucial role the corporate sector could play in mitigating human suffering wrought by disasters. This can be done by effectively collaborating with the government, international and national relief organisations.
Enquiries	web: http://www.wcdr.gfdr.org/

17–19 November

Location	Toronto, Canada
Title	2nd Annual Canadian Risk and Hazard Network Symposium
Details	Keynote speakers will be internationally respected scholars, practitioners and activists who will share leading edge knowledge and practices in the risk and hazard fields. Presenters will lead participants through case studies and discussion of some real life natural disaster events like the 2004 Peterborough Flood and the 1998 Ice Storm.
Enquiries	web: http://www.crhnet2005.yorku.ca

28 November–9 December

Location	Montreal, Canada
Title	COP 11 and COP/MOP 1
Details	Canada will host the first meeting of the Parties to the Kyoto Protocol (COP/MOP 1) in conjunction with the eleventh session of the Conference of the Parties to the Climate Change Convention (COP 11). Only representatives of parties, the United Nations family, and admitted observer organisations may attend.
Enquiries	web: http://unfccc.int/meetings/cop_11/items/3394.php

4–7 December

Location	Orlando, Florida
Title	2005 Society for Risk Analysis (SRA) Annual Meeting.
Details	There are three supporting goals for this year's annual meeting, which are (1) to take advantage of the meeting location in Florida to touch upon "local" topics that have broad implications or analogies, (2) to continue the internationalization of the SRA, and (3) to encourage a more interdisciplinary orientation in the technical program. The 25th anniversary of the SRA also presents an opportunity to examine the changing role of risk analysis in societal and private decision making.
Enquiries	e-mail: sra@burkinc.com web: http://www.sra.org/events_2005_meeting.php

23–27 January 2006

Location: Quito, Ecuador

Title   Cities on Volcanoes 4

Details   This meeting provides a forum where volcanologists, urban planners, civil defenders, community authorities, and business and health specialists can meet to discuss ways to mitigate the effects of volcanic eruptions and minimize their impact upon humanity through better science, technology, communication, and education. Symposia include new computational techniques for mitigating volcanic hazards, volcano studies and monitoring, risk management, emergency management, and human health impacts of volcanism. Workshops, field trips, and other scientific activities will also be offered.

Enquiries   e-mail: citiesonvolcanoes4@igepn.edu.ec

Web: http://www.citiesonvolcanoes4.com/

22–23 February 2006

Location   Hong Kong

Title   GOVSEC ASIA, Asia Law Enforcement & Asia Ready Conference & Exposition - Uniting the Best Minds in Government Security, Law Enforcement and Emergency Management.

Details   GOVSEC Asia, Asia Law Enforcement & Asia Ready is the event of choice for government security leaders, law enforcers and first responders around the Asian region - offering up-to-the-minute insight, strategy, tactics, best practices and technologies for each of the three key components that constitutes national security. The first presentation in Hong Kong brings together recognized experts and industry professionals to explore what's new, collaborate, share knowledge and experiences and vision.

Enquiries   email: info@infoexws.com

web: http://www.govsecasia.com

AUSTRALIA

13–17 November 2005

Location   Melbourne, Australia

Title   Greenhouse 2005: Action on Climate Change.

Details   Interest in climate change is high, particularly with regards to taking effective action. There is a clear need for industry, scientists, and government at all levels to work closely together to tackle this significant environmental issue. Demand is strong for the latest information on the science, the likely impacts of climate change, adaptation strategies, and approaches to reducing atmospheric greenhouse gas concentrations. This conference will cover these themes as well as international issues, policy development, communication, and education.

Enquiries   e-mail: info@greenhouse2005.com

web: http://www.greenhouse2005.com/.

interesting websites

APFM—Associated Programme on Flood Management
http://www.apfm.info/

The Associated Programme on Flood Management (APFM) is a joint initiative of the World Meteorological Organization (WMO) and the Global Water Partnership (GWP). It promotes the concept of Integrated Flood Management (IFM) as a new approach to flood management. The website includes case studies on flood management, community approaches to flood management, publications and a database on institutions and agencies involved in flood management.

Risk Frontiers
http://www.riskfrontiers.com/

Risk Frontiers, based at Sydney's Macquarie University, is a not-for-profit research organisation sponsored by the Australian insurance community. The organisation focuses on natural hazards risk assessment and risk management tools for application in insurance, emergency management, land-use planning and floodplain management. The quarterly newsletter *Risk Frontiers* is available online and covers topics including tsunami, earthquake, bushfire and flood risk. The website also includes publications, some of which are available online.

Regional Flood Mitigation Programme
http://www.dotars.gov.au/localgovt/rfmp/index.aspx

The Regional Flood Mitigation Programme is an Australian Government initiative. It works in partnership with State, Territory and Local Governments in the implementation of priority, cost effective flood mitigation works and measures in rural, regional and outer metropolitan Australia. The site includes links to reports including *Economic Costs of Natural Disasters in Australia* and *Benefits of Flood Mitigation in Australia*.
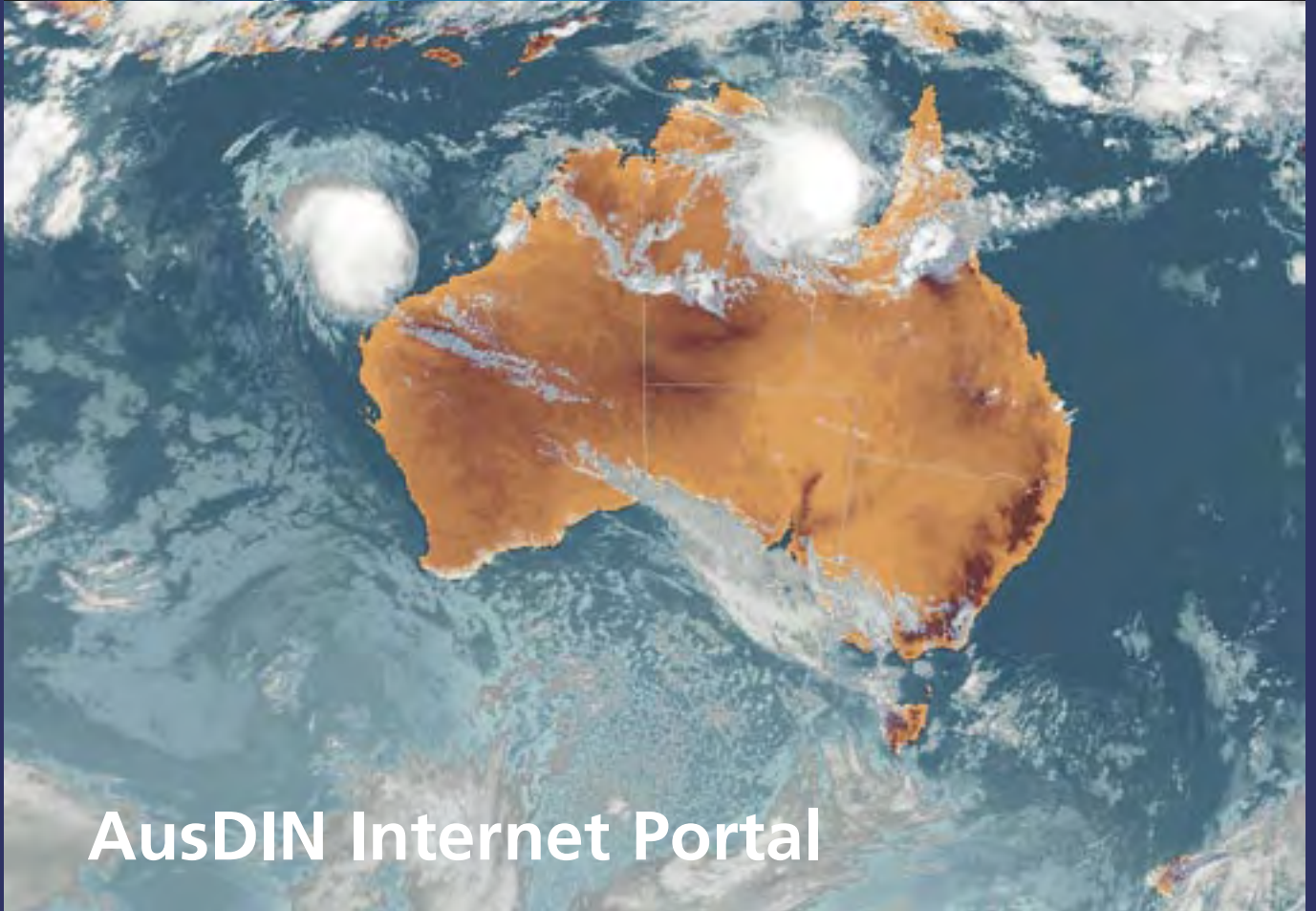
AusDIN Internet Portal

The essential one-stop-shop for emergency management information, coming soon from the Australian Disaster Information Network.

A national network, developed through partnerships with State, Territory and Local governments, Australian Government agencies and other key stakeholders to bring you a wide range of emergency management information. Providing a powerful advanced search function, this Portal is specially designed for:

- *Emergency management practitioners*

- *Emergency management education*

- *Jurisdictional and community needs*

- *General public information*

For more information, visit www.ema.gov.au/AusDIN

Image: Satellite image processed by the Bureau of Meteorology from the geostationary satellite GOES-9 operated by the National Oceanographic and Atmospheric Administration for the Japan Meteorological Agency.