



The Australian Journal of Emergency Management











Produced by Emergency Management Australia

Vol 16 No 1

Autumn 2001



In this issue ...

-  **Flood Insurance, is there a problem? Is there a solution? –a review of the workshop held at the Centre for Resource and Environmental Studies, ANU on 7–9 Feb 2001** 1
by Philip Buckle and Rob Fleming
-  **Community: the concept of community in the risk and emergency management context** 5
by Graham Marsh & Philip Buckle
-  **Evacuation of a passenger ship— is panic a major factor?** 8
by Peter Ockerby
-  **Government policy on public health, food safety and environmental issues—lessons from BSE in Europe (emergency management, mad cows, anxious politicians, science and the media)** 15
by Terry Nicholls
-  **Assessing the legal liabilities of emergencies** 18
by Nicholas Kanarev
-  **Catastrophe management: coping with totally unexpected extreme disasters** 23
by Allan Skertchly and Kristen Skertchly
-  **Dam safety risk treatments** 34
by Steve Warren
-  **Managing biological emergencies: a new approach** 40
by Grant Rawlin and Roger Jones
-  **Responding to hazard effects: promoting resilience and adjustment adoption** 47
by Douglas Paton, David Johnston, Leigh Smith and Marian Millar
-  **Impact of Internet media in risk debates: the controversies over the Cassini-Huygens mission and the Anaheim Hills, California, landslide** 53
by Christine M. Rodrigue

Plus ...

- Book and report reviews / announcements** 36-39, 46, 62
- Conferences and other announcements** 33, 52
- Disaster Events calendar** 63-65
- EMA Update** Centre pages

Cover: The Indian Earthquake in January 2001 caused extensive damage to towns and villages in the state of Gujarat. Images courtesy the International Federation of Red Cross and Red Crescent Societies (A McColl).

The Australian Journal of Emergency Management



The Australian Journal of Emergency Management is published by the Australian Emergency Management Institute, Mt Macedon, Victoria, Australia. Funding for publication is provided by Emergency Management Australia. The journal's circulation is 5,100 copies, distributed without charge to subscribers throughout Australia. It is also sent to people throughout the world.

The journal endeavours to provide an information sharing forum for all those involved in emergency management. Contributions relating to Australian and international emergency activities, articles identifying and discussing issues, policies, planning or procedural concerns, research reports and any other information relevant to the emergency and disaster management community are welcome.

The aim of this publication is the exchange of information and views across the Australian emergency management community, therefore, the views expressed in this journal should not be taken to be the views of Emergency Management Australia.

This journal incorporates a review process. Three levels of review—refereeing, editorial board review and editing—are conducted. Material submitted for publication should be on disk and reach the Editor by the following dates: Summer—September 15th; Autumn—December 15th; Winter—March 15th; Spring—June 15th. The editorial committee reserves the right to determine the suitability of all material submitted and where necessary to edit submissions.

Articles for publication may be forwarded to:

Rob Fleming
 Editor
 Australian Emergency Management Institute
 Main Road
 Mt Macedon, Victoria 3441
 Tel: 03 5421 5100; Fax: 03 5421 5272
 Email: rfleming@ema.gov.au

Subscriptions

If you wish to be placed on our mailing list please contact Rob Fleming, Australian Emergency Management Institute, at the above address.

Journal design and production by
 Dianne Treble
 Publishing Innovations
 RSD 813 Spring Hill, Victoria 3444
 Tel: 03 5424 8339; Fax: 03 5424 8262
 Email: publish@kyneton.net.au

ISSN 1324 1540

Flood Insurance, is there a problem? Is there a solution?

— a review of the workshop held at the Centre for Resource and Environmental Studies, ANU on 7–9 Feb 2001

Australia is one of the few developed nations that does not offer comprehensive flood insurance. This unexpected fact was revealed at a workshop held at the Australian National University by the Centre for Resource and Environmental Studies (CRES) on February 7–9, 2001. This workshop was sponsored by CRES and supported by the Insurance Council of Australia and Emergency Management Australia to examine the issues of 'Residential Flood Insurance: The Implications For Floodplain Management Policy'. Within this workshop a number of issues were raised that are of national significance.

The origins of this workshop came from a similar meeting held on this topic by CRES some 10 years ago. However, unlike many of CRES's other initiatives nothing seems to have developed on this issue from it.

The original 1989 workshop highlighted the fact that there was:

- a lack of detailed data necessary to ascertain levels of risk
- there was a need for reserves held by insurance companies to be untaxed, a need for insurance coverage or other form of compensation for small businesses
- a divergent view on what insurance model would be most appropriate.¹

If Australia has not developed some universal type flood coverage², why is this a problem or an issue? Discussions within the workshop revealed that many of the problems identified over a decade ago had not been resolved but were still in some process of resolution or showing some signs of changing. However, there was still some divergence of opinion within the industry over many of these matters, even within the insurance companies and their representatives. John Handmer points out in a paper presented to the workshop that many of the issues identified at the last workshop are still to be fully resolved. These were:

- that there would be adverse selection

by Philip Buckle, Manager, State Emergency Recovery Unit, Department of Human Services, Victoria, and Rob Fleming, Editor, The Australian Journal of Emergency Management

with only those at high risk taking out policies

- that the premiums would be too expensive for most people
- that insurance would discourage flood damage reduction activity
- that the risk is not evenly or randomly distributed, so that claims will be occasional and very large perhaps affecting many or most policy holders at the same time
- as claims are not random in space or time, ideally reserves would be accumulated to meet these claims. But such reserves are taxed in Australia.

So against this background, have we progressed or not?

The industry claims that it could provide such a universal coverage if it would make a profit; this is its first priority and in the context of a free market economy this is not unreasonable. However, it was acknowledged that the amount of property exposed to flood is quite small and the difference between flood, fire and other natural risks is only a matter of probabilities. Following the Wollongong floods and others we are starting to see some insurance companies cover and pay out for some type of flooding. This cracking of positions is causing some degree of concern within the industry of how to define flood. Already some companies offer flood insurance in Queensland and New South Wales (ironically the states with the greatest flood risks) but often the availability of this insurance cover is hidden in the general wording of the policy.

In the case of the Wollongong flood one householder left his property with the

rising flood level, another householder stayed and had to eventually seek refuge by breaking through the ceiling and the was eventually found on the roof. When claims were assessed the householder who left received nothing as it was classified as damage due to flooding but the one who stayed, his damage was deemed as storm by the assessor due mainly to the hole in roof.

Many companies are caught up in definitional problems that affect the risks they will cover, their actuarial calculations, their assessments of cause and damage and ultimately their costs. This problem is caused by trying to differentiate between the concepts of 'storm', 'flash flood' and 'riverine flood'. If one views this from a consumer's perspective 'when is a flood not caused by a storm', (apart from earthquake and dam-break, both of which are probably covered by insurance anyway). Again taking a simplistic point of view it would be better to call all these flood and storm results 'water damage'.

This confusion applies also to policy-holders or prospective policy holders. Common sense or day-to-day definitions of flood do not adequately meet the very precise, but company specific, need for a clear statement of the event to be insured. Even among the conference participants there was confusion and disagreement about the precise meanings of words such as 'flood'.

Many companies felt that somebody needed to set these definitions in law so as to prevent many of the disputes occurring. An alternative might be that

Notes

1. John Handmer. Flood insurance: a backward glance and some current issues. Draft paper prepared for the Residential Flood Insurance: The Implications for Floodplain Management policy Conference. February 7–9, 2001. Centre for Resource and Environmental Studies. Australian National University.

2. David Ingle Smith. Discussions at the Residential Flood Insurance: The Implications for Floodplain Management policy workshop. February 7–9, 2001. Centre for Resource and Environmental Studies. Australian National University.

rather than having some set legal definition, if the industry were to just include 'water damage' within their policies rather than trying to differentiate types of flood, it would avoid many of the disputes, but would it cost more?

It was stated that the resistance of the industry to provide a low cost coverage was not based on historical or past events but the fear that we are going to 'get a big event in the near future and the last 30 years has not been a big problem'³. But why should Australia be different from any other comparable country that provides flood coverage? Claims that fire insurance is less an insurable problem as it was mitigated by having a fire brigade response and flood was a bigger problem does not seem to be valid. The buildings are seldom completely destroyed by flood as opposed to fire and that State Governments have undertaken extensive flood mitigation works in the last 10 years and continue to do so. Although there may be considerable differences between the States in regard to flood mitigation programs, it seems that all States are moving to address these issues.

It was acknowledged that government supported or sponsored schemes are not likely. Although a strongly supported view in the 60's, governments since then have adopted a non-interventionist perspective. This is strongly borne out in the political ideology of the then Treasurer and now the Prime Minister 'that governments and government authorities should, to the maximum extent possible, seek to avoid intervention in matters that can be left to the private sector'⁴.

The ideology of the market solving the problems was again stated by the Minister for Financial Services and Regulation in 1999 following the Wollongong floods in which he said:

'The initiatives (NRMA offering flood coverage) here come about because of competition in the marketplace; they do not come about because of any detailed prescription from the federal government or state governments forcing insurers to take uncommercial decisions. The best pressure that comes about is because of Competition'.⁵

It was thought that the current opposition would largely follow this line as it was felt it is unlikely that a Labour government would now hold a different perspective. Especially when last in government from 1983-1994 when they embraced the competition policy and did not have any alternative policy with regard to flood insurance from the 1979 Howard Policy. Interestingly, the now

Labour opposition has now announced a new plan for improving flood insurance. This was announced in a Joint Statement by the leader of the opposition, the Hon Kim C Beazley MP and the Shadow Assistant Treasury, Kelvin Thompson MP on 13 February 2001.

But what should be the role of governments?

Apart from a non-interventionist approach within the market, governments still need to play a role in the provision of flood mitigation programs. The Labour party statement states that the 'Government has a role in the insurance industry. It cannot simply vacate the field and expect competition to deliver fairness and equity to consumers... Labour believes that Government has a role in:

- providing the overarching legislative framework for the operation of the industry
- providing the appropriate prudential framework
- intervening when the market fails to deliver fair and transparent outcomes for consumers.'

They believe that the 'greatest need for this currently exists in the area of insurance for water damage'. It is interesting to note that the term water damage is used rather than flood damage. They further state that if elected they will establish a parliamentary inquiry into the issue of flood insurance and work with the insurance companies to implement recommendations of the June 2000 Australian Securities and Investment Commission into Flood Insurance.

It is hard to ascertain what would be the precise interventionist approach they will adopt but one would imagine that they might be prepared to consider some form of legislative stick if no development occurs in this area if the insurance companies do not adequately respond. However, it appears that there is more willingness on the part of the Labour opposition to pursue an active working relationship with the industry rather than let competition come to a solution which in the last 10 years it has failed to do so. So perhaps the days of non-intervention may be coming to a close.

The Labour opposition also states that it will work with the States and Local Governments to ensure that maps showing the areas that are subject to the 1 in 100 years floods are produced and published. The Insurance Council of Australia has welcomed this. It is interesting to note that the Council claims that the 'lack of flood mapping was one of the key reasons why flood insurance was not more widely available'.⁶

The Insurance Council point out that the current Federal Regional Flood Mitigation provided only \$20 million over three years for the whole of Regional Australia. This is provided on a 1:1:1 funding basis, which requires the same contribution from State governments and local councils. Representatives from local governments stress that this funding is inadequate and they do not have the funding base to contribute 30% of the funding to flood studies and the small allocation across Australia is often a disincentive rather than an incentive. Local governments claim that to ensure work is undertaken a 30:30:20 split would be more effective.

Governments certainly have a role here and not the Insurance Industry. A comprehensive mapping service is needed in which to map the flood risk areas. To walk away from this responsibility is to say to the general public that they are not interested in the safety and welfare of their citizens. Even if governments adopt a fixation that the market will resolve this issue, mitigation works and public information is not a role for the insurance industry. Government also has a role to ensure safety in the floodplain areas. This may be by some mitigation work, removing or purchasing property such as with the US FEMA scheme or at least informing people in potential danger. Not all people will have the capacity to insure against flooding and often the very poorest of people will seek accommodation in caravan parks because of the low rents. However, the caravans, in which they live and contain their valuables, are structures that are more likely to be severely damaged as against the more permanent structures of contemporary houses.

Notes

3. George Walker. Discussions at the Residential Flood Insurance: The Implications for Floodplain Management policy workshop. February 7-9, 2001. Centre for Resource and Environmental Studies. Australian National University.

4. The Hon John Howard, M.P. A Policy Information Paper by the Treasury, May 1979, AGPS, Canberra

5. Joe Hockey, Minister for Financial Services and Regulation, Joint Statement by the leader of the opposition, the Hon Kim C Beazley MP and the Shadow Assistant Treasury, Kelvin Thompson MP. 13 February 2001.

6. Alan Mason, Insurance Council of Australia, Insurance Council Responds to Opposition Flood Policy, Media Release. February 13, 2001.

But will the consumers understand the link between flood mapping, mitigation work and insurance?

Consumers are voters and will ultimately have their say, whether it is on the GST, or petrol prices. Many of these concerns may be a matter for the ballot box including the availability of insurance and the need for effective and timely disclosure of flood prone areas. But where are consumers and the public generally placed in this arena?

A large proportion of the population do not have house or content insurance or are under-insured. Despite claims that governments and government authorities should, to the maximum extent possible, seek to avoid intervention in matters that can be left to the private sector, governments of all types legislate to provide safety nets for the poor, disadvantaged and needy or to cover risks that would otherwise be catastrophic for individuals. For example, it is compulsory to have third-party vehicle cover. So it is possible to point to contradictions in government pronouncements about avoiding intervention.

Ray Burby's paper revealed that in the US only 20% of those required to carry out flood insurance actually do so⁷. So one could not expect much difference in Australia. It is estimated that only 50% of the population take out contents' insurance and it would not be hard to assume that the lower socio-economic group would be a large proportion of the uninsured. Studies undertaken by James Cook University reveal that only 30% of policyholders actually know in detail what losses or risks their household policies cover. People often seek clarification of their policies after an event has occurred.⁸ People view insurance as a payment which has no chance of winning but is intended to avoid them losing.

So when companies start arguing about the fine points of how water enters a house after a storm it is no wonder consumers feel treated as mug-punters. For the person who has been flooded such precise points of distinction are immaterial and in the circumstances of their loss can seem to be heartless and pedantic.

Would it be expensive to have coverage?

Estimates given at the workshop suggest that to cover flood risks for those people exposed would be extremely high. However, it was suggested that after examination of costs that all policyholders (not just those living on flood prone land)

already pay a large proportion of their premiums for storm or water damage. Additional cover for flood, as water flow over ground from a watercourse, would be slight.

If consumers have difficulty understanding their policy content it would not be hard to assume that they would find it hard to understand the criteria by which insurance companies assess the risks to ensure a profitable outcome. From a simplistic point of view, to have flood (and all hazards) covered within in the policies, the insurance companies would need to spread the risk to all policyholders. But would this be excessive?

We already spread the cost of differential risk between policyholders; areas of low risk from burglary or theft or fire may

... some degree of partnership between the industry and governments is needed to ensure a balanced approach.

subsidise areas of greater risk. Smith claims that if premiums were paid by all households in Australia, regardless of their risk to mainstream flooding, the annual premium per insured household would fall to \$12 for the 1% probability flood and \$28 for the Possible Maximum Flood (PMF).⁹

Discussion within the workshop suggested that such a cover might cost in the vicinity of \$50.00. In view of the increase of premiums over the last year due to the GST this might be acceptable. However, this does not resolve the problem of houses not insured, which will ultimately result in some hardship grant by the

federal government if they are effected by flood. So the governments do have a role in times of flooding and it is not just a market issue.

Insurance premium costs are to some extent irrelevant for some sectors of the population. The resource poor may be unable to afford any premium at all. Some people, through poor decision making skills, or through inadequate information, may be unable to make informed or reasoned assessments of the benefits of insurance. Other people, such as those whose first language is not English or who have poor language skills, may not readily comprehend information about flood risks and may not easily understand insurance policy wording.

One suggestion to cover all residential buildings was that all local governments include in their rates a proportion to cover for flood damage and that this money be paid to the insurance industry. This would in effect spread the risk as wide as possible and some estimation of the premium would be about \$18.00 per house. Both of these approaches may have a perceived problem of equity. People might be annoyed by paying for others. However, in some way most consumers are paying for someone else's misfortune and this is the way the industry spreads its risk. This approach would not address the people not covered by any content insurance. The UK approach was to build in some small amount into all rents, thereby having the biggest coverage of all and assisting the industry to spread the risk and ensure profitability.

Often overseas experience indicated that when universal insurance is provided it may result in a decrease in mitigation work and a lowering of priorities and expenditure in this area. Therefore, some degree of partnership between the industry and governments is needed to ensure a balanced approach. In view of the projected climate changes, where we can expect more of all types of hazards to occur, can we afford not to take a more active partnership role?

Whether the industry adopts some bundled approach to spread the risk, we are sure it will still ensure some type of

Notes

7. Raymond J Burby. Residential Flood Insurance and Floodplain Management: Lessons from the United States. Paper prepared for the Residential Flood Insurance: The Implications for Floodplain Management Policy Workshop. February 7-9, 2001. Centre for Resource and Environmental Studies. Australian National University.

8. Linda Berry. Relief and the Community. Paper prepared for the Residential Flood Insurance: The Implications for

Floodplain Management Policy Workshop. February 7-9, 2001. Centre for Resource and Environmental Studies. Australian National University.

9. David Ingle Smith. The What, Where and How Much of Flooding? The background to residential flood insurance. Paper prepared for the Residential Flood Insurance: The Implications for Floodplain Management Policy Workshop. February 7-9, 2001. Centre for Resource and Environmental Studies. Australian National University.

risk rating approach, which might be at odds with a universal system. However, consumer demands will be an increasing voice if nothing changes in the next few years. Companies will find it hard to differentiate between storm, flash flooding, riverine flooding and perhaps governments may have to take more seriously the role of mediation and resolution. Even then they may find it difficult to try to stick with concepts that pose more difficulties than to assist in any resolution.

What's the next step?

The issue needs some resolution. Although it may sound easy to adopt a model from the US or the UK it probably needs to be resolved both by the industry and governments. However, it was interesting to note that the ICA was not always able to command or bring together the companies on these issues. Companies, despite having a representative on the council often had to refer back to their parent organisation in the UK, Germany, US, Japan or other locations for direction. Often the resultant responses were based on the cultural preconceptions of the parent companies rather than solutions and joint recommendations by the council within Australia. As George Walker points out *'there are deeply entrenched attitudes within the insurance industry that ..provide a major barrier'*¹⁰ to any move to resolve this issue.

One difficulty that was touched on in the conference related not to flood insurance or to its cost to insurance companies. Rather, individual companies were wary of putting themselves at a competitive disadvantage in relation to their other companies. This suggested that companies would be willing to offer flood insurance if others did also so ensuring that the risk was spread.

As stated at the workshop 'if the soft drink manufacturers can successfully market drinks with no nutritional value on taste alone, then insurance companies should be able to market their policies, which assist with safety and security of life. Indications from the workshop are favourable in this direction. What is clear from this meeting is that we cannot let another 10 years go by without some

resolution and continued mitigation.

From a consumer point of view it is the Insurance companies that need to take the initiative. Consumers already feel that there is sufficient money paid in by their premiums to cover all types of hazards and there should be no distinction between storm and flood. We believe that consumers would be prepared to pay an addition small premium to ensure all hazards are covered. Consumers had increase their premiums by 10% last year to cover for the GST so a small or even a progressive increase would be acceptable. The fairest way would be payment through council rates, which would require some partnership with local government and enable the risk to be spread to every household not just the ones who insured. But there is a choice of direction and it is up to the companies to determine which would be the more acceptable way.

Governments, Insurance companies and the community need to look at novel and imaginative answers to these questions. New premium schedules, distributing risk across the community, new types of loss reinstatement.

The government and in particular the federal government could consider increasing funding to local government so that the regional flood mitigation program is provided on a 30:30:20 basis. This would ensure local governments undertake the necessary flood studies. It is also a matter of public safety to ensure that all relevant flood studies and maps are made freely available to the public who require it. We feel that a charge for such a service is not appropriate and goes against the whole notion of public safety. State governments need to increase work in identify and undertaking flood mitigation work. Figures revealed at the workshop indicate that where mitigation work has been undertaken the risks are greatly reduced and also premiums would reflect this reduced risk.

Perhaps in the end an arbiter or referee is required to enforce some of the critical thresholds identified at the conference. These would include:

- disclosure of flood risk by water authorities, municipalities and governments
- application of a common and easily understood definition of flood across the industry
- acceptance of data standards and types that are relevant to flood and risk assessment and evaluation
- cost (risk) sharing across the broader community, as now applies to perils such as fire.

What the conference identified was a willingness on the part of the insurance industry to move forward; but no one was willing to take the first step. Penguins on an ice floe dither about diving into the water because there may be a killer whale lurking there to snatch the bold, first penguin. So en masse they dither and hesitate, then gang up and push one of their number in to see if the predator is there. Surely we can do better than penguins.

For most householders insurance is the single most important action they can take to protect themselves from natural hazards. Where insurance is not available, or is not chosen for whatever reason, the people who suffer losses may be able to access some government assistance. This is usually inadequate to restore their losses in any significant way. We have seen people who have suffered major damage to their homes and contents and to their farms and businesses and who have not had insurance. The pain, distress and hardship they experience is profound and endures for many years.

This conference showed that the problems of providing flood insurance are not insurmountable and may indeed be relatively easily achieved if there is will and courage on the part of the industry and encouragement from government.

The big issues are not whether insurance companies can provide flood insurance nor whether they can afford to do so and still run profitably. In both cases the answer is affirmative.

The more difficult issues concern broader social and economic responses. Can we afford not to have universal flood cover? If we do spread the risk across a broader segment of the population (or even the entire population) then what equity issues must we confront? Would universal flood cover inadvertently promote riskier behaviour or reduce efforts to mitigate flood hazards? How would we deal with people who are unable to afford flood insurance?

The workshop was positive. The representatives at the conference individually seemed to show strong commitment to resolving the matter of inadequate or inequitable availability of flood insurance. It is now up to their companies to take this further and for governments to work with them to address the broader issues of equity, planing controls, building standards, data availability, risk behaviour management and risk disclosure. Insurance companies are not managed for community benefit, but the benefit they provide to the community is massive.

Notes

10. George Walker. Insurability of Residential Flood Losses in Australia: a personal view. Residential Flood Insurance: The Implications for Floodplain Management policy workshop. February 7-9, 2001. Centre for Resource and Environmental Studies. Australian National University.

Community: the concept of community in the risk and emergency management context

Emergency management is clearly and deliberately moving along a path defined by the risk analysis process (Standards Australia 1999) and by its derivative process, community emergency risk management (Emergency Management Australia 2000). 'Community' is a key element of Victoria's emergency management arrangements as well as of those of, in greater or lesser degree, other States and Territories and the Commonwealth (Hodges 1999).

Therefore understanding the concept of community is of obvious importance within the context of risk, emergency management and community recovery; but it is a most abused and misunderstood term. The purpose of this article is to start the debate on the manner in which the term community is used within these circles.

Too often community is used in a sweeping fashion without the recognition that all the people in the community in question may have in common is that they live or work in the vicinity of the risk; here community is defined implicitly by proximity. Community is also used to describe everyone living in the whole state e.g. the Victorian Community as well as at any other given spatial unit, for example the rural community or the East Gippsland community. Too often, a basic assumption exists on the part of planners and managers that there is a community living in the affected area that can be rebuilt or re-bonded. The assumption is that there was a definable group of people present who had something in common, who were bonded together in some positive form and equally that they were not in conflict with each other or may have had very little contact prior to the event.

It needs to be recognised that for a number of people there is no feeling of affection or attachment to an area, or even to their housing that they may be simply using as a dormitory with the intention of moving on when convenient. We, the authors of this article, recognise that in some areas, particularly rural settings, the geographic area may be the setting closest to the traditional view of 'community'; that is 'community' as

by Graham Marsh, Lecturer, School of Social Science and Planning, RMIT University & Philip Buckle, Manager, State Emergency Recovery Unit, Department of Human Services, Victoria

shared space or as growing from close proximity. However, even there one cannot assume that the residents are of like mind and are not in conflict with each other or are not apathetic to each other's needs.

This article challenges the assumption then of there being such a thing as an easily defined and discoverable *single* community. It is our view that such a belief is based on a fallacy and we offer an alternative set of definitions, placing the need to understand the concept of community firmly in the risk management context.

The most important things to be said then are that firstly, there is no such thing as an all-embracing 'community'. Each of us belongs to a number of communities that may or may not be geographically based. These communities are defined in a number of ways, for example, by our interests, relevant demographic features as well as by location; but even location (that is a defined area) will be defined in part by a common interest that, in itself, may be, more important than the spatial unit itself (Ife 1995).

We can better understand this if we incorporate traditional spatial concepts into a definition of community as 'those people (groups whatever) sharing a common characteristic'. This allows us to incorporate notions of space (where we must acknowledge space is not the critical factor but something defined or influenced by space—e.g. access to resources, transport systems, government)

This notion also moves us away from the idea that a community is necessarily cohesive and self-aware; for example all 5 year olds have common interests (says the education system) and in that sense they are a community but they are not aware of themselves as forming a community.

It also allows us to introduce the notion of the 'mosaic of communities' to which

people belong. They belong to a community defined by access to municipal services, by recreational interest (Tottenham Hotspur supporters), by age group (over 65s), by ethnicity (Greek immigrants) by religion (Uniting Church members) and often by many other factors. We share similar interests with many other people but rarely are all our interests with all the same people.

Secondly, despite having stated that there is no such thing as 'the community' we still need to define what we mean by the term.

It is very difficult to categorise what is a community. Some researchers interested in this matter have characterised community in the following ways. Community is diversity (Bell and Newby (1971) and Willmott (1989). For Max Weber: community equalled 'belonging together... sharing a common culture, interaction & institutionalisation of central activities' (Ife 1995). Going beyond the mere geographic description—it involves a sense of belonging & commitment. Time is involved in developing a community—it is a process not a passive never changing concept.

Community may equal shared solidarity; its source being a common set of interests, values & attitudes. Although community is usually taken, and this certainly applies in the emergency management context, to be a cohesive, more or less homogeneous group, it may in fact arise as a confluence of external, sometimes conflicting, pressures. Communities may also exhibit elements of conflict between different interest groups (Ife 1995) Membership may also not equal obligation. Ron Wild's belief was that 'people are often not aware of the communities to which they belong.' People simply exist within a certain context the boundaries of which may not be clear to them (Ife 1995).

Community is such a loose term and we often use it interchangeably with friends, networks, recreational groups, voluntary associations, pressure groups and even social movements.

Within local councils generally it is often applied to the citizens living within the confines of their city or to neighbours

who may not even know or talk to each other. But in many situations neighbours may have no sense of belonging to, or connection with the city or neighbourhood; in fact there is no 'glue' as an intrinsic and inseparable element of their geographic areas which bonds the residents together, which creates a unified force.

And why should there be when all they may have in common is the closeness in proximity of their dwellings?

We must also recognise that 'community' should apply, when emergency management is involved, not just to the domestic residents but to industry, businesses, schools, services etc.

Any local area will also be composed of residents who vary from those most able to cope due to age, wealth, resources both physical and intellectual and with adequate access to information to those most vulnerable, with limited access to these resources, and most at risk if a disaster or crisis occurs.

It is essential then for emergency managers to ensure that they have accurate, up to date community profiles available at the time of a crisis and during the recovery period. These profiles will include not simply traditional elements such as proximity to known hazards or traditional demographic groups (aged, young etc.) but also analyses of other social features, inventories of environmental and infrastructure assets and liabilities and profiles of economic and business activity.

For many people a 'feeling of community', of a common cause, of meaningful relationships with one's neighbours is lacking as their value systems, interests and activities differ. Occasionally the promise that residents may be empowered through uniting with their neighbours is realised, but in many cases, even that promise fails to lead to continuing, long-term participation in community development, concerns and activities.

One last point on this would be that even when the neighbours and people living in proximity do communicate with each other, feeling a common bond, this does not necessarily lead to participation in local issues or to even to taking part in community emergency management processes.

Mabileau, Moyser, Parry and Quantin (1989), in their research in France and the United Kingdom, discounted the idea that individuals live in communities which are characterised by 'a certain sense of solidarity and common identity' which are formed simply by living in a

particular locality. They questioned this 'community identification' theory which holds that in 'such 'communities' residents are likely to have an intention...to act in certain ways towards one another, to respond to each other in particular ways, and to value each other as a member of a group' (1989).

Mabileau *et al.* (1989) believed that 'a person's notion of a community is inextricably related to that person's ideological stance on a range of other values. Thus, the attributes of a community will be significantly different for a person on the political left compared to someone on the political right; this will apply also to any strongly held value or ideological position, political, environmental, religious. Of course, strongly held views may often be counter-poised by opposing but equally strongly held counter-views which may militate against community cohesion.

Potentially, this may in turn affect the types of issues and actions taken in pursuit of 'community values'. They also suggested the 'possibility that locality and community are entirely irrelevant in the modern era...that people are moved by interests that transcend locality, with class, status or profession. Indeed, some may regard these as non-spatial communities'.

Within any one neighbourhood or city there may then be many diverse communities and within each of these there will be many diverse opinions. Each individual may belong to a number of unconnected communities even within the local council boundaries or, for example, within their ethnic group and yet have no meaningful relationships with their neighbours. The observations of one of the authors of this article, as a participant observer, led him to draw the following conclusions:

Despite the best of intentions, policies and publicity on the part of councils and local activists, communities will not form, nor will citizens participate, unless the circumstances are such that individuals will recognise the necessity of joining with other residents in a common cause and will be enabled in doing so.

Within the boundaries of local governments many potential 'communities of interest' exist, as the citizens have similar interests at stake that are often under threat from their local and other authorities. This could be particularly so following involvement in a disaster or crisis. However, this potential to come together as a community with a common cause is,

too often, not realised even when the residents have similar ideologies. Conflict is often present, as is the opportunity to compete for scarce economic, political and social resources, all of which would otherwise normally assist in the development of the community.

Examples of types of communities

- **Communities of affection or function:** may be based on ethnicity, class or gender when they have emotional ties with each other, where there's a group sharing something together. (Ife 1995)
- **Communities of competition:** where groups come together as they compete in temporary alliance for economic, political &/or social resources; even these temporary alliances may generate some community cohesion.
- **Communities of interest:** are based not on area but on the basis of industry, labour, social or recreational interests as we may find with union members, industry associations or primary producers associations.
- **Communities of status groupings and interest:** are based on occupation, income level and type and level of skill may co-exist within a given local government area; e.g. manual workers, professionals, farmers, service workers, non paid workers (retired, unemployed, home duties).

Communities are not static entities and they may disintegrate rather than develop. For instance changes in the industrial or commercial base such as due to factory closure, failure of industry to maintain its position may lead to population losses, changes in community priorities or even the fragmentation of the community into competing and antagonistic groups. One industry towns are very vulnerable. Stagnant towns means youths move that leads to more stagnation. Changes in technology affects a town e.g. banking technology means fewer staff are needed which leads to closure which leads to unemployment of youths and the loss of bank families and of professional talent in the community and the cycle continues. Government decisions on railways, freeways, schools, disaster management and relief packages along with regionalisation all lead to growth or decline in rural and regional cities in particular.

Community formation and participation

From the research of one of the authors on participation at the level of local government (Marsh 1997) the actual circumstances present at a particular time

within a person's life-cycle and in a particular local area determined:

- who the participants in local issues were at the level of local government
- how many people gathered, understood what was in their perceived best interests and contributed to individual and group goals and directions
- what their responses would be and the effectiveness of these responses.

Different responses were present in neighbouring streets, not only due to conflict over ideological views and to support or non-support for proposed development, but because differences existed in the residents' commitment to activism.

In some neighbourhoods a single community formed centred on a particular issue; in others, separate communities often at variance with each other formed despite the issue being the same for both neighbourhoods; while in others there was a complete lack of any cohesive response to a particular threat or issue.

What was evident from the surveys in the three cities¹ was that not only did the majority of residents not form or join a community group to address an issue, 58 per cent of them had never taken up any issue individually with their council. This was despite the fact that in many of the areas surveyed there were substantial issues needing to be addressed.

The St Kilda residents surveyed were the most likely to have taken up one issue or more, perhaps because they were the most highly educated of the respondents from the three cities. The implications of such findings for emergency managers needs to be taken into account in any recovery programs. Many residents just do not have the skills necessary to participate in such programs nor do they have access to information that would help them in the understanding of such processes.

From the research in these three cities, circumstances, including the mechanisms established by the council enabling participation and information dissemination, determined:

- the composition, if one was formed, of a group of like-minded citizens at any one time
- how residents viewed their neighbourhood (was it a temporary abode, a dormitory to go home to?)
- the degree of conflict and competition for scarce resources present which

might aid community formation

- whether empowerment of the less privileged existed
- whether any residents were aware of policies and proposals that may have affected them
- if residents who were aware subsequently contacted fellow residents
- the commonality of the residents including the ideological approaches present (for example conservative or altruistic or Not In My Back Yard (NIMBY))
- the degree of community concern, competence and the effectiveness of any submission presented by them
- the skills available to the community; the level of access they had to the council; and, how comfortable residents felt in their dealings with the bureaucracy in particular

While the composition of the community was important, it was not simply the 'haves' who formed communities and participated while the 'have nots' did not. While the haves are the most likely participants, and are therefore most likely to be positive beneficiaries of the recovery processes, these people also have often been excluded from the participatory processes or they may have excluded themselves. Prior to the most effective participation of any citizen occurring, the long-term, full development of the citizen particularly in the area of skills development needs to be present and many of the haves also feel that they are lacking in this field.

To summarise then, proximity does not always equal community in fact in many geographic areas there may be a number of communities often in conflict with each other. Even outside threats e.g. development or response to a disaster may not lead to a community developing or to re-bonding as there may not have been any community togetherness prior to the event.

Implications for emergency management

We have indicated that while there is no single community that embraces all citizens and represents a coherent and cohesive expression of all their beliefs, opinions and aspirations there are multiple communities that co-exist in time and space. We have also suggested that within the community as defined by a given geographical area there may be groups that compete with each other for limited resources.

This suggests three issues to us:

- Emergency management planners need

to be more astute and sophisticated in the ways in which they analyse communities. They can no longer assume simply that there is a single, unified community that is all that has to be engaged in planning and management of hazards, risks and emergencies.

- We need to be more shrewd in how we develop strategies for engaging the various communities that co-exist within a given government area and how we mediate between competing interests.
- We need to develop skills and techniques for including diverse and sometimes differing groups and their aspirations in the planning and management processes. Moving from unity to diversity will require us to apply skills of negotiation and conflict management that we have rarely applied previously.

Dealing with these issues therefore necessitates re-skilling, to a greater or lesser extent, of agencies involved in emergency management. We therefore have to meet our own challenges first and then move on to provide better support to the community in planning and management.

References

Bell C. and Newby H. (1971), *Community Studies: An Introduction to the Sociology of the Local Community*. George Allen and Unwin, London.

Emergency Management Australia (2000) *Emergency Risk Management: Applications Guide*.

Hodges A. (1999), *Towards Community Safety*, Paper presented on 17 October 1999 to the Australasian Fire Authorities Council Conference 'Priority Community Safety'.

Ife Jim (1995), *Community Development. Creating community alternatives—vision analysis and practice*, Longman, South Melbourne, pp. 1-3, 14-17, 89-94.

Mabileau A., Moyser G., Parry G. and Quantin P. (1989), *Local Politics and Participation In Britain And France*, Cambridge University Press, Cambridge, pp. 190-191.

Marsh, Graham (1997), *Community Participation in the development of Policy at a Local Government Level A Study of Three Cities*, Unpublished PhD Thesis, RMIT Melbourne.

Standards Australia (1999) AS/NZS 4360:1999 *Risk Management*.

Willmott P. (1989), *Community Initiatives Patterns and Prospects*, Policy Studies Institute, London.

This article has been refereed

Notes

1. St Kilda Knox and Lewisham with the latter being in South East London

Evacuation of a passenger ship – is panic a major factor?

Introduction

The author of this research is concerned that many of the actions taken by those responsible for the safety of passengers on a ship are based on incorrect assumptions about how passengers will behave in an emergency. This leads to the misconception that notifying passengers that an emergency or potential emergency exists will result in large-scale panic. Consequently the decision to raise the alarm and begin preliminary evacuation preparations is often delayed with resultant disastrous consequences.

The 1995 amendments to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, (STCW 95), outline specific requirements for safety-related training. Included in this training is the requirement that all persons having responsibility for the safety of passengers in an emergency on board a passenger vessel undertake training in crisis management and human behaviour in emergencies.

The research that is reported here sought to prove or disprove the following hypotheses:

That those in charge of an emergency on a passenger ship believe that:

- panic is a natural occurrence in an emergency
- sounding an alarm, such as a fire alarm, will cause panic
- as a result of the above, the alarm should be delayed until absolutely necessary
- the research also sought to prove that the above assumptions and beliefs are generally held as a result of media reporting of incidents rather than actual participation in emergencies.

Training in crisis management and human behaviour in emergencies needs to recognise these widely held assumptions and beliefs and make students aware of their existence. To support the author's hypotheses a survey was conducted of seafaring students studying at the Australian Maritime College. A questionnaire was supplied to students that asked them to answer whether or not they believed that passengers would panic in an emergency and whether, as a result, they believed that the alarm should be delayed

by Peter Ockerby, Lecturer - Marine Firefighting, Australian Maritime College, Launceston, Tasmania.

until absolutely necessary. To find out why participants held these views the questionnaire also asked participants whether they held these beliefs as a result of participating in an emergency or as a result of reading media reports about emergencies.

Literature review

Panic is very often confused with stress and even people subjected to an emergency may reflect that they panicked, when in fact they only exhibited normal stressful behaviour.

There is a tendency to associate with panic actions that appear in retrospect to have been inappropriate. Yet none of these actions, even jumping, are clear or consistently reliable evidence for panic. For example, if an individual exposed to a fire as it spreads into a room is faced with a choice between perishing in the flames or jumping from a window, the latter would be a rational choice (Sime 1990, p. 74).

Stress behaviour may be defined as 'mental or emotional strain which may have some of the following symptoms: increased heart rate, sweating, nausea, breathlessness, speech difficulty and acute self-consciousness' (Truett 1988, p. 4). It should be apparent from this definition how easy it would be to confuse stressful behaviour with panic behaviour.

To assist in differentiating between panic and stress we can further categorise behaviour into two categories: coping and non-coping.

Panic is associated with non-coping behaviour while stress is associated with coping behaviour.

'The behaviour of passengers in a critical situation on board a passenger ferry' was a prize winning dissertation submitted by Jorgen Harbst & Freddy Madsen to the Danish Investment Foundation in 1991. In this research, Harbst and Madsen found that passenger behaviour is affected not only by the emergency, but also by factors leading up to the emergency.

Harbst and Madsen (1993) found that whether people are shopping in a supermarket, flying in a plane, staying in a hotel or travelling on a ship, they have generally accepted the risk. If they have generally accepted the risk they will not be motivated to study emergency instructions. Many people ignore airline flight attendants during their pre-flight safety demonstration or even if they do watch they may not really be paying attention. Similarly, very few people study the escape routes in a hotel. Therefore passenger behaviour should not be expected to be any different simply because people are on a huge ship that they believe to be invincible.

The concept of risk denial is also used to illustrate the belief that accidents only happen to other people. Dr Guylene Proulx from the National Fire Laboratory of Canada (Proulx 1994) has developed an underlying rationale for four concepts related to how people will react. These concepts are *avoidance*, *commitment*, *affiliation* and *role*.

Coping behaviour	Non-coping behaviour
Attempts to solve the problem	Makes no attempt to solve the problem
<i>For example:</i> Raises the alarm Removes threat Escapes rationally Considers others	<i>For example:</i> Reacts emotionally Becomes hostile Withdraws

Table 1: Coping and non-coping behaviours (adapted from Truett 1988)

Avoidance

This concept assumes that people will tend to ignore an unexpected event in the hope that it will go away. This reaction appears to be particularly strong upon discovery of a fire. The initial reaction is often to either look for a reasonable explanation or to ignore the danger signs. This concept often leads to a delay in the raising of the alarm. During the Bradford Football Stadium fire in England in 1985, in which 56 people were killed, television cameras clearly showed spectators watching the football match while the fire in the stand behind them was rapidly building in intensity (Dowling 1994, Proulx 1994). Following the grounding of the M/V Yorktown Clipper near Alaska in 1993, passengers continued with what they had been doing, even though the vessel had started to list (National Transportation Safety Board 1994).

Prior conditioning will also affect how people react. For example, it is well known that prior to the Titanic disaster people were led to believe that the ship was unsinkable. Conditioned to this belief, many people reacted accordingly and denied that the ship was in danger of sinking.

Commitment

This helps to explain the delayed reactions of people in response to signs of an emergency. Commitment assumes that people will finish one activity before paying attention to another, even if that other activity has the potential to put their lives in danger. If people have stood in a long queue or have paid for a meal in a restaurant they will be reluctant to leave. Ten people were killed in a fire in Woolworths in Manchester, England in 1979 (Dowling 1994). Although the fire started in clear view of over 100 people sitting in the store restaurant nobody took any action, continuing instead to eat their meals. In the fire in the Kings Cross Station in England in 1987 people were still entering the station despite smoke coming out of the tunnel system (Dowling 1994, Proulx 1994).

Affiliation

Research has shown that if people enter a building or ship as a group then they will want to evacuate as a group. People will often spend time assembling before evacuating, and then they will only move as fast as the slowest member of the group.

This model predicts that ... individuals will not be concerned solely with self-preservation. They will be even more concerned than usual to retain or make contact with other

group members with whom they have close psychological ties and who are also threatened (Sime 1983, p.21).

For example, should a parent be expected to follow directions to an assembly station when they know that their child is asleep in a cabin two decks below? Yet to allow them to go down to their cabin will impede the evacuation of other passengers on their way up.

This caused problems during the Summerland fire on the Isle of Man in 1973 in which fifty people died. This building was a leisure complex and children's activities were quite separate from those of adults. Instead of making for the nearest exit many people, not unnaturally, tried to recover their children. This caused conflicting streams of traffic with some people trying to enter further into the building while most were trying to evacuate (Summerland Fire Commission 1974).

Role

This concept is used to help explain the response of people according to their normal every day duties. Passengers and crew may be expected to respond quite differently in an emergency. Passengers will feel that it is not their duty to take charge or assist. Instead they will generally take a passive role and look to the crew for advice and assistance.

The above concepts are supported by other research that is shown below in tabulated form.

Harbst and Madsen (1993) indicate that when an emergency arises, passenger behaviour will be similar to the following model:

- 10% of people will accept that there is danger
- 30% of people will look for further evidence of danger
- 60% of people will initially ignore the signs of danger

Harbst and Madsen (1993) then quote research to illustrate the likely actions of people once they have accepted that a dangerous situation exists:

- 10% will attempt to evacuate.
- 5% will attempt corrective action; eg, start fighting the fire.
- 10% will attempt to warn others.
- 60% will wait for instructions or look to others' initiatives
- 12 - 14% will become paralysed and take no action; eg, wait in their cabins
- 1 - 3% will panic

Given that panic is undesirable the risk should be reduced as much as possible. A common approach is to delay raising the alarm.

'We don't want to cause panic'.

'We don't want to alarm the passengers.'

'We'll go and investigate it first, see if it's worth notifying the passengers'.

'It may not be anything worth worrying about.'

These and other similar responses are very common when signs of an emergency are present. Due to a misguided sense of wanting to avoid panic and not inconvenience the passengers, those in charge consistently delay raising the alarm. Besides the problems caused by a delay in raising the alarm one must question whether it is morally correct. Morally, can one justify not notifying the passengers of an emergency, or potential emergency, simply because of concern about how they may react? The author believes that it would be better to notify the passengers and give them the facts. If they are given sufficient, timely information, passengers should be able to take reasoned actions.

Media reporting of fires that attribute the cause of death to panic also serve to confirm this belief. 'For a long time, it has been common practice in the media to depict those who die in fires as victims of their own propensity for "panic" or irrational or egocentric behaviour, ...' (Proulx & Sime 1991, p. 844). For example, in 1977 a fire broke out in the Beverly Hills Supper Club in Kentucky, USA. Headlines that followed included:

Panic Kills 300

Panic and 300 Stampeded to Death A Killer Called Panic

The official report concluded that panic was not a major contributing factor to the loss of life. It did however, identify human factors other than panic, including a delay in notifying people of the fire. An announcement asking people to leave was not given until about twenty minutes after the discovery of heavy smoke. Additionally, there were 1350 people in the room where the fire originated, although the recommended capacity was only 536 people. It should also be noted that the number of deaths was 164, not 300 (Truett 1988).

Yet, those reporting on fires are usually observing from outside and when they make their report they have the benefits of hindsight and of having been able to gather all the facts. Sime (1990, p. 72) states that 'flight is not the normal way of leaving a building. Because of this, it looks much more disorganized to independent commentators on the fire or even individuals in the situation than in fact it is'. Sime (1990, p. 74) then discusses how 'the lack

of use of exits and competition for a single exit are often cited as evidence for panic'. In doing so, he quotes Turner and Killian (1957, p. 10, as cited by Sime 1990, p. 74) who state that:

When people, attempting to escape from a burning building pile up at a single exit, their behaviour appears highly irrational to someone who learns after the panic that other exits were available. To the actor in the situation who does not recognize the existence of these alternatives, attempting to fight his way to the only exit available may seem a very logical choice as opposed to burning to death.

Numerous case studies exist where the alarm was delayed because those in charge were concerned about panic. In some cases the gamble paid off, and no harm was caused. Yet in others, the delay in raising the alarm contributed to a major loss of life.

In 1989 the British ro-ro vessel *Earl Granville* struck a rock near the entrance to Cherbourg Harbour (Marine Accident Investigation Branch 1991). At the time she was carrying 707 passengers and approximately 170 cars from Portsmouth to Cherbourg. Following the grounding extensive flooding occurred within the double bottom. A substantial quantity of water also entered some machinery spaces and the carpenter's store. The Master, realising that there was a very real danger of capsizing or sinking, considered beaching the vessel in shallow water in the outer harbour. However, the vessel remained upright and passage was continued to the inner harbour and berth.

Despite the seriousness of the situation the Master stated that he did not make an announcement to the passengers at any time as he did not want to start a panic among 700 passengers. Additionally, no distress or urgency messages were sent, save for a radio message to the ship's agent requesting the port authorities to obtain divers, pumps and a lay-by berth.

A number of recommendations were made following the investigation into the incident, including:

Masters should not hesitate to alert crew and passengers, and to broadcast an urgency (PAN) signal, whenever an incident occurs which may imperil the ship. Undue alarm is far more likely to be caused if this is not done and then subsequently emergency procedures have to be pursued in haste than if preparatory action is taken in good time (p. 8).

In 1993, the US passenger vessel *M/V*

Yorktown Clipper struck a rock in Glacier Bay, Alaska (National Transportation Safety Board 1994). The hull was pierced in several locations and the vessel began to flood. On board were 134 passengers and 42 crew members. Despite the impact being felt and heard throughout the vessel the master did not sound the general alarm because he wanted to evaluate the situation first to avoid unnecessarily alarming the passengers. About 15 minutes after the grounding he used the public address system to advise passengers to return to their cabins and don life preservers. Although most crew members were prepared to react in an emergency, the lack of a general alarm created uncertainty about their actions. About 30 minutes later the master again tried to use the public address system to advise the passengers to muster. However, opened electrical circuits had caused failure of the public address system and crew members had to advise passengers individually.

All passengers and non-essential crew were safely evacuated and transferred to nearby vessels and there were no reports of injuries. The investigation into the incident by the US National Transportation Safety Board acknowledged that the procedure used by the master to assess the danger did not adversely affect passenger safety, in this accident. However, the report also states that:

Under other circumstances, a delay in getting the passengers into their life jackets and getting the crew and passengers to their muster stations could be critical to their survival. The Safety Board believes that precisely because the seriousness of the situation is unknown immediately after an accident, the general alarm should be sounded.

Rather than creating confusion, sounding the alarm will inform passengers and crew that the master is aware of the emergency and is taking action. Further, time spent making an evaluation before making an announcement cannot be recovered, and if a vessel is about to sink, there may be insufficient time left to conduct a safe and orderly abandonment (p. 33).

The above findings are supported by the results of research commissioned by the Tyne and Wear Metro Passenger Transport Executive to assess their communication system in relation to safety criteria set out in the Fire Precautions (Sub-surface Railway Stations) Regulations 1989. Proulx and Sime (1991)

report the results of this research in a conference paper titled 'To prevent panic in an underground emergency: Why not tell people the truth?'

To assess the behaviour of train passengers in an emergency an experiment involving five different evacuations was conducted in one of the underground stations. In each experiment the scenario was similar, the time of day was similar, only the information given to passengers varied. Each experiment provided progressively more information. For example, experiment one provided only a fire alarm whilst experiment five provided an alarm bell with directive public announcements.

The results of this research demonstrated that the more information that was provided to the passengers the better the evacuation results. In experiment one it took nearly nine minutes before passengers started to respond to the alarm and this was only achieved when the fire brigade arrived and started telling people to leave. The exercise was ended after nearly fifteen minutes with people still inside the station.

In contrast exercise five utilised the alarm bells followed by directive information including that there was a suspected fire, its location and how people should behave. In this exercise people were moving out of the station within one minute and the evacuation was completed within six minutes, save for two groups of people. One group had a baby in a pushchair and the other group had a big pram. These two groups took seven and ten minutes respectively.

In their research report Proulx and Sime (1991, p. 850) note that:

Some concern was expressed in prior discussion with senior management that an explicit P.A. reference to a threat, namely 'There is a suspected fire on the N/S escalators' might lead to 'panic'.

However, the authors note that the opposite occurred, and whilst the statement did not encourage panic it 'provoked sufficient stress to initiate an evacuation, while keeping passengers sufficiently calm to evacuate in a prompt and orderly fashion' (Proulx & Sime 1991, p. 851).

In their report of the above research Proulx and Sime (1991, p. 852) concluded that 'in an emergency telling people the truth about an incident appears to be the best way to convince them of the gravity of a situation'. Sufficient information should therefore be provided to enable informed decision making and provide people with ample time to safely evacuate. This is supported by research into other

types of emergencies:

Emotions or feelings generated by flood warnings can include disbelief, boredom, anxiety, fear or even excitement. It seems, though, that many warnings fail to generate any feelings or interest at all. The message should therefore contain wording which is designed to motivate or arouse (Emergency Management Australia 1995, p.27).

Barry Sweedler, director of the National Transportation Safety Board's Office of Safety Recommendations and Accomplishments states (The Associated Press 1998) 'if you're in a hotel room and smoke is detected, the alarm goes off, it doesn't go off in the manager's office. We don't have that on vessels. We'd like to see that'.

Readers should consider these comments, and those of the previous case studies and research reports in the context of the following incident:

In 1994 the passenger ro-ro ferry Estonia, travelling from Yallinn to Stockholm capsized and sank with the loss of over 900 lives. A summary of the conclusions, published in the journal *Safety at Sea International* in February 1998, notes the following:

The lifeboat alarm was not given until about five minutes after the list developed, nor was any information given to passengers over the public address system. By the time the alarm was given, the list made escaping from inside the vessel very difficult. This, together with problems in using life-saving equipment contributed to the tragic outcome (p. 15).

The above incidents illustrate the importance of raising the alarm and notifying passengers and crew. While in some cases a delay in raising the alarm does not result in undue risk it is very clearly a gamble. A gamble, that if lost, may result in unnecessary injury and loss of life.

Data analysis

The following data analysis details the responses to the survey questions in relation to the hypotheses that were developed for this research.

Figure 2 illustrates that most of the respondents had been involved in an emergency. The question deliberately avoided specifying that the emergency had to occur on a ship as the author simply wished to know if respondents had been involved in an emergency of any type.

Although the majority of respondents who provided a response indicated that they did not feel the urge to panic they did not view the actions of others as favourably. This can be seen in the results

Question	Yes %	No %
Have you ever been involved in an emergency?	91	9
Did you feel the urge to panic?	33	67
Did other people appear to panic?	48	52

Figure 2: Had respondents been involved in an emergency?

Question	Yes %	No %
Have you seen or read media reports of emergency incidents where panic occurred?	70	30
Have you read official reports where panic occurred?	57	43

Figure 3: Had respondents read of incidents where panic occurred?

for the last question that shows a similar number of people thought others appeared to panic as those who did not.

The questionnaire then provided room for those who had been involved in an emergency to outline the type of emergency and their actions. Apart from one respondent who indicated that he had been involved in a house fire all the others who completed this section indicated that their emergency had occurred on board a ship. The types of emergencies described could mainly be described as fires or groundings although one did include a man overboard emergency and another included being hit by a missile during the gulf war.

The next section of the questionnaire sought to find out whether respondents had read of incidents where panic had occurred. The results obtained to the questions relating to this area are summarised in Figure 3.

The results to this section indicate that the majority of respondents had seen or read of incidents where panic had occurred, either in the media or in official reports. Respondents were then asked to describe why reports of panic occurred, and of those that completed this section the comments included:

- lack of training/understanding
- it is my experience that the level of panic is proportional to the level of danger and the behaviour of the leader
- failure to issue orders
- during a fire on a passenger vessel the music continued to play in between announcements concerning the gradual disintegration of the ship; this deliberate obfuscating contributed to anxiety levels throughout the incident
- panic when people trapped in fire, no lighting, no plan or equipment

- passengers not being 'led' by crew. Crew did not communicate
- lack of communication, passengers not being told what was expected of them
- lack of command/leadership, communication problems, nationality/language problems
- media publicity is sold better with panic situations
- the crew or passengers were not prepared, no emergency drills were carried out on board
- media beat up is certainly common, ignorance of facilities and procedures is a far greater killer than panic but it doesn't make as good a story.

The comments here were pleasing in that where respondents had read of panic occurring they were able to see past the description of panic and ascertain the underlying cause. As can be seen above the cause mainly centred on communication, leadership and training aspects, although two respondents commented on the media using panic to make the report more exciting.

The third section of the questionnaire then asked respondents to indicate their views to a number of statements relating to human behaviour and panic. In this section respondents were provided with three response choices, 'yes', 'no' or 'don't know'.

Analysis of Figure 4 (overleaf) highlights some interesting results. Although the majority of respondents believe that passengers can be expected to panic in an emergency and that sounding the alarm will cause panic, they also believe that public address announcements should include the reason for the emergency. Therefore it would appear that most respondents believe that when, and if, passengers have to be told about the

Question	Yes %	No %	Don't know %
Passengers can be expected to panic in an emergency	59	18	23
Sounding the alarm will cause panic	30	57	13
Public address announcements should include the reason for the emergency	67	20	13
Panic is a major cause of death in an emergency	42	33	25
The sounding of the alarm should be delayed until absolutely necessary	25	71	4

Figure 4: Did respondents believe passengers were likely to panic in an emergency?

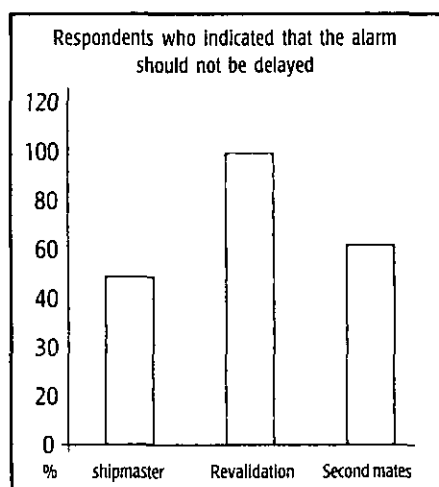


Figure 5: Breakdown of respondents into individual groups

emergency they should be kept fully informed.

Many of those who believe that passengers can be expected to panic also indicated that the alarm should not be delayed until absolutely necessary. Figure 5 provides an interesting comparison between each group of respondents to the last question.

The Second Mate students consisted largely of young cadets who had completed at least the minimum sea time of eighteen months that is required before being allowed entry to the course. Shipmaster students consisted of those students with more sea time who were studying to gain the qualifications to become a Master of a

ship. The Revalidation course is required by maritime legislation for those who wish to maintain their sea going qualifications but have not worked at sea for five years.

The revalidation students, who consisted of experienced senior seafarers, indicated that the alarm should not be delayed until absolutely necessary. Each respondent in this group also indicated that they had been involved in an emergency. In contrast only 50% of Shipmaster students and 66% of Second Mate students indicated that the alarm should not be delayed until absolutely necessary. This result therefore appears to indicate that experience demonstrates that it is best to raise the alarm early rather than leave it until there is no alternative.

The final section of the questionnaire related to the hypothesis that people believe that an alarm should be delayed until absolutely necessary.

The results in Figure 6 appear to contradict the hypothesis as they show a clear majority of respondents believing that the alarm should be raised immediately an emergency or potential emergency occurs. However, analysis of the three groups of respondents produced the following results:

Figure 6 illustrates that people with the most experience are more likely to raise the alarm immediately. Additionally the only revalidation student who indicated that the alarm should be delayed explained

If an emergency or potential emergency occurred on a passenger ship do you think those in charge should:	Yes %	No %
Immediately sound the general alarm to notify crew and passengers	65	35
or		
Seek further information before sounding the alarm	35	65

Figure 6: In an emergency, should an alarm be delayed?

that his response was for electronic alarms only. An analysis of the explanations of those who indicated that the alarm should be raised immediately indicates that most believe that early information is vital to allow safe evacuation. It should be noted that the majority of the comments in support of raising the alarm immediately were from the revalidation students.

- From experience on merchant vessels and in the hydrocarbon industry, waking people up unnecessarily or interrupting meetings/work is far better than letting a situation develop further.
- The rationale for response is that an emergency or potential emergency will most likely be quite apparent to passengers/crew anyway. Armed with such awareness passengers/crew would immediately anticipate an announcement by the command concerning the emergency. Failure to provide such an announcement would contribute to increased anxiety levels.
- Emergencies can soon get out of control.
- Early warning and frequent information will alert and prepare people for the emergency. It is easier to cancel the alarm than to have mass panic at the last moment.
- Properly informed passengers are more likely to make more rational decisions if given time to prepare both mentally and physically.

The above comments illustrate that those who support immediately raising the alarm do so in the belief that the inconvenience of false alarms is outweighed by the necessity to prepare people mentally and physically when the emergency turns out to be real. Conversely the comments of those who support investigating before sounding the alarm do so out of concern for unnecessarily inconveniencing people for false or minor emergencies. Additionally there were very few supporting comments from those who indicated that further information should be sought before sounding the alarm. The main comments from those who indicated their support for this position were:

- Carrying passengers is a commercial enterprise and making their voyage enjoyable and incident free needs to be balanced with their safety.
- Many alarms are automated and can be activated by 'burning toast' and it is probably not necessary to unnecessarily alarm the passengers.
- If the emergency is only electronically indicated; e.g. fire alarm, then checking the alarm quickly is required. If it does

exist then notify others.

There were no comments from those supporting the delaying of the alarm to prevent panic. The main concern appeared to be unnecessarily worrying or inconveniencing passengers for false alarms, especially those activated by electronic means.

Discussion

In this section the results of the survey are discussed and compared with the literature review in relation to each hypothesis. Readers should be aware that this section presents the author's interpretation of the results.

That those in charge of an emergency on a passenger ship believe that panic is a natural occurrence in an emergency.

Only nine percent of respondents indicated that they had never been involved in an emergency. Of those who indicated that they had been involved in an emergency, only thirty-three percent indicated that they felt the urge to panic. However forty-eight percent believed that others appeared to panic. This is consistent with the results of other research that found that because people were in a hurry to leave a dangerous situation 'it looks much more disorganised to independent commentators on the fire or even individuals in the situation than in fact it is' Sime (1990, p.72).

In relation to this hypothesis respondents were asked to indicate whether they thought that passengers might be expected to panic in an emergency. Fifty-nine per cent of respondents indicated that they would expect passengers to panic, twenty-three percent did not know whilst only eighteen percent indicated that they would not expect passengers to panic. The results would therefore appear to support this hypothesis. Given that nearly fifty percent of respondents who have been involved in an emergency indicated that others appeared to panic it is perhaps not surprising that respondents would expect passengers to panic.

Participants undertaking the Crisis Management and Human Behaviour in Emergencies course therefore need to be aware how observers view the behaviour of others. The behaviour of passengers hurriedly making their way to their cabins to locate family members, instead of following directions to assembly stations, should not inadvertently be construed as panic. Misinterpreting the behaviour of passengers could lead to flawed decision making. For example, if ship's officers observe the aforemen-

tioned behaviour in an emergency then next time they may consider delaying the alarm out of concern for 'causing panic'. Those responsible for the safety of passengers therefore need to have a good understanding of human behaviour so that they will be able to appreciate why people are acting in a certain manner.

That those in charge of an emergency on a passenger ship believe that sounding an alarm, such as a fire alarm, will cause panic.

The results of this research are consistent with other studies mentioned earlier in the literature review. In this study the majority of respondents indicated that sounding the alarm will not cause panic whilst only a minority indicated that they believe that sounding the alarm *will* cause panic. This hypothesis was therefore not supported as the majority of people believe that sounding an alarm will not cause panic.

However, there are important implications for those responsible for the safety of passengers in an emergency. The underlying theme apparent from the literature review is that passengers will need more than one cue to motivate them to take the emergency seriously and begin evacuating. Whilst it appears that there is little need for concern about an alarm causing panic the fact that people largely ignore them is cause for concern. For example, in Proulx and Sime's (1991) study passengers needed an alarm plus authoritative public address announcements that there was a fire before they took the situation seriously.

Even in the Woolworth's fire in Manchester in 1979 (Dowling 1994) shoppers remained seated in the restaurant even though they were in full view of the developing fire. They did not begin evacuating until someone came over and shouted at them to leave. Harbst and Madsen (1993) found that when an emergency arises only ten per cent of people will accept that there is danger while the others will either initially ignore the signs of danger or look for further evidence.

Those with responsibility for the safety of passengers should therefore be aware that more than one cue will be needed for passengers to take an emergency seriously. Simply sounding an alarm and then expecting passengers to make their way to assembly points that have been identified during safety drills is unlikely to be successful. Authoritative public address announcements supported by the presence of uniformed staff giving

directions will be needed to ensure passengers appreciate the seriousness of the situation and begin to evacuate in an orderly and safe manner. Emergency Management Australia (1995, p.27) also states that:

Those designing messages should not be worried about causing inappropriate concern or 'panic': the real problem is usually one of persuading people to take action rather than doing nothing.

This point needs to be reinforced during the teaching of the Crisis Management and Human Behaviour in Emergencies course.

That those in charge of an emergency on a passenger ship believe that as a result of the first two hypotheses that the alarm should be delayed until absolutely necessary.

There were two questions relating to this hypothesis. The first asked whether respondents believed that the alarm should be delayed until absolutely necessary. The second asked respondents to indicate whether they would immediately sound the alarm to warn crew and passengers or seek further information before sounding the alarm.

The majority of respondents indicated that the alarm should not be delayed until absolutely necessary. A similar response was achieved to the question asking respondents to select their preferred course of action with the majority also indicating that the alarm should be sounded immediately an emergency or potential emergency exists.

Although the sample group was relatively small the results do appear to indicate that experience influences how a person will react. The revalidation students, who possessed considerable seagoing experience, all believed that alarms should be sounded immediately there is evidence of an emergency or potential emergency. These students believed that any inconvenience due to false alarms is outweighed by the necessity to begin emergency preparations in the event that the emergency proves real.

However, the comments from the shipmaster and second mate students, who had more limited experience at sea were mixed, with some believing that passengers should not be inconvenienced or unduly alarmed until an emergency is proven to be real.

The research and case studies that were cited in the literature review support the views of the revalidation students. Attention is drawn to the comments of

the Marine Accident Investigation Branch (1991) following the grounding of the Earl Granville in Cherbourg Harbour about the need to take preparatory action. The National Transportation Safety Board (1994) also made similar comments after the M/V Yorktown Clipper struck a rock in Glacier Bay, Alaska.

Those teaching the Crisis Management and Human Behaviour in Emergencies course need to be aware of the above results. Instructors should ensure that participants, particularly those with relatively little experience, are aware of the need to raise the alarm and begin preliminary evacuation procedures, especially when the seriousness of the situation is unknown.

That the above assumptions and beliefs are generally held as a result of media reporting into incidents rather than actual participation in emergencies.

This hypothesis produced some interesting results. As reported previously ninety-one percent of the respondents indicated that they had been involved in some type of emergency. Of these, only thirty-three percent felt the urge to panic and only forty-eight percent thought others appeared to panic. Yet seventy percent had read of media reports where panic had occurred and fifty-seven percent had read official reports where panic had occurred. Why then do media and official reports differ from the experiences of those people who have been involved in emergencies?

The answer may most likely be found by revisiting the research of Sime (1990, p. 72) and Turner and Killian (1957, p. 10, as cited by Sime 1990, p. 74). These researchers concluded that with so many people evacuating together it is easy for the evacuation to look disorganised to observers.

The underlying reasons for 'panic' occurring can mainly be attributed to problems associated with communications, training, leadership or simply media 'beat up'. In fact whether panic did even occur is probably also open to conjecture. For example, in the Beverly Hills Supper Club fire, where headlines attributed the cause of death to panic, 'the cause of death was smoke and carbon monoxide inhalation' (Sime 1990, p. 66). The report attributed the lack of panic 'to insufficient appreciation of the seriousness of the emergency and acceptance by the staff of their responsible role in directing people to the exits' (Sime 1990, p. 66). Further, the report concluded that 'panic is not consi-

dered a major contributing factor to the large loss of life ...' (Best 1977, p. 66, as cited by Sime 1990, p. 66).

During the teaching of the Crisis Management and Human Behaviour in Emergencies course a mix of official reports and corresponding media reports should be used. Teaching methods may include the use of syndicate exercises whereby groups examine reports for panic and then try to ascertain if panic did occur and what were the contributing factors. Syndicate findings would then be presented to the rest of the course in a plenary session.

Recommendations

After analysing and discussing the results of this research in conjunction with the literature review the author makes the following recommendations:

1. Those people who have responsibility for the safety of passengers in an emergency on a passenger ship should be made aware of how easily stress and/or flight behaviour can be misconstrued as panic. Misinterpreting the behaviour of passengers may lead to flawed decision making.
2. People with the responsibility for notifying passengers that an emergency or potential emergency exists must consider that the use of an alarm in isolation from other means of communication is unlikely to ensure an effective evacuation. Passengers need more than one cue before they will take the situation seriously so alarms must be supported by authoritative public address announcements and directions from uniformed ship's crew.
3. Where there is any doubt about the seriousness of an emergency, or when all the facts are not known, preparations for evacuation should begin. This does not have to mean a full scale evacuation of the ship but it should at least include notifying passengers and have them start to make their way to the assembly points. A delay in the early stages of an evacuation could lead to a massive loss of life during the later stages.
4. The teaching of the 'Crisis Management and Human Behaviour in Emergencies' course should incorporate the use of media and official reports to illustrate that panic is often misinterpreted for other forms of behaviour. These reports should also be used to examine the underlying reasons for any evacuation problems. Instructors should consider this and the aforementioned recommendations during the planning stages of the course.

References

- Dowling D.M. (1994), 'Action in the event of fire: Human behaviour — a firefighter's view', *Fire Engineer's Journal*, vol. 54, no. 173, pp.20-24.
- Emergency Management Australia, (1995), *Flood Warning: An Australian Guide*, Mount Macedon, Victoria.
- Gardner J. (1996), 'Building design and human behaviour in fires', *Fire Engineers Journal*, vol. 56, no. 193, pp. 18-20.
- Harbst J. & Madsen F. (1993), 'The behaviour of passengers in a critical situation on board a passenger vessel or ferry', IMO Maritime Safety Committee, 62nd session, item 23.
- International Maritime Organization, (1996), *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 (STCW 95)*, London.
- Marine Accident Investigation Branch, (1991), 'Report on the grounding of the British ro-ro vessel Earl Granville off Cherbourg on 19 August 1989', Southampton.
- National Transportation Safety Board, (1994) 'Marine accident report—Grounding of U.S. passenger vessel M/V Yorktown Clipper in Glacier Bay Alaska, August 18, 1993', Washington.
- Proulx G. & Sime J.D. (1991), 'To prevent panic in an underground emergency: Why not tell people the truth?' in *Fire Safety Science: Proceedings of the Third International Symposium*, eds. G. Cox & B. Langford, London.
- Proulx G. (1994), 'Human response to fires', *Fire Australia*, August edn, pp.14-16.
- Safety at Sea International (1998), 'Estonia — the final report', no. 347, pp.14-15.
- Sime J.D. (1983), 'Affiliative behaviour during escape to building exits', *Journal of Environmental Psychology*, vol. 3, no. 1, pp.21-41.
- Sime J.D. (1990), 'The concept of panic', in *Fires and Human Behaviour*, 2nd edn, ed. D. Canter, David Fulton Publishers, London.
- Summerland Fire Commission (1974), *The Summerland Fire*, Isle of Man Government.
- The Associated Press (1998), 'Safety board recently weighed in on cruise ship fire safety', [on-line]. Available at: www.chron.com/co.../96/09/29/cruise-29.html.
- Truett T. (1988), *Fire Safety Management 1 - Study Guide*, The School of Mines & Industries, Ballarat, Australia.

This article has been refereed

Government policy on public health, food safety and environmental issues —

lessons from BSE in Europe (emergency management, mad cows, anxious politicians, science and the media!)

Introduction

Although bovine spongiform encephalopathy (BSE), or 'mad cow disease', is not present in Australia it raises crucial issues for those elements of the Australian scientific and emergency management community that are concerned with public health and environmental issues.

In the developed world, governments seem to be moving away from regulatory responsibility for various industries under the banner of economic rationalism and market deregulation. Consumers, because they are better educated—and because they appreciate their natural and legal rights—expect, for example, a 'no risk' food supply. In western democracies the media, and historically the press, have taken the responsibilities of their investigative reporting role seriously. However, in some areas of the media investigative reporting appears to have developed, in the search for a 'good story', into a role (real or perceived) as leaders in, or at least promulgators of, society's moral well being.

The food producing industry, and the scientific and regulatory community that supports it, has to work within this new framework, in which society appeared to assume before BSE occurred, the following:

- in hindsight, man-made disasters are preventable
- scientific knowledge is complete
- governments should have effective regulatory controls for everything
- industry is able to self-regulate to high levels of competence, for example in food safety
- all of this should be achievable within the government budget
- most important government, and some industry, decisions are made with long-term and altruistic aims
- politicians and bureaucrats generally make rational policy and decisions based on the available scientific information

Since the publicity and public inquiries surrounding the appearance of BSE in the

by Terry Nicholls, National Offices,
Agriculture, Fisheries and
Forestry, Australia.

UK, public opinion, as expressed in polls and media coverage, is that the UK government and industry can be venal, uncaring and insensitive, and that self-regulation (or co-regulation) is merely a euphemism for absence of regulation.

As well, scientists, or at least non-government scientists in the UK, are seen as courageous while government scientists are seen as heartless, and they and their political masters, do not care about human life because they twist and selectively interpret scientific information to suit a political-industrial agenda (Jenkins 1996).

These assumptions and the changed public perceptions following the BSE episode were difficult for the UK government and industry to manage. Examination of the BSE story is, therefore, a salutary experience internationally for all government policy experts, regulators and scientists, as it is for food safety experts in industry and potentially for managers of biological (including environmental) emergencies.

Society seems to assume, employing hindsight promoted through the media, that BSE and new variant Creutzfeldt-Jakob Disease (vCJD) could have been predicted, prevented and better managed. This is the underlying theme of the BBC Panorama documentary TV program on BSE, shown on the ABC *Four Corners* program in August 1996 and in much of the subsequent media enquiry and investigations.

A brief early history of BSE

BSE is the latest form of a number of transmissible spongiform encephalopathies (TSEs), or slowly developing

neurological diseases that cause microscopic cavities in the brain of animals leading to nervous dysfunction and inevitably to death. TSEs are well described in humans, particularly Creutzfeldt-Jakob Disease (CJD) and kuru. In animals, scrapie in sheep, transmissible mink encephalopathy and chronic wasting disease of mule deer are all also well described.

There is a strong genetic influence in susceptibility to these diseases (Junghans, Teufel, Buschman, Steng and Groschup 1998).

TSEs are transmissible, but the agents causing these diseases do not, as far as is known, contain nucleic acids (the genetic code of life). The TSE agent is thought to be an altered-host encoded protein, or prion, derived from central nervous tissue (Prusiner 1997).

TSE agents are resistant to heat, chemicals, ionising radiation and extremes of pH. The detailed pathogenesis of the disease and the process of infection are not well understood, but ingestion is generally accepted as the natural route of infection (Wilesmith, Wells, Cranwell and Ryan 1988). Diagnosis is on clinical grounds confirmed at necropsy by histopathology. Until recently there was no satisfactory ante mortem method of confirmation of diagnosis of BSE, but monoclonal antibody technology looks promising (O'Rourke, Baszler, Parish and Knowles 1998).

BSE first appeared in the United Kingdom (UK) in April 1985. Farmers observed dairy cows with changed demeanor and incoordination that progressed to recumbency and death within a few weeks. Investigations by the Ministry of Agriculture Fisheries and Food (MAFF) led to diagnosis and classification of the new disease in November 1986 (Wells, Scott, Johnson, Gunning, Hancock, Jeffrey, Dawson and Bradley 1987).

Further investigations incriminated ruminant-derived meatmeal fed to cattle

as a nutritional supplement as the likely cause.

Changes in carcass rendering practice were a likely cause of BSE amplification and transmission (Wilesmith, Ryan and Atkinson 1991).

The UK MAFF conducted a rapid and logical investigation of the precipitating cause (a change in rendering process). This led to a detailed epidemiologically based response and a management plan that was considered to be adequate at the time.

Then in April 1996...

In April 1996, the announcement of a suspected link between BSE and 10 (now 47¹) human cases of vCJD was made (Will, Ironside, Zeidler, Cousens, Estibeiro, Alperovitch, Poser, Pocchiari, Hofman and Smith 1996).

The communications revolution and the explosion of information—available to the media—led to a short term and unresolved public debate with massive political, economic and social consequences.

Modern communications, particularly on the Internet, have influenced media activity, which has in turn influenced international politics and community concerns in a synergistic and seemingly unpredictable fashion. This occurred following the linking of the 10 initial cases of a 'new variant' form of CJD with BSE.

The UK beef industry has been severely affected by the BSE episode. This is illustrated by a steady decline in cattle numbers. Domestic sales of British beef fell and beef exports have been interrupted culminating in a formal ban of UK beef in the EU. This has recently been lifted. Indirect effects were seen when beef consumption in countries as such Japan and Korea decreased in response to extensive and adverse international publicity on BSE.

Numerous national industry and government groups and working parties were formed to review the situation, and to enhance diagnosis and surveillance for CJD, vCJD and BSE around the world. Scientists have publicly displayed their hypotheses in an effort to attract fame and/or funding, enticed by an eager media.

Special interest groups opposed to animal use or meat consumption have

also used the situation to their advantage. Each new scientific publication has been scrutinised by the media for a story or news angle.

Discussion

Understanding all this activity is important for a country, such as Australia, that is a major exporter of primary produce. A number of questions can be asked.

Is there any identifiable pattern in the sequence of events in emerging diseases that could be of value to government and industry for the better management of potential public health, environmental (and biological emergencies in general)?

The key factors to identify and predict before they happen in the sequence of events that leads to any public debate on emerging issues are the potential for:

- media involvement
- involvement of human health, particularly deaths
- economic loss

If these last two factors are not brought to the attention of politicians, bureaucrats or industry leaders as community concerns by the media, then the development of policy and regulatory and/or quality management programs is likely to be slow. Public health and environmental issues are not generally seen as high priorities by decision-makers.

Can emerging situations with potential public health and trade importance be subjected to a meaningful science based risk analysis (Nunn 1997) in the face of a media-led adverse community reaction?

The human tragedy story line, particularly if child death is involved, gives the media leverage to raise the level of community awareness and concern to the point where industry and government have to take action.

Bad news is often all the news that is carried by the media (Lowe 1998). Rigorous science based risk analysis is not usually an option in these conditions. Direct economic factors such as loss of domestic and export markets due to consumer apprehension are also of major concern to government and industry, but usually secondary to human health issues.

The views of the scientific community, particularly government scientists, may be distrusted by the general community and media and may be largely irrelevant in the heat of a major media event. However, these views could be used in the risk communication aspect of risk

analysis to inform the public and influence public opinion before a major media event occurs.

Can risk analysis address public perception and apprehension about an issue?

Government and industry interest in potential public health disasters in western democracies appears to be minimal unless human life is actually lost. However, it may be reasonable from the cost-benefit perspective not to attempt to prevent disasters, but to repair the damage after a disaster occurs. This approach may have merit if there are many competing potential disasters, funding constraints, political and management inertia, and limited expertise associated with incomplete scientific and technical knowledge. However, excellent and flexible emergency management programs would be needed.

Are there key events, analogous to hazard analysis critical control points, that could be used to accelerate or improve the management of these events either by the scientific and regulatory communities or by government and industry?

Undertaking a systematic risk analysis may uncover such points, indicating that more development of preventive measures, public education to influence opinion, or the preparation of specific emergency plans might be indicated. If modern plagues such as AIDS, BSE and enterohaemorrhagic *Escherichia coli* are viewed from this broad perspective, then a pattern of failure to respond (unless it is politically necessary) to emerging human and animal disease problems can be discerned. Promotion of foresight and anticipatory risk analysis is a difficult task.

Do modern democratic governments, with their short time horizons and policy decisions influenced by economic factors and policies of increasing industry self-regulation, have the ability to manage emerging public health and environmental issues?

In the late 1990s the UK government politicians, bureaucracy and industry all wanted the emerging BSE problem to disappear from the public consciousness. This too, on reflection, would be expected in the political and economic environment in the UK at the time with its policies of industry self-regulation and 'small' government. It is also possible, conversely, that excessive or heavy handed action taken in the early stages of the BSE

Notes

1. Department of Health UK, 1999/0646 Monthly Creutzfeldt-Jakob Disease Figures posted on FSNET November 4 1999.

outbreak from 1985 to 1995 could have invited criticism of over-reaction and misuse of scarce resources.

Governments and government bureaucrats need a structured approach to present arguments to the public justifying preventative action, or at least the establishment of emergency management protocols for the identified hazard.

Are media influences and consumer attitudes a positive or negative influence in the management of emerging issues?

In the April 1996 BSE/vCJD episode the Internet ran hot with both informed and ill-informed debate and the public opinion of government and industry, including public sector scientists, plummeted. There is no doubt that the media can make the logical management of biological emergencies extremely difficult. Conversely, good use of the media to communicate knowledge and information can reduce misinformation and speculative hyperbole that can be distracting to emergency management of the issue.

Options

The transfer of regulatory responsibilities to industry further compounds this dilemma and complicates the management of biological emergencies. However, the scientific and regulatory agencies serving industry and government can develop a framework for managing emerging issues if they understand the sequence of events and influences that make emerging public health and environmental issues become significant public policy issues. Such an understanding could lead to a more systematic and collaborative policy and management approach, including emergency management, through risk analysis.

1. Government and industry can continue with existing practice, which is to let emerging issues take their natural course. This usually involves no or minimal action until pressure makes reaction necessary. In economic terms, with competition for funds for a number of emerging issues and with a limited ability to predict relative importance and/or potential catastrophes, this may be a viable option if the costs of repairing the disaster are less than prevention. However, this approach may also result in poorly directed, short-term decisions and inappropriate funding if the issue becomes the subject of media-led public debate. It may also lead to deliberate obfuscation, or indeed misleading statements by government as happened in the UK. That is, this

approach has the potential to become derailed by media and political reaction.

2. An alternative approach is for government and industry to undertake risk analyses, including cost-benefit studies, on emerging diseases or public health issues and environmental issues. Even if government or industry does not take preventive action then at least informed decisions could be made if the issue is targeted by the media and becomes the focus of attention. It also allows other groups, possibly the scientific community, to influence policy decisions with sound scientific information before media attention escalates. It might also lead to better planning and preparation for the emergency management of biological disasters.

Conclusions

Governments are in a difficult situation, caught between competing interests. On the one hand there is a policy-driven need to reduce costs, while on the other there is a demand for open-ended expenditure. This can lead to a systemic paralysis in the government or bureaucracy, so nothing or little is done.

The only other approach, already beginning to emerge in Australia, the US and the EC, is to attempt to undertake public health and environmental issue risk analysis (including cost-benefit studies and risk communication strategies). While this is the most logical course of action, and it may be the most cost effective, it is often not possible for the reasons given above.

In trying to implement change the first major challenge becomes obtaining the funds and an effective bureaucratic/legislative infrastructure to collect, coordinate and analyse information on the emerging issue. This is necessary to undertake subsequent cost-benefit studies to mount an economically rational argument as well as to be aware of public perceptions—and then effectively drawing it to the attention of government and industry for the implementation of effective and efficient action.

The second major challenge is to obtain the secure ongoing funds and infrastructure support to prepare for biological emergency management, including food safety, public health and environmental issues.

An understanding of the process that promotes emerging public health and environmental issues to issues of real political and economic concern is essential if scientists and emergency management professionals are going to

influence government and industry expenditure decisions and outcomes. If these issues are not resolved we will continue to follow the present evolutionary and crisis-driven pathway.

References

- Jenkins S. (March 27, 1996), 'Opinion. Use and abuse of science', *The Times*.
- Jensen H.H., Roberts T., Unnevehr L. and Hamm S. (1995), in 'The Economics of Reducing Health Risk from Food, Proceedings of NE-165 Conference', June 6-7, Washington, DC USA, ed. Julie A. Caswell, Food Policy Marketing Center, Department of Agricultural and Resource Economics, University of Connecticut, pp. 47-53.
- Junghans F., Teufel B., Buschmann A., Steng G. and Groschup M.H. (1998), 'Genotyping German sheep with respect to scrapie susceptibility', *Vet Rec*, 143, pp. 340-342.
- Lowe I. (24 October 1998), 'Forum. Tell it like it is', *New Scientist*, p. 52.
- Nunn M. (1997), 'Quarantine risk analysis', *Australian Journal of Agriculture and Resource Economics*, no. 41, pp. 550-578.
- O'Rourke K.I., Baszler T.V., Parish S.M. and Knowles D.P. (1998), 'Preclinical detection of PrPSc in nictitating membrane lymphoid tissue of sheep', *Vet Rec*, no. 142, pp. 489-491.
- Prusiner S.B. (1997), 'Prion Diseases and the BSE Crisis', *Science*, no. 278, pp. 245-251.
- Wells G.A.H., Scott A.C., Johnson C.T., Gunning R.F., Hancock R.D., Jeffrey N., Dawson M. and Bradley R. (1987), 'A novel progressive spongiform encephalopathy in cattle', *Vet Rec*, no. 121, pp. 419-420.
- Wilesmith J.W., Wells G.A.H., Cranwell M.P. and Ryan J.B.M. (1988), 'Bovine spongiform encephalopathy epidemiological studies', *Vet Rec*, no. 123, pp. 638-644.
- Wilesmith J.W., Ryan J.B.M. and Atkinson M.J. (1991), 'Bovine spongiform encephalopathy: epidemiological studies on the origin', *Vet Rec*, no. 128, pp. 199-203.
- Will R.G., Ironside J.W., Zeidler M., Cousens S.N., Estibeiro K., Alperovitch A., Poser S., Pocchiari M., Hofman A. and Smith P.G. (1996), 'A new variant of Creutzfeldt-Jakob disease in the UK', *The Lancet*, no. 347 pp. 921-925.

Author contact details

Terry Nicholls
National Offices
Agriculture, Fisheries and Forestry
Australia
GPO Box 858
Canberra ACT 2601
Email: Terry.Nicholls@affa.gov.au

Assessing the legal liabilities of emergencies

Introduction

This paper is divided into two thematic parts. First, it examines in a general way what type of emergency powers governments possess and what potential legal pitfalls might await emergency services personnel in undertaking their duties. Second, it explores the landscape of some of the legal liabilities issues associated with planning, crisis decision-making and evacuation.

Part one: emergency powers

Emergency management law is essentially the preserve of the States and Territories

The Australian Commonwealth-States constitutional arrangements assign responsibility for the management emergencies to the states and territories whose responsibility it is to maintain peace, welfare and good government.¹ It is also the reason why there is not a uniform corpus of emergency management law within the Australian Commonwealth. The net effect of this arrangement is that each state and territory has developed its own approach to emergency management.

Within this framework the Commonwealth government, largely through the Department of Defence's Emergency Management Australia organisation, plays a role albeit without any emergency management legislation. Under arrangements agreed with the states and territories the Commonwealth government provides support in two ways. First, it assists the states and territories to develop their capacity for responding to and recovering

by Nicholas Kanarev, Australian
Emergency Management Institute.
Presented at the Emergencies 2000
Conference, Sydney, on 10 April 2000

from emergencies. Second, it provides physical assistance to a requesting state or territory when that state or territory cannot reasonably cope using its own resources during an emergency.² The Commonwealth government also performs a specific role in emergency management providing physical and financial assistance to other countries in the event of a major emergency,³ reception for persons evacuated to Australia following an overseas disaster or civil emergency⁴ and in response to the re-entry of radioactive space debris.⁵

Despite there being an absence of uniformity regarding emergency management law among the states and territories, a degree of commonality does exist in the legislation when it comes to conceptualising emergencies and their management. At government level, emergency management is regarded in terms of an escalating scale of destruction with a commensurate level of government agency response. This approach views emergency in terms of magnitude and is measured by the number of deaths, injuries and extent of property damage. For example, Victoria's *Emergency Management Act 1986* defines emergency as:

*an actual or imminent occurrence of an event which in any way endangers or threatens to endanger the safety or health of any person in Victoria or which destroys or damages, or threatens to destroy or damage, any property in Victoria or endangers or threatens to endanger the environment or any element of the environment.*⁶

Likewise, in New South Wales the *State Emergency and Rescue Management Act 1989* regards an emergency as:

*an actual or imminent occurrence (such as fire, flood, storm, earthquake, explosion, accident, epidemic or warlike action) which: (a) endangers, or threatens to endanger, the safety or health of persons in the State, or (b) destroys or damages, or threatens to destroy or damage, property in the State.*⁷

Similar sentiments are expressed in the emergency management statutory regimes of South Australia,⁸ Tasmania,⁹ Queensland,¹⁰ the Northern Territory¹¹ and the ACT.¹² Western Australia is the only state which has not enacted specific emergency management legislation and relies on a cabinet directive, Policy Statement number 7, which is interspersed with applicable police, fire and state emergency service legislation.¹³

Response to an emergency is thus treated as a reactive process implemented by government instrumentalities (Salter 1995/1996). Moreover, the policy underlying emergency response is based on coercive power exercised by governments in a time of crisis in the interests of public safety.

Notes

1. *Australian Emergency Management Arrangements*, sixth edition 1999, EMA, p.6. See also for example, s5 *Constitution Act 1902* (NSW).
2. Under COMDISPLAM, see *Australian Emergency Management Arrangements*, p. 6 and p.12.
3. Under AUSASSISTPLAN.
4. Under COMRECPLAN.
5. Under AUSCONPLAN SPRED.
6. Section 4(1).
7. Section 4.
8. Section 4 *State Disaster Act 1980*.
9. Section 2 *Emergency Services Act 1976*.
10. Section 6 *State Counter-Disaster Organisation Act 1975*.

11. Section 4 *Disasters Act 1994*.

12. Section 3 *Emergency Management Act 1999*.

13. Sociologists such as Enrico Quarantelli of the Disaster Research Center, University of Delaware, dispute that the scope of an emergency ought to be measured by numbers of casualties or the extent of property damage. In Quarantelli's view it is possible to have a disaster or an emergency without deaths, injuries or property damage as happened in the United States in 1979 when minor spillage occurred at the Three Mile Island nuclear reactor. Following that event there was social disruption which lasted several weeks to the everyday lives of millions of people living within an eighty mile radius of the affected area. Social routines such as attendance at work, school and participation in recreational activity virtually ceased to exist. According to Quarantelli the essential character of a

disaster is the way in which it disrupts social organisation. Quarantelli, E., *Disasters are Different*, Preliminary paper #221, University of Delaware (1995) pp. 11-12. For other exponents of the social disruption model over the magnitude of event model see Dynes, R. R., Tierney, K. J., *Disasters, Collective Behaviour and Social Organization*, U. of Delaware Press, Newark, 1994, pp.1-10; Drabek, T. E., *Human System Responses to Disaster*, Springer-Verlag, New York, 1986, pp. 6-7. Indeed, from a litigious point of view the social disruption model makes sense as it readily identified those who are responsible for the disruption. For example, the Longford gas explosion in Victoria in September 1998 brought several class actions against Esso Petroleum and recent aviation fuel crisis saw similar action brought against Mobil Petroleum. 'Mobil hit with two class actions', *The Age*, 25 January 2000.

Declarations of a state of disaster or emergency

The pinnacle of this coercive power is found in that part of the legislation that enables a state or territory to declare a state of emergency or disaster.¹⁴ In its delegated application it arms members of the emergency services with far-reaching operational powers. This includes powers of entry, possession, closure and destruction of private and public property,¹⁵ the use of reasonable restraint against members of the public to prevent them from entering an emergency area,¹⁶ as well as the forceful removal of people from an emergency area.¹⁷ It is important to note that many of these powers can be exercised by the emergency services without a declaration of a state of disaster or emergency as they are part of their routine operational activities. However, a declaration is part of a wider strategy of response incorporating the direct involvement of the highest level of government.

Just how long a declared state of disaster or emergency remains in force is dependent on which state or territory you live and who makes the declaration. In Victoria and New South Wales it is the Premier who makes the declaration and it can be for up to thirty days during which time a further thirty day period can be declared.¹⁸ In South Australia a state of disaster can be declared in three ways. First, the Minister can make an interim declaration of a state of disaster for up to twelve hours which subsequently cannot be renewed or extended;¹⁹ second, the State Coordinator can make a declaration for up to forty-eight hours which, with the Governor's approval, may be renewed or extended;²⁰ third, the Governor may make a declaration for up to ninety-six hours which can be extended but only on

the authority of a resolution of both houses of Parliament.²¹ In Tasmania the Minister may declare a state of emergency for up to two days and may, before the expiration of that period, extend the declaration for another two days.²² A state of disaster may also be declared by the Governor on the recommendation of the Minister and may be in force for up to fourteen days and an extension of fourteen days is also available.²³ In Queensland a state of disaster can be declared in two ways: first, a disaster district coordinator can declare a state of disaster for up to three days; second, the Governor in Council can make a declaration which can remain in force for fourteen days and be extended for a further fourteen days.²⁴ In the Northern Territory the Administrator can declare a state of disaster for up to seven days.²⁵ The Administrator, or in his absence two Ministers, can extend the state of disaster for a further fourteen days.²⁶ The Minister can declare a state of emergency which can be in force for up to two days.²⁷ In the ACT it is the Chief Minister who can make the declaration of a state of disaster.²⁸ The ACT legislation, unlike other Australian jurisdictions, does not specify a maximum period for the duration of a declaration of a state of disaster in the Act. Significantly, only the ACT has specifically legislated that a state of emergency cannot be declared in relation to the bringing an industrial dispute to an end or to deal with a riot or other civil disturbance.²⁹ Thus, theoretically at least, a declared state of or emergency could be applied to quell industrial action or political unrest in all other jurisdictions in Australia.

Declarations of a state of disaster or emergency infrequently activated

Historically, declarations of a state of

disaster or emergency have been rarely activated. A state of disaster has never been declared in Victoria or the ACT.³⁰ New South Wales has invoked a state of emergency on two occasions: in 1993 during an outbreak of green-blue algae along the Murray River and in 1997 in response to the Longford gas crisis in Victoria where the New South Wales government had to use its emergency powers in order to enter properties in order to shut off gas facilities along the Murray River which were being supplied from Victoria. No state of emergency was declared in New South Wales following the Newcastle earthquake in December 1989, nor was there a declaration during the Sydney bushfires in January 1994, nor following the Sydney hailstorm in April 1999. South Australia has declared a state of disaster on one occasion during the 1983 Ash Wednesday bushfires. Tasmania has never declared a state of disaster but did declare a state of emergency on one occasion in 1984 during a bushfire. Queensland has declared a state of disaster on at least nine occasions, all of which were in relation to flooding events. The Northern Territory has had one declaration of a state of disaster in 1998 for the town of Katherine which was inundated by flood waters.

Declarations of a state of disaster are infrequent because major emergencies are themselves a relatively infrequent event. In reality, declarations are the power of last resort which governments exercise to meet the exigencies of a crisis. Moreover, they are of limited duration and intended for a specific purpose such as quarantine or evacuation. Another reason is that relief funding arrangements from both state and Commonwealth treasury departments and welfare agencies are not usually dependent on a state

Notes

14. Division 4 *State Emergency and Rescue Management Act 1989* (NSW); Part IV *Emergency Services Act 1976* (Tas); Part 5 *Emergency Management Act 1986* (Vic); Part 3 *State Counter-Disaster Organisation Act 1975* (Qld); Part 4 *State Disaster Act 1980* (SA); Part VII *Disasters Act 1994* (NT); Part III *Emergency Management Act 1999* (ACT).

15. Section 37A(1)(b) and (c) and s37F (1) *State Emergency and Rescue Management Act 1989* (NSW); s28(1)(a) and (2)(a) *Emergency Services Act 1976* (Tas); s24(2)(c) *Emergency Management Act 1986* (Vic); s25(2)(i) *State Counter-Disaster Organisation Act 1975* (Qld); s15(2)(c) and (d) *State Disaster Act 1980* (SA); s 37(1)(e) *Emergency Act 1994* (NT); s27(1)(p) *Emergency Management Act 1999* (ACT).

16. Section 37(c) *State Emergency and Rescue Management Act 1989* (NSW); s28(1)(b) *Emergency Services Act 1976* (Tas); s24(2)(d) *Emergency Management Act 1986* (Vic); s25(2)(b) *State Counter-Disaster Organisation Act 1975* (Qld); s15(2)(g) *State*

Disaster Act 1980 (SA); s37(1)(d) *Disasters Act 1994* (NT); s27(1)(b) *Emergency Management Act 1999* (ACT).

17. Section 37(1) and (2) *State Emergency and Rescue Management Act 1989* (NSW); s28(1)(b) *Emergency Services Act 1976* (Tas); s24(2)(e) *Emergency Management Act 1986* (Vic); s25(2)(ii) *State Counter-Disaster Organisation Act 1975* (Qld); s15(2)(b) *State Disaster Act 1980* (SA); s37(1)(d) *Disasters Act 1994* (NT); s27(1)(i) *Emergency Management Act 1999* (ACT).

18. Section 23(1) and (6) *Emergency Management Act 1986* (Vic); s33(1), s35(2) *State Emergency and Rescue Management Act 1989*.

19. Section 12(1) and (2)(b) and (c) *State Disaster Act 1980* (SA).

20. Section 13A (b) and (c) *State Disaster Act 1980* (SA).

21. Section 13(1), (2)(b) and (3) *State Disaster Act 1980* (SA).

22. Section 25 *Emergency Services Act 1976* (Tas).

23. Section 26. *Emergency Services Act 1976* (Tas).

24. Sections 23(1) and (2) and 24(1) and (2) *State Counter-Disaster Organisation Act 1975* (Qld).

25. Section 35(1) and (3)(b) *Disasters Act 1994* (NT).

26. Section 35(4) *Disasters Act 1994* (NT).

27. Section 39(1) and (2) *Disasters Act 1994* (NT). Under s40(2) the same powers that are available to the emergency services under a declared state of disaster (outlined in ss37 and 38) are similarly available under a declared state of emergency.

28. Section 20(1) *Emergency Management Act 1999* (ACT).

29. Section 19 *Emergency Management Act 1999* (ACT).

30. In the case of the ACT this is not surprising as the *Emergency Management Act* was not enacted until late 1999.

of disaster or emergency having been declared. Legally, it requires the approval from the highest levels of government, and can be problematic politically as it allows the emergency services to override the public's civil rights during the time of the response operation. Indeed, to what extent civil rights are suspended, deferred or subrogated in the interests of public safety during a time of emergency remain somewhat enigmatic.

Good faith

Underpinning emergency management legislation is the policy that emergency services personnel exercise their authority within the confines of their authority. That is, even though legislation provides emergency services personnel with a degree of immunity in undertaking their duties, it does so only as long as the undertakings are performed in good faith and not negligently.³¹ What does 'in good faith' actually mean? None of the state or territory legislation provides a definition of good faith. Moreover, the courts have tended to read such immunities restrictively meaning that each case turns on the merits of its own circumstances (Barber & Parthimos 1994). The High Court in the 1961 case, *Board of Fire Commissioners (NSW) v Ardouin*, regarded the term to mean an act which is undertaken 'without any indirect or improper motive'.³² The notion of honesty was amplified in the 1993 case, *Mid Density Developments Pty Ltd v Rockdale Municipal Council*,³³ where the Federal Court held that, within a statutory context, the notion of honesty needs to be understood to be something more than honest incompetence. That is, the court needs to take into account what was a person's state of mind was at the time of the incident (subjective test) as well as how would a reasonable person with the same level of experience have conducted him or herself in the same circumstances (objective test). In short, good faith in an emergency management context requires that emergency services personnel act not merely in accordance with recognised existing procedural practices but also in the circumstances need to exercise sound professional prudence, better known as 'common sense' (Henry 2000).

Negligence

To date in Australia there has not been an action of negligence by a member of the public against operational emergency services personnel following a major emergency event. This is not surprising as emergencies require a multi-agency response effort and it is not always clear

which agency is responsible for what aspect of the event, especially during the initial stages. Nevertheless, there have been occasions where operational personnel have been criticised in the media for the way in which they managed the response effort (Kanarev 1997). Where operational emergency services personnel leave themselves vulnerable to possible negligence claims would be in the following circumstances: they are in control of an emergency situation; they have a public safety role to perform on behalf of particular and identifiable members of the public; and their action or inaction directly causes people affected by their decision-making to suffer harm or injury.

While emergency services personnel do not have a duty of care to the world at large, (Barber & Parthimos 1994) it is the public safety role which they perform that can place them in a 'special relationship' with particular members of the public. It is this special relationship which can also create a duty of care. Breach of this duty, if reasonably foreseeable and resulting in property or personal injury, could render the agency responsible liable to an action of negligence. Duty of care rests on two principles. With regard to emergency services personnel, first, there needs to be the element of agency control of an emergency situation in a specific area involving members of the public or private property within that area.³⁴ Second, within the control element there needs to exist a proximate relationship between the emergency services personnel and the public. This could be established when (a) the emergency services personnel were within a reasonable physical proximity to members of the public and could reasonably render assistance;³⁵ and (b) when the emergency services personnel had the requisite authority to act on behalf of the public³⁶ and that a member of the public was vulnerable to harm as a result of their activities.³⁷

How then, might responsibilities such as a duty of care affect emergency management operation practice in areas like planning, crisis decision-making and evacuation?

Part two: operational liabilities

Legal liabilities associated with planning

In a legal sense emergency management plans and the planning process come under the same rubric as budgets, standing orders, standing operating procedures, guidelines and manuals. That is, it is part of the broad and amorphous concept of policy. The courts have distinguished between policy decisions and operational decisions. As a rule policy decisions are not subject to negligence actions.³⁸ This is because policy matters generally do not attract a duty of care as they are dictated by financial, economic, social or political factors or constraints.³⁹ Moreover, policy decisions lack the specificity of what sort of actions ought to be taken in particular circumstances; those decisions are left to operational staff (Taylor 1998). Thus, the elements of negligence such as the foreseeability of risk, requisite proximity and an identifiable vulnerable class of persons or property is simply too remote to attract a duty of care.

Operational decisions, however, do attract a duty of care. How policy decisions are implemented operationally are examinable at law which means that both emergency management staff and their employer can be held liable in negligence. While the defence of necessity⁴⁰ is available to the emergency services, there is no defence based on 'merely fulfilling the emergency management plan'. In short, how operational decisions are managed on the ground do come into the purview of the law whereas the policy decisions formulated at a distance by senior management most likely do not (Barber & Parthimos 1994).

Notes

31. Section 62 *State Emergency and Rescue Management Act* 1989 (NSW); s36 *Emergency Services Act* 1976 (Tas); s37 *Emergency Management Act* 1986 (Vic), this Act specifically refers to volunteer emergency workers; s29 *State Counter-Disaster Organisation Act* 1975 (Qld); s17 *State Disaster Act* 1980 (SA); s42 *Disasters Act* 1994 (NT); s78 *Emergency Management Act* 1999 (ACT).

32. (1961) 109 CLR 105 at 115 as per McTiernan J.

33. (1993) 116 ALR 460.

34. *Hill v Chief Constable of West Yorkshire* [1988] 2 All ER 238; *Dorset Yacht Co Ltd v Home Office* [1970] AC 1060; *Glasheen v Waverley Municipal Council* (1990) Aust Torts Reports 81-016.

35. *Woods v Lowns* (1996) Aust Torts Reports 81-376.

36. *Knightley v Johns* [1982] 1 All ER 851; *Jaensch v Coffey* (1985) 155 CLR 549; *Sutherland Shire Council v Heyman* (1985) 157 CLR 614.

37. *Perre v Apand Pty Ltd* (1999) 73 ALJR 1190. See also Hancock, G., and Baron, A., "Pure economic loss: the implications of *Perre's case*," *Law Institute Journal*, February 2000 p. 83.

38. *Anns v Merton London Borough Council* [1978] AC 728; *Sutherland Shire Council v Heyman* (1985) 157 CLR at 424 at 466-467 as per Mason J.

39. *Sutherland Shire* at 468 as per Mason J.

40. *Gillick v West Norfolk and Wisbech Area Health Authority* [1986] 1 AC 112.

Legal liabilities associated with crisis decision-making

Unlike routine decision-making, making decisions in an emergency involves crisis decisions. Professor Uriel Rosenthal (1989) put forward three reasons why crisis decision-making is qualitatively different to routine decision-making. First, crises create a stress-inducing environment. Second, there are time constraints in which decision-makers need to act. Third, there is the pressure of an expectation, from senior management, government and the public, that the decision-making will produce a positive result (Rosenthal 1989). Having to make crucial decisions in a time of emergency can affect decision-makers in several ways. For example:

- incomplete, contradictory or ambiguous information from the field may create a sense of uncertainty in the decision-maker which in turn may create a state of high anxiety and lead to feelings that the decision-maker has lost control of the situation
- as stress increases a person's perception of the situation is likely to become increasingly rigid along 'black' and 'white' lines of 'the issue is either this or its that'
- people from outside agencies may become stereotyped
- decision-makers may lose perspective by focusing entirely on the immediate and ignore how their decisions might have future ramifications (Rosenthal 1989).

Since operational decisions are crisis decisions and thereby examinable by the courts, by what standard does the law measure the decisions of emergency management personnel during an emergency?

Like the issue of good faith, the court would apply the subjective and objective test to the actions of the decision-maker. The subjective test examines the state of mind of the decision-maker. The objective test examines the standard of care that would be exercised by a prudent emergency management decision-maker in the same circumstances as the decision-maker (Luntz 1992). That is, breach of the standard is dependent on what the decision-maker knew or ought to have known at the time when the alleged act of negligence occurred.⁴¹ Breach is comprised of three elements:

- gravity of risk: the degree to which care was required by the decision-maker is exponential to the risk of damage or injury which was incurred by the recipient of that decision⁴²

- probability of occurrence: if the probability of damage or an injury occurring is very slight, then the decision-maker may be excused from taking precautions⁴³
- practicality of precautions that could have prevented the damage or injury: what expense, difficulty and inconvenience would have been required by the decision-maker to deal effectively with the emergency?⁴⁴

There is also the addition of policy factors which the court would need consider. These include the prevailing community values of fairness, freedom of conduct and the role the emergency services perform within the community.⁴⁵

In short, the court would look at three things. First, what were the consequences of the decision-maker's decisions. Second, compare and contrast the decision-making process with what a reasonable decision-maker having the same level of experience would have done in the same circumstances. Third, gauge the consequences in the light of the prevailing community standards of what ought to be expected of an operational emergency manager.

Legal liabilities associated with evacuation management

From an emergency management perspective, an evacuation has all of the ingredients that highlight the legal liabilities of the emergency services: the exercise of coercive power, a duty of care and operating in a crisis decision-making environment. It is also a time when emergency services personnel are potentially at some level of risk of being sued for negligence by a member of the public who may have been affected by operational decisions.

Although the states and territories emergency management legislation makes reference to evacuation, none of them put forward a definition of what an 'evacuation' actually is. While the concept lacks definition, two models of evacuation have evolved in Australia. The first I have called the pecuniary interest evacuation model and other the mandatory evacuation model.

Pecuniary interest evacuation model:

Only Victoria has adopted the pecuniary interest evacuation model which is not overridden during a declaration of a state of disaster. Section 24(7) *Emergency Management Act* 1986 states that during a declared state of disaster the Coordinator in Chief cannot 'compel the evacuation of a person from any land or building if the person has a pecuniary interest in that land

or in any goods or valuables on the land or in the building'. A pecuniary interest is a property right not merely restricted to a physical area and can include goods and chattels. It is based on the principle, dating back to the middle ages, that a person who is not a felon or likely to act unlawfully or under some custodial order can freely enjoy his or her property rights unencumbered by the state.⁴⁶

The reasons why the Victorian government adopted this model can be found in the parliamentary debates following the February 1983 Ash Wednesday bushfires. Not only was there extensive property damage throughout the state but also forty-seven people died (Cain 1983). The inclusion of the pecuniary interest model was an initiative of the Liberal-National opposition which had a majority in the state's upper house, the Legislative Council. Using its upper house majority as a leverage, the opposition persuaded the Labor government to adopt the model. The opposition's argument for inclusion of the pecuniary interest model was fourfold:

- often the safest place during a bushfire was to remain in the home⁴⁷
- exclusion of a pecuniary interest clause was contrary to individual civil rights
- the power to remove people forcefully from their homes during a disaster was likely to increase public confusion and panic as well as choking the road system making the task of combating the disaster more difficult for the response agencies
- forceful evacuation was administratively unworkable as it imposed a duty of care on response personnel who, in theory, made themselves liable for any injury to or death under their assumed control.⁴⁸

Thus police in Victoria, who carry the overall responsibility for evacuation, can only advise people (who are not in

Notes

⁴¹ *Roe v Minister of Health* [1954] 2 QB 66.

⁴² *Paris v Stepney Borough Council* [1951] AC 367.

⁴³ *Bolton v Stone* [1951] AC 850.

⁴⁴ *Wyong Shire Council v Shirt* (1980) 146 CLR 40.

⁴⁵ *Western Suburbs Hospital v Currie* (1987) 9NSWL 511 (CA) at 523-524 as per McHugh JA.

⁴⁶ *Balfour v Balfour* [1919] 2 KB 571.

⁴⁷ Most of the Ash Wednesday fatalities occurred when people were burnt to death in their cars. Of the people who were burnt in their homes none were lost by being burnt in front of the fire; all were lost after the fire had passed and heated material such as ashes had fallen from surrounding trees. Victoria Parliamentary Debates, Assembly, volume 372 pp. 2520-2525.

⁴⁸ Parliamentary Debates, Assembly, volume 372 pp. 2530-2533.

custody or are intellectually incapacitated) to leave their homes.

The pecuniary interest model, however, is not without potential legal problems. Take for example the situation where parents decide not to evacuate but the police, guided by child protection workers, decide to evacuate forcefully any children who, it is perceived, might be in imminent danger from an approaching flood or bush fire. In theory pecuniary interest rights are not the preserve of adults but are also extended to children who, for example, might have toys on a property. The police and child protection workers could claim jurisdiction under s63(c) *Children and Young Persons Act 1989* (Vic) which empowers them to take children away in circumstances of danger. Under the Act a child is in need of official interventionist protection where the child has suffered or is likely to suffer significant harm as a result of physical injury or emotional or psychological harm and that the child's parents have not protected or are unlikely to protect the child from harm.

The civil rights provision under the *Emergency Management Act* which potentially allows adults to keep their children if they decide not to evacuate and the child protection obligation accorded to police and child protection workers appear to be in conflict. The issue awaits either legislative change or court resolution.

Mandatory evacuation model: The mandatory evacuation model which operates in the other states and territories allows the emergency services to evacuate, forcefully if necessary, anyone from any area to another area. It is also a model which has some inherent problems.

First, the model is antithetical to the notion that the emergency services personnel undertaking an evacuation need the public's consent before the public is to be evacuated. However, forcing the public to evacuate their homes without information about why such an action is necessary and to where they are being evacuated might be a cause for an action in tort. Second, the model may involve a degree of deprivation of civil liberty and raises the spectre of trespass against the person; that is, assault. Third, there is the matter of what the emergency services personnel can do in a situation where a person refuses to leave his or her home based on the reasonable belief that he or she is safer there. What action constitutes reasonable force to evacuate such a person? Certainly it would not be politically acceptable to evacuate a person from their home at gunpoint. It is not

difficult to imagine the kind of political fallout for the government of the day if, for example, such a drama were to be screened nationally on the 6 o'clock evening news. After all, any heavy-handed tactics of removing people forcefully from their homes readily conjures up images of jackboots and state repression. In short, having the legislative authority to evacuate people by force might become a public relations disaster for both the emergency services and the government.

Finally, is the issue that at every stage of an evacuation, and this includes withdrawal, shelter and return, the emergency services personnel who are involved in this process also potentially assume a duty of care. Directing or transporting people away from the danger to a safe area, providing welfare for evacuees and ensuring that the evacuees are returned to their homes when it is reasonably safe to do so involves some form of responsibility toward the public. It also means that any one of the stages of the evacuation process may create a claim for negligence.

Conclusions

1. Since it is the Australian states and territories that shoulder the primary responsibility for emergency management in Australia, it is not surprising that emergency management law is state-based and state specific. While the Commonwealth government does perform a significant emergency management role in assisting the states and responding to overseas emergencies, it does so in the absence of emergency management legislation.
2. The states and territories emergency management legislation perceives emergencies in terms of magnitude and consequently response is regarded as a reactive process. In relation to dealing with the public, response agencies are provided with coercive powers, the apotheosis of which is embodied in the government's right to declare a state of emergency or disaster. However, the declaration of a state of emergency or disaster is a power of last resort and, apart from Queensland, has been exercised infrequently.
3. There are potential legal liabilities associated with operational decisions but those associated with policy decisions lack the requisite elements of a duty of care and would therefore be unlikely to attract a negligence action. Crisis decision-making and evacuation management are examples of operational decisions. The standard by which courts would measure decisions made

in a crisis have a subjective and objective component and consideration would also be given to policy factors pertaining to community values. Apart from Victoria which has adopted the pecuniary interest evacuation model, all the other Australian states and territories have adopted the mandatory evacuation model. Both models have a level of legal complexity.

4. In summary, although there is a high degree of commonality of emergency management law in Australia, the matter of how the exercise of those powers is undertaken and to what extent that exercise conflicts with civil rights remains an unresolved issue.

References

- Barber P. and Parthimos N. (1994), 'Ensuring the health and safety of emergency services personnel—a legal perspective', *The Macedon Digest*, vol. 9, no. 3, Spring p. 29.
- Cain J. (1993), 'Ministerial statement, Premier', *Victoria Parliamentary Debates, Assembly*, vol. 368, no. 16, March. pp. 3072-3073.
- Drabek T. E. (1986), *Human System Responses to Disaster*, Springer-Verlag, New York, pp. 6-7.
- Dynes R. R. and Tierney K. J. (1994), *Disasters, Collective Behaviour and Social Organization*, U. of Delaware Press, Newark, pp. 1-10.
- Henry M. (2000), 'Statutory immunities—when is good faith honest ineptitude?' *Australian Journal of Emergency Management*, vol. 15, no. 3, pp. 10-15.
- Kanarev N. (1997), 'The political nature of disasters: Part 1', *Australian Journal of Emergency Management*, vol. 12, no. 3, pp. 18-19.
- Kanarev N. (1997/98), 'The political nature of disasters: Part 2', *Australian Journal of Emergency Management*, vol. 12, no. 4, pp. 35-36.
- Luntz H. (1992), *Torts: Cases and Commentary*, 3rd ed., Butterworths, Sydney, p. 177.
- Quarantelli E. (1995), *Disasters are Different*, Preliminary paper #221, University of Delaware, pp. 11-12.
- Rosenthal U. (1989), 'Human factors influencing crisis decision making', *Emergency Preparedness Digest*, vol. 16, no. 3, p. 13.
- Salter J., (1995/97), 'Towards a better disaster management methodology', *The Australian Journal of Emergency Management*, vol. 10, no. 4, Summer, p. 8.
- Taylor T. (1998), 'How to work with lawyers', in Bland, M., ed. *Communicating Out of a Crisis*, Macmillan, London, p. 99.

Catastrophe management: coping with totally unexpected extreme disasters

There is no doubt that conventional incidents can be effectively handled by clearly defined emergency procedures under a well acknowledged authority structure, but a major event creates a whole new situation. No longer is the incident clear cut. No longer is the degree of preparation and competence enough.

Now we have the big one. No-one understands why it is out of control. It is not easy to label because it is taking new directions every few minutes. It is coming at you from every angle. Too many people have been affected. The bad news is getting worse. And as you look around you, you see the whole world collapsing.

Campbell, 1999

Catastrophes

There is a rich array of accounts of past calamitous events that have impacted the inhabited world. Each dysfunctional event has its own unique characteristics, impacts, and legacies. Many examples have appeared in this journal and elsewhere (e.g. Bryant 1991; Blackie et al. 1994; Hobsbawn 1996; Newson 1998; Berz 1999; Halley 1999; Mitchell 1999; Kundzewick and Kaczmarek 2000).

Bringing about safer futures for human communities will benefit from an objective appreciation of the adverse impacts of severe hazards coupled with an examination of the hazard mitigation weaknesses and risk management limitations of current human settlement design and functioning (Brooks 1992; Lintern 1992; Kugler and Lintern 1995; Reed 1996; Rasmussen 1997; Lewis 1999; Mitchell 1999; and Kundzewick and Kaczmarek 2000).

The recent publication, 'Dreadful Visitations: Confronting Natural Catastrophe in the Age of Enlightenment' (Johns 1999) provides a suitable starting point for examining the prime topic of this paper—how best to contend with the impacts upon communities of unexpected extreme hazards. The above study focuses upon the eighteenth century 'where overwhelming natural disasters are seen to be rarely wholly "natural", but are the products of human agency as well'. As Johns goes on to observe:

by Allan Skertchly and Kristen Skertchly,
SMILE-Success Management,
International Learning Enterprises

Indeed, it might well have seemed a particularly calamitous period to the people of the eighteenth century. The Bengal famine of 1770 is estimated to have killed ten million; earthquakes in Portugal, Peru, Calabria and Japan leveled cities, killing tens of thousands of inhabitants, igniting volcanoes, and setting in motion destructive tidal waves that smashed ports and swallowed up entire islands; cyclones in India in 1737 and 1789 claimed hundreds of thousands of lives; avalanches in Switzerland buried whole towns and their populations, among them the faithful of Leukerbad, who gathered for vespers in January 1718 and were crushed under tons of snow; hurricanes made their way through the Caribbean and the Atlantic coast of North America, sweeping away people and property in every decade of the century; and volcanic eruptions killed thousands, witness Vesuvius in Italy, Laki in Iceland—where one-third of the population died in 1783—and Papandayan in Java, where in 1772 three thousand people in mountainside villages were sucked into a lake of lava.

Since the eighteenth century there have been substantial world-wide population increases, the Industrial Revolution, urbanisation and the growth of cities, the arrival of teeming mega-cities, the advent of the Computerised Information Age and, increasingly, Globalisation. Throughout this period the dysfunctional impacts of natural and constructed hazards have intensified (Berz 1999; Blanke and Smith 1999; Leach 1999; Lewis 1999; Mitchell 1999 and Guidette 2000), with the prospects for future natural environmental hazards looking even bleaker (IPCC 1996 and MacDonald 1999). According to MacDonald:

The impacts of global climate change are conventionally discussed in terms of changes in the temperature averaged over the year and over the globe. Much less

emphasis has been placed on anticipated changes in weather variability. Of particular interest are extreme events such as windstorms, hurricanes, floods, droughts, hailstorms, tornadoes, etc.

In the last decade, the number of catastrophic weather events has been three times as great, and the cost to the world economies eight times higher, than in the decade of the 1960s. In part, the higher cost in the last decade is due to greater vulnerability of society as a result of increasing urbanisation.

In 1997, a year with exceptionally few natural disasters, some 13,000 deaths could be attributed to weather-related events, and the economic losses were \$30 billion, as compared to \$60 billion in 1996. The most frequent natural catastrophes in 1997 were windstorms and floods, which accounted for 82% of the economic losses and no less than 97% of the insured losses. 1992 was the worst, 1999 the fifth worst for insurance losses in the USA.

Floods devastated large areas of China in 1996 and 1998, North Korea, 1995, South Korea 1996, Latin America and the United States, particularly in 1993, 1999. As in 1996, Central Europe, experienced the Odra (Oder) and Vistula rivers floods when the heaviest precipitation ever recorded inundated areas in Poland, Germany, the Czech Republic and Austria. And so on to the present, every year has evidenced major natural disasters. Such events are ongoing, and we must learn how best to live with them.

The predicted increases in the surface temperature of the oceans will undoubtedly lead to increased water content of the atmosphere, since the vapor pressure of water rises exponentially with temperature. Thus, it is highly likely that at least some regions of the globe will experience increasingly severe cyclonic activity and higher precipitation and more frequent flooding in the global warming world (IPCC 1996).

The present, highly urbanised, highly vulnerable, mega-city situation (Fuchs 1994; Lo and Yeung 1998) with its extremely disabling catastrophe-proneness (Mitchell 1999) is at the centre of future concerns, as these cities are of global significance. An extreme impact event in

one such city, Kobe-Osaka, vividly illustrates this:

The Great Hanshin earthquake of 17 January 1995 was a signal event in the history of urban disasters. Not only was it Japan's most deadly and destructive natural disaster in over 70 years, it also raised disturbing questions about existing hazard-management policies and programmes that had been regarded as among the most effective in the world. Despite decades of attention to the goals of hazard reduction by Japanese governments, industries, and citizens organisations, over 6,000 residents of the country's second-largest metropolitan area were killed, 10 times as many were injured, and large parts of the Kobe-Osaka urban region experienced heavy damage and disruption. Fires took hold rapidly and burned out of control, structures and lifelines that had been designed and built to hazard-resistant standards gave way, emergency management operations failed to live up to expectations, and recovery programmes dragged on well beyond their targeted completion dates.

Not since the massive Kanto earthquake of 1923 devastated Tokyo and Yokohama killing more than 140,000 people, has a major Japanese urban area been so grievously stricken by natural disaster. Indeed, this was the first time that Japan's annual disaster death tolls have climbed back above double digits into the thousands since the Ise Bay typhoon of 1959 killed over 5,000 people around Nagoya and triggered a major restructuring of the country's hazard-management systems. Economic losses may have exceeded a staggering US\$100 billion! (JNDS 1995).

Supporting Mitchell (1999), we see the Hanshin (Hanshin-Awaji; Hyogoken-Nambu) earthquake as just one recent extreme event in a string of natural disasters that have inflicted unprecedented losses on cities and towns and across countrysides around the world. Often these have involved earthquakes, but hurricanes, water inundations, storm-surges and wildfires and deep-freezes, have also led to heavy losses. Though the upward trend in economic and material losses is most striking, deaths and injuries have also been substantial. These events have far-reaching implications for most of the world's population (IDNDR 1996; ADPC 1999).

The above case-study on a natural hazard disaster in a mega-city was chosen because it illustrates the potential for similar massively debilitating nature-sourced urban catastrophes (Lewis 1999; Zamecke and Buchanan 1999). Various other kinds of hazards are also capable of

producing urban catastrophes (Bryant 1992; Davis 1992; Blackie et al. 1994; IDNDR 1996; Blanke and Smith 1999; Mans 2000; Romei 2000).

Wars too have frequently been associated with large-scale destruction of urban areas, especially in the twentieth century e.g. Hiroshima, Dresden, Phnom Penh, Kabul (Hobsbawn 1996). Political terrorism, crime and cyber-terrorism are also potent agents of urban destruction (PCCIP 1997). So too are hazardous or interruption-prone industrial technologies (e.g. Auckland (Electricity), Bhopal (Chemical), Chernobyl (Nuclear), Melbourne (Energy-Gas), Sydney (Water), Texas City (Tornado-inflicted outages)) and ubiquitous air-pollution (Perrow 1984; Mitchell 1996).

The increasingly complex community safety and hazard coping issues which are associated with new multi-faceted types of hazard are noted by Mitchell (1999, 35-36):

The adequacy of existing means for managing natural hazards and other types of environmental hazards is increasingly being called into question in the United States and the global community. This is illustrated by a sampling of the issues that have recently emerged in professional and lay forums.

Novel problems are posed by new types of hazard. These come in several varieties. Some are amalgams of natural and technological hazards. When a storm or a tsunami affects a chemicals manufacturing or storage facility it is not just the threat of high water and strong winds that is of concern; it is also the possibility that toxic materials may be dispersed throughout surrounding areas (e.g. Nagoya 1959; Times Beach, Midwest floods, 1993, Hanshin-Kobe, 1995). If an earthquake affects a nuclear reactor site, radioactive materials may be released. The flooding of old mines can cause surface collapses; dam fractures can cause inundations, damage and deaths.

Given the expanding variety of technological hazards, the possibilities for new or unusual combinations of natural and technological hazards are spiralling upwards. For example, five classes of technological hazard pose quite different sets of problems when combined with natural hazards:

- (a) *Unsuspected hazards involve substances or activities that were regarded as harmless or benign until scientific evidence or human experience showed otherwise (e.g. DDT, asbestos, maintaining cooling towers).*
- (b) *Improperly managed hazards involve*

failures of various kinds of hazard-control systems (e.g. nuclear facilities such as Windscale, Three Mile Island, Chernobyl; chemical plants such as Seveso, Basle, Bhopal; power supply systems, Auckland and Longford; transportation systems such as the US space shuttle Challenger and super-tankers such as the Exxon Valdez and highjacking; storage and disposal sites for toxic materials such as Kyshtyni, Times Beach, Love Canal, Minamata, Central Australia).

- (c) *Instrumental hazards that are intended to cause harm and are consciously employed towards that end; they include sabotage, arson, and warfare. Military industrial technologies belong to this group (e.g. nuclear, biological, and chemical weapons such as defoliants and nerve agents; deliberate oil-spills and oilfield conflagrations).*
 - (d) *Cyber Terrorism and Information Technology discontinuities causing communications and data-flow stoppages (Optical cable severance's). Computer viruses (Michelangelo; 1991; Melissa 1999; I love you 2000; SMASH 95, 2000); illegal 'hacking' access and sabotage; the fragility of contemporary electronics and satellite communications nets.*
 - (e) *Hazards of global environmental change constitute a separate but related class of events that are now making their way onto the public policy agenda. It is widely accepted that a build-up of greenhouse gases in the atmosphere might trigger climate changes and other repercussions such as sea-level rises and inundations.*
- Some of the industrial hazards are sufficiently well known to be classifiable as 'routine' hazards, but others including components of many of the above and most of the hazards connected with global environmental change—are entirely unprecedented in the human experience. They are best considered 'surprises' (Mitchell 1996). How should public policies be changed to take account of the widening range of threats to human survival?*

In view of this situation, why single out natural hazards out for special consideration?

The answer is that natural hazards are joint products of nature and society and may affect vast reaches of landscapes and seascapes and impact globally.

The recent (1991, 1999-2000) inundation of Bangladesh, Mozambique and Timor; Pacific tsunamis (Aitape/Sissano 1998); United States hurricanes (Andrew

1992); and the Ethiopian and African famines; all attest to this. Unlike the other threats just mentioned, they are only partly created by humans. This gives them a special place of concern in debates about humanity's future because they are not, ipso facto, entirely susceptible to human will. Indeed many aspects of nature are uncontrollable by humankind. They represent an 'other' that can sometimes be modified by humans, but is not ultimately amenable to complete human amelioration, in either the material sense or the mental one.

Whatever the scale of the human habitat, 'all major disaster problems in the Third World (and elsewhere) are essentially unresolved development problems. (Often, too, these problems are exacerbated by corrupt and/or inefficient governments.) Disaster prevention is thus primarily an aspect of development management and this must (ideally) be for settlements that function within sustainable limits' (Grann, Norwegian Red Cross).

Confirming Mitchell (1999), we can conclude that the severity of naturally induced hazards invites humans to recognise that our knowledge of the Earth and its peoples is incomplete, uncertain, disjointed, and currently subject to inabilities to control many contingencies. It is likely to remain so in the foreseeable future. We should prepare ourselves and our institutions, and instigate environmental hazard mitigation strategies for the twenty-first century, with this firmly in mind, especially as the mega-cities become the pivots and nodes of a truly global society (Lo and Yuen, 1998). For mega-cities are, in effect, crucibles where new kinds of hazards are being fashioned and old ones reshaped so that existing ways of dealing with both are inadequate (Lewis 1999; Mitchell 1999; White 2000).

Most currently held notions about the security of cities in the face of natural extremes are no longer tenable and future disasters in intricate, large, urbanised cities are likely to pose very complex problems for society and across the world. The following comments expanded from Mitchell (1999, 27-28) *characterise urbanisation as a predisposition for disaster:*

Urban development increases disaster-susceptibility in a number of ways. First is the frequent association of cities with naturally risky locations such as seacoasts and floodplains because such places also confer important benefits (e.g. buildable land, well-appointed sites for the collection and transshipment of goods, and fertile hinterlands). Initial settlements may take



Above: Wars have frequently been associated with large-scale destruction of urban areas. (Image courtesy International Federation of Red Cross and Red Crescent Societies)



Above: Many aspects of nature are uncontrollable by humankind. Above: the 2001 Indian Earthquake, and the 2000 floods in Vietnam. (Images courtesy International Federation of Red Cross and Red Crescent Societies)

advantage of available safe sites, but subsequent growth typically spills over into adjacent high-risk areas. Coastal metropolises of Australia and the United States and

the seaward-expanding cities of Asia are good examples.

Secondly, the physical process of building cities often creates or exacerbates existing

environmental risks. For instance, paving over water-sheds reduces infiltration, speeds runoff, and increases flood volumes; constructing coastal defences may reduce supplies of beach sand and facilitate erosion during storms. As the leading edge of urban development marches across the landscape, the incidence of natural disasters tends to keep pace. The human role in creating conditions for disaster is clearly visible. Bangkok klongs (canals) that used to accommodate overflow from the Chao Phraya River have been filled in to create streets that are now chronically flood prone, while the city continues to subside owing to pumping of water from underlying aquifers. Similar problems exist in London, Venice and the low countries of Europe, and in Queensland's Cairns, Townsville, Brisbane and the Gold and Sunshine Coasts.

Thirdly, cities increase disaster potential by concentrating people and investments. A disproportionate amount of material wealth is bound up with cities in the form of buildings (ceremonial, commercial, industrial, and residential) and infrastructure (i.e. the complex and expensive networks of lifelines that sustain urban populations and make it possible for them to interact with each other and the outside world).

When an extreme event occurs, urban losses are often very heavy. In a matter of hours, hurricane Andrew inflicted over US\$20 billion of property damage on the Miami metropolitan area, whereas it took about six weeks of heavy flooding in mostly rural sections of nine Midwestern U.S.A. states to produce approximately half as much material loss (Myers and White 1993).

Fourthly, the built environment is continuously wearing out, but the rate of urban replacement rarely matches the rate of urban obsolescence. As a consequence, most cities contain large concentrations of old buildings that fail to meet present standards for hazard-resistant construction. Differential ageing and uneven replacement of the physical stock typically produces a complex patchwork of disaster-susceptibilities.

Fifthly, many urban areas contain populations that are particularly vulnerable to disaster. For example, Metropolitan areas often attract large numbers of immigrants, most of them poor and all of them separated both from the familiar landscapes of home, whose risks were known, and from traditional support networks or customary behaviours that provided a modicum of security in the event of disaster.

Finally, few governments of rapidly growing cities have been able to allocate significant resources to hazard reduction

when they are already stretched to breaking point by the task of providing basic support services for their expanding populations.

In short, cities often contain all of the ingredients for disaster: heightened risks, concentrated exposure, and increased vulnerability. In light of the available evidence about intensified urbanisation associated with cities and particularly mega-cities, the potential for a quantum leap in disaster-susceptibility is clear.

When a major natural (or other) disaster strikes, it disrupts—and may destroy—not just the lives of citizens and the city's physical fabric but also the functioning of the metropolis. And all too often, unfortunately, contemporary resurrections after disasters generally reassert fatally flawed past policies and propensities.

Viewed against the emergence of a predominantly urban world, where people increasingly live in towns, cities and giant urban agglomerations (i.e. mega-cities), and with the probability of increasingly extreme weather events in the future, past events and on-going developments confirm the potential for even larger disasters and losses.

Lessons learned

The most important educational goal is learning to learn. Luis Alberto Machado, 'Creating the Future', 1990.

All contemporary learners could benefit from the refinements of a learning approach championed by Rose and Nicholl (1997).

Johns (1999) provides insights on some lessons so far learned from natural disasters:

Above all, the historical and literary study of natural disasters focuses attention forcefully on the human contributions to catastrophe. As Oliver-Smith (1986) claims, 'human groups and institutions play a far more active role in the creation of destructive agents and circumstances than is usually imagined or portrayed'. If a disaster is defined as a physical phenomenon—an earthquake, a hurricane, or a flood, for example—affecting a human group adversely, then surely the activities of that human community, both before and after the event, require investigation.

The social, political, and economic activities of societies must therefore be examined to determine the extent to which they delayed or exacerbated disaster. For instance, people, locationally enabled by the authorities, are falsely optimistic about their prospects for their enduring survival after building homes on flood plains, earthquake faults, precipitous beach-front cliffs, storm-surge-prone lowlands, or amidst high wild-fire-risk hills and woodlands. Johns (1999) continues:

To what extent, then, do discourses on catastrophe today reinforce or counter perceptions of both disasters and their victims? The dominant perspective, according to geographer Hewitt (1983), sees natural disasters as unique, cataclysmic environmental events, largely unpre-

Old and new hazard management issues
The changing contributions of people, natural systems, and technologies to the creation and enhancement of hazards
Measures to encourage improved use of available information about hazards (including scientific knowledge and folk wisdom)
Attenuation of individual, group and organizational memories
Global interdependence and the vulnerability of most communities (e.g. economies, cities, settlements) to major disruptive events
The relative adverse human impacts of cumulative small-scale hazards and single large disasters
Innovative procedures needed for coping with unprecedented hazards (i.e. unanticipated surprises and extreme catastrophes)
Individual, community and government attitudes toward risks and hazards in the context of competing other values/goals
Equity and inequity in the distribution of hazard costs and benefits
The illumination of polarizing debates about appropriate hazard-management strategies (e.g. 'top-down' versus 'bottom-up', centralization versus decentralisation, rights versus responsibilities, discretion versus direction, anticipation versus reaction)
Effective means for sustaining stakeholder involvement in decision-making beyond periods of acute crisis
Coalition-building between hazards interest groups and others, that address overlapping problems e.g. sustainable development, urbanisation or urban hazards and disasters issues
<i>Note: Most of these issues and topics are interwoven.</i>

Table 1: Old and new hazard-management issues (Developed from Mitchell, 1999)

dictable, and severely damaging to the social, physical, and economic life of human communities. In order to return societies to a pre-disaster status quo, one viewed as 'normal' urban communities require restorative development, modernisation, essential technologies, and accompanying technical expertise.

What is apparent in most urban settlements is an array of scientific and technology-based institutions and falsely protective 'citadels of expertise' that in many instances ignores the natural environment and traditional local practices and grass-roots survival ideas and culture (Blackie et al. 1994; Skertchly and Skertchly 1999).

This current conventional approach, Hewitt argues, traces its beginning precisely to the Industrial Revolution and the development of scientific method in the seventeenth and eighteenth centuries. In this period economies came to favor the development of cities. But, as Hewitt affirms, the greater the historical or geographic distance a society has 'from urban-industrialism, the surer studies of disaster are to find its people to be "fatalistic", "subjective", and in the thrall of "mystical", "irrational", or at least "pre-scientific" notions.' This is the situation today in much of the Third World.

And in many developed (ing) urbanised settlements natural hazards are grossly under-emphasised or not effectively accommodated (White 2000).

Hewitt (1983) and anthropologist Oliver-Smith (1986) proffer an alternative to the conventional approach. As Johns (1999) summarises their observations:

From this perspective, disasters, rather than being freak events caused by unexpected forces, are ongoing natural agents in an ever-changing world. Seen from this perspective, natural disasters, which have always occurred everywhere in some form or another, and will continue to do so, are part of well-informed societies' realistic views of what's 'normal' and of the objective ideological approach necessary to adapt to and cope with the overall material and other conditions they need to sustain in order to best maintain their ongoing normalcy and safety.

This well-informed view suggests, in particular, that maintaining the current Western approach to living in the first world and then exporting it elsewhere, breeds economic forces and market pressures that ultimately work to destroy both the local and the global environment, with the implication that natural disasters can appear as innocent, even innocuous, events in the face of self-interest

If globalisation finally gains overall

dominance in the twenty-first century via essential economic ties between nations and continents, it can be traced meaningfully to foundations in the eighteenth century by way of cultural responses to ubiquitous natural catastrophes. By looking broadly at disasters in the eighteenth century and up to the present day, we are in a better position to interpret interdependent 'globalisation' and to recognise the impact of catastrophes on the world as a whole rather than to view them partially with an isolated focus only on the wealthiest or worst-hit regions.

Can it be argued that world bodies, and major nations and their relief agencies in particular, operate selflessly, or even predominantly, in the interests of third-world, mendicant disaster victims? A sound and equitable answer to this question is a logical first step to establishing the most useful and fair responses for using global relief resources to ameliorate the dysfunctional devastation of local catastrophes (Johns 1999).

In so doing, we affect a shift in the interpretation of Western progress to embrace increasingly shared concerns for global survivorship. The question that mega-city hazards pose to policy makers goes right to the heart of sustainability and the future of human-kind across the world. How, if at all, can large and rapidly changing cities be made sustainable in the teeth of potentially devastating global events that are also highly uncertain?

Given the current centrality of sustainable development as a necessary guide to apt policy-making for all aspects of the human environment in the future, the contention that it does not — as currently construed — adequately take account of environmental hazards is a serious challenge. A detailed argument in support of that claim is beyond the scope of this paper, but it is appropriate to introduce some important pieces of supporting evidence.

According to Mitchell (1999):

First, urban sustainability is a concept that is contested between advocates of so-called 'green' and 'brown' agendas; hazards play different roles in these agendas and are affected by different kinds of policy responses (Satterthwaite 1996; World Resources Institute 1996).

The green agenda gives pride of place to hazards that are linked with anthropogenic degradation of the physical environment (e.g. resource exhaustion, erosion, pollution) (Beatley 1995; Mitchell and Ericksen 1992). The brown agenda highlights hazards in less developed countries that are linked to poverty and

inadequate urban services (Main and Williams 1994; McGranahan and Songsore 1994).

Acute geological, meteorological, and hydrological hazards are not excluded from consideration, but other types of human-constructed hazards that affect the poor on a daily basis are heavily emphasised. Possible surprises (i.e. unprecedented hazards), especially those that may affect more affluent cities, receive little attention. Even if combined, these two agendas do not provide a comprehensive basis for addressing the hazard-management problems of large cities in the global context.

Secondly, differences between hazard mitigation and sustainable development ensure that important parts of each subject remain outside the frame of reference of the other. In other words, safety (a prime consideration in hazards management) does not necessarily find a place in the contemporary sustainability agenda, and disruptive contingencies (of which hazards and disasters are good examples) may require different responses than enduring problems (Mitchell 1992; Berke 1995).

The truth is that large and complex cities require expansive management initiatives that can simultaneously address incommensurable goals. Mega-cities must be prepared to cope with unexpected or unfamiliar events as well as long-term problems; acute natural hazards as well as chronic crises of environmental degradation. Along with the historical evidence about trends in urban hazards, the dysfunctional events of recent history clearly support this claim (Hobsbawm 1996).

To ignore the role of environmental hazards in cities is to deny important lessons of urban history. To assume that sustainable urban development can be achieved without attention to problems of contingency, of which natural hazards are a pre-eminent example, is to court frustration and failure.

The natural hazard problems that confront today's and tomorrow's urban cities and settlements 'are the joint products of nature and society' (Mitchell 1999, 2). Table 2: Some Hazard Conceptualisation and Management Problems, reflects also, some further difficulties. And Mitchell (1999, 40) further observes that:

Underlying all of these specific reasons is a larger problem. It is this: contemporary society, in the main, fails to treat natural hazards as complex systems with many components that often require simultaneous attention. We tinker with one or another aspect of these systems when what is required are system-wide community hazard amelioration strategies.

Hazard conceptualisation and management problems
Lack of agreement about definition and identification of problems
Lack of awareness of natural and unnatural (human-made) hazards
Lack of future forecasting capabilities
Misperception or misjudgment of risks associated with hazards
Deliberate misrepresentation of hazards and risks
Lack of awareness of appropriate responses
Lack of expertise to make use of responses
Lack of money or resources to pay for responses
Lack of coordination among institutions and organizations
Lack of attention to relationship between 'disasters' and 'development'
Failure to treat hazards as contextual problems whose components require simultaneous attention (i.e. reciprocity)
Lack of access by affected populations to decision-making
Lack of public confidence in scientific knowledge
Lack of capable and enlightened political leadership
Conflicting goals among populations at risk
Fluctuating salience of hazards (competing priorities)
Public opposition by negatively affected individuals and groups

Table 2: Some hazard conceptualisation and management problems(Developed from Mitchell, 1999)

Perhaps even more important, we fail to address the direct linkage between natural hazard systems and economic investment decisions that drive the process of 'development' and affect the potential for disasters in the future.

That such links exist has been known for a very long time (The Code of Hammurabi, King of Babylon, c. 2250 B.C.):

If a man owes a debt, and the storm inundates his field and carries away the produce, or if the grain has not grown in the field, in that year he shall not make any return to the creditor, he shall alter his contract and he shall not pay interest for that year.

Currently, these problems are considerable and there is clearly no prospect of a universal panacea. Indeed, as evidenced by their virtual absence of such concerns on the agenda of the 1996 United Nations Conference on Human Settlement (UNCHS 1996), they are, somewhat surprisingly, not presently of widespread concern amongst otherwise able people concerned with planning, building and running human habitats.

However, other international agencies such as the International Red Cross and Crescent, the United Nations Environment Programme, the United Nations Commission on Human Settlements, the World Health Organisation, and the World Bank, are all fully cognisant of the issues and problematique (Mitchell 1999, 503-504). And many programmes undertaken during the International Decade of Natural Disaster Reduction (IDNDR 1996; ADPC

1999) have, too, highlighted the domain. These projects reveal too that there is much existing hazard mitigation 'know-how' that is not utilised effectively (Clark 1972; Higgins 1980; Friedman 1985; Argyris 1993).

Despite the spectacular advances in many aspects of the sciences and technologies of the 20th century, human settlements display increasing alienation from their natural environments and against accommodating better to the prospect of increasingly complex disruptions caused by future natural hazards. The current prediction and expectation is for continuing extreme traditional and novel disasters for every future generation bringing catastrophic suffering and death, and immense and growing material losses (Kundzewicz and Kaczmarek 2000). One commentator even goes so far as to most pessimistically say, 'Nature will, in time, destroy us!' (Newson 1998).

In summary, we may say that **urbanised human settlements are beset by increasingly complex natural hazard and other potentially disruptive problems.**

Following upon Mitchell (1999, 474-475) we may profile the situation thus:

- Agents of natural hazards (e.g. drought, floods, storm surges, earthquakes, landslips, windstorms, snow and ice, fire and volcanoes) are many and the mixes varied.
- Intricate, locationally unique, interrelationships between natural hazards and human settlements exist.
- Hazards issues and interests wax and wane in private and public minds and

compete for attention against other settlement problems and interests.

- Natural hazard characteristics and their incidence are imperfectly understood.
- Accommodating natural hazards into sustainable development strategies is often neglected.
- There is a dearth of comprehensive, coordinated, system-wide, multi- and trans-disciplinary design and management of human settlements within their natural environments.
- As the possible impacts of many known hazards are at best handled in a piecemeal fashion and at worst are all but totally discounted, no evident comprehensive provision at all is being made for anticipating and coping with unexpected, unthinkable, extreme catastrophes that are anticipated.

The question confronting us here is how best to cope with such disturbing prospects in the turbulent and vulnerable extreme-hazard-event times that undoubtedly lie ahead.

Coping

Give me a place to stand on, and I will move the earth. Archimedes, 287-212 B.C.

Archimedes enduring aphorism affirms, that rescue-for-survival bases must be solid.

The central thrust of the solution to mitigating the adverse impacts of hazards is to maximise the ability to cope with diverse disasters at the level closest to the centre of the primary impact(s) through provision of the best possible means for short-term survival and then facilitating processes to expeditiously restore normal living (Zamecka and Buchanan 1999). This extant 'motherhood' tenet is not new, but many of the refinements covered herein are.

We have explored many key aspects of current perceptions of the hazard risks and vulnerabilities that confront contemporary cities and communities. The picture that emerges from our explorations includes as main features (Mitchell 1999, 495, 497):

- the diversity of risks that confront urban populations and growing interactivity among those risks
- the extent to which previous urban disasters (especially natural ones) have had deep and long-lasting repercussions on built environments and societal institutions as well as more obvious immediate human effects

- the build-up of catastrophe potentials in conurbations and mega-cities
- the narrowness and rule-bound-constraints of existing urban hazard-management policies and programmes
- important gaps in scientific and technological information
- re-organisation of the urban ecology of environmental hazards, most notably reflected in shifting and unknown patterns of exposure and vulnerability as manifest from unexpected, infrequent, and otherwise exceptional events.

In short, according to the case-study evidence, the environmental hazards of large urban areas are highly significant and they are changing in ways that will increase their salience during the twenty-first century and beyond. Urban managers would do well to pay attention to these trends and to include hazard amelioration management among their priorities. There is a need for the public and private sectors to learn to take disjunctive events into account systematically and deliberately, not just as inconvenient disruptions of 'normalcy'. Broadly construed, hazard mitigation-in all its forms and for a broad range of events-should become a continuing basic integral part of urban governance. To discount the importance of natural hazards in contemporary human settlements is to leave their populations exposed to worsening risks.

According to Campbell (1999, 52) catastrophic disasters possess the following attributes and dimensions :

- they don't have any rules
- there are often not enough emergency services to cope
- vital resources are knocked out
- there are inadequate procedures for dealing with the situation
- resolution is a long way off. Events keep escalating
- the media moves from being very local to very international
- there are serious differences of opinion in how things should be done
- the government of the day and the bureaucracy become seriously involved
- the public takes an armchair position (and is fed by the media)
- the victims and their families become the visual antithesis of the problem (again, projected by the media)
- there are growing numbers of authorities and officials involved
- sometimes there is complete chaos in simply trying to identify which of the emergency services and investigative bodies is doing what
- there is an urgent need to know who is in charge.

At present there is a dichotomy between

human settlement planners and those concerned with minimising the adverse effects of hazards. Planners extol the values and virtues of cities and settlements as desirable human achievements, rarely affording concern for hazards a full place in their quests for growth and development (UNCHS 1996).

On the other hand, hazard mitigators (and kindred souls) often possess knowledge, insights and capabilities that are invaluable as resources for contributing to making human settlements safer places, but all too often this material is not put to appropriate use (Higgins 1980; World Problems and Potential 1985; Shiels and Shiels 1991; Berke 1995; McIntire 2000). And even when it is, 'existing public policies strongly favour professionalised warning, evacuation, and emergency-management programmes for a wide range of known acute threats backed up by separate sophisticated engineering technologies for different chronic risks' (Mitchell 1999, 480).

Table 3: Contemporary Counter-Disaster Legacy, summarises the current approach to coping with dysfunctional emergencies.

Currently, there is no provision for creative contingency emergency management responses to novel and unanticipated situations such as, for example, those suggested by Mitchell (1999, 480):

Many improvements to the formal public

adjustments are possible, including the upgrading of emergency services and the installation of hazard-warning and evacuation technologies in cities that do not yet possess them, as well as the development of appropriate methodologies for assessing hazards and incorporating risk-management strategies into public budgets, plans, statutes, and other regulatory devices. However, even in relatively well-provisioned cities of Europe, Japan, North America, and Australia, the areal and demographic coverage of formal public sector hazard-management programmes is incomplete, and the extent to which they address the premier hazard concerns of resident populations is often uncertain.

What else that might be done remains missing from the preferred range of management alternatives? Broadly speaking, the neglected approaches involve non-expert systems, informal procedures, non-structural technologies, private sector institutions, and actions taken by individuals, families, neighbourhood groups, firms, and similar entities. Among others, these include measures that:

- encourage hazard-sensitive decisions about site selection, land management, and facility operations
- control the installation and replacement of infrastructure
- relieve institutional and social inequities that shift hazard burdens onto certain (already disadvantaged) groups

Contemporary counter-disaster legacy
Increasingly hazard-prone urban communities perceiving extreme natural and other hazards as abnormal events
Hazard mitigation is viewed as an ancillary, not integral element
Hazard mitigation is but one of a number of important matters
Where in place, most counter-disaster planning and management is focused on a limited range of defined and evident hazards and risks, and overly 'status quo' bureaucratic remediations
No community has in place comprehensive arrangements to cope best with all possible forms of known, let alone as yet to be manifest, catastrophes; extreme contingency management is rudimentary, if evident at all
No community has established an appropriate apportionment of individual, community, private and public sector rights and responsibilities, and of expectations of 'global village' support
No community evidences the best possible ability to 'cope with unexpected or unfamiliar events as well as long-term problems; acute natural hazards as well as chronic crises of environmental degradation' and adequate built environment maintenance
Even in cities (e.g. Tokyo and Los Angeles) and Third World communities (e.g. Pacific Islands and Caribbean) at the 'leading-edge' of counter-disaster measures, major gaps and uncertainties in emergency management knowledge, resources and capabilities exist
Natural and other hazards have yet to be adequately incorporated in sustainable community and urban development programmes
Each human settlement has unique challenges with wide differences in inheritances, values and goals and competing stakeholder priorities and predispositions
There is much world-wide historical knowledge and data, and forecasting capabilities, and continually extending emergency and catastrophe management 'knowhow' that may be used as the foundation for 'state-of-the-art' hazard mitigation initiatives, but which currently often lies seriously under-utilised

Table 3: Contemporary counter-disaster legacy

- buttress local grass-roots capacities for hazard management
- promote less environmentally stressful non-structural hazard-mitigation technologies.

In addition, there is a lack of initiatives that jointly address new and different kinds of hazard, and future unknowns, and a slowness to integrate hazards management with other problem-solving urban programmes, and a failure to investigate the multiplicity of roles that hazards may play in the lives of urban and other residents.

The implementation of a range of initiatives, such as those outlined above, would do much to enable people and communities to adapt and creatively cope better with their own novel and unique catastrophic circumstances, whenever and however they arise.

Mitchell, Devine and Jagger (1989) have provided a contextual model for the incorporation of the main hazard components—physical processes, human populations, adjustments to hazards, and net losses into human settlement planning and operations. Thus the hazard domain and the settlement domain are integrated into a single all-embracing conceptual framework (Hamilton 1999). Such an ekistic framework (Doxiadis 1968; Skertchly 1990) would provide a state-of-the-art systems-based framework within which orderly, properly prioritised progressive attention could be given to hazard mitigation concerns, issues and problems at different levels of human settlement (Beer 1974, 1975; Bossomaier and Green 1998; Capra 1997; Clarke and Crossland 1985; O'Connor and McDermott 1997; Senge, 1990).

Use of a sophisticated interactive hazard-settlement systems framework, integrally incorporating natural and human-made hazards, would facilitate sustainable human settlement development (Berke 1995; Blanke and Smith 1999; Bossel 1999; Lewis 1999; Satterthwaite 1999; Thiele 1999; Zamecka and Buchanan 1999) so maximising anticipated human survival.

Safer human communities: maximising the prospects of survival in sustainable settlements

The modern comprehensive international and inter-disciplinary science of human settlements-ekistics—was initiated by Doxiadis (1968) for the study of human settlements and their problems. As such, it encompasses all aspects of the planning and functioning of communities large and small, including counter-disaster capa-

bilities (Skertchly 1990). However, as we have seen, often the counter-disaster capabilities are all but neglected, as planners and others pursue their specialisations (UNCHS 1996; White 2000). Does not the importance of the domain of hazard mitigation and settlement sustainability for all humankind justify the development of a better integrated methodology for maximising the prospects of survival in human settlements? This article has barely skimmed the surface of the field (e.g. Elms 1998; Heath 1998). The need is for well-informed, attainable, future hazard preparedness, effective hazard mitigation action plans and optimal human survival attributes in all communities (Zamecka and Buchanan 1999; McEntire 2000; and White 2000). Examples of exemplary community hazard mitigation component programmes of the kinds conducive to facilitating safer communities are those acclaimed at the *Safer Communities Awards* (EMA 2000).

In order to systematise the actions and behaviours that would be most conducive to optimising the likelihood of short-term survival and to then optimise the continuation of human life after the advent of a catastrophe, it thus appears necessary to institute a composite approach to optimising survival in human communities. This thrust could be captured in resurrection and extension of the original ekistic concept in the new format of *Safer Human Communities*, whose emphasis is upon maximising human safety in sustainable settlements.

The central focus of Safer Human Futures will be to use leading-edge scientific knowledge and practical know-how to

- prolong inside (individual, group and community) durable and safe quality-of-life; and of short-term optimal likelihood-of-survival, after being impacted by disabling catastrophes
- ensure subsequent adequate outside rescue, recovery and reconstruction help is available and delivered, when needed.

The scope of the Safer Human Communities, hazard mitigating and human settlement vulnerability reduction specialisation, would embrace the whole natural and unnatural hazards field targeting individuals, communities small and large, and global survival, and of the administrative and managerial arrangements and mechanisms pertaining to the communities. It would be an integrated systems (and sub-systems) hazard-settlement paradigm.

Facilitating sustainable and robust,

adversity-coping, personal, group, organisational, national and global characteristics, is seen as the best possible foundation for optimising survival in all human communities. *Table 4: Optimising Catastrophe-Coping: Safer Human Communities*, depicts the main entities of the field as it would address survival concerns at different levels of human aggregation. At each level, ongoing and progressive hazard-coping preparations would be taking place through structured learning and experiential simulations. Optimal chances of survival after a disaster or catastrophe would depend initially upon immediate life-support capabilities and then access to whatever level of safe-havens are necessary to cope with the severity and extent of the hazardous event, and later societal reconstruction.

There is no doubt but that the qualities of individual human beings are important in their abilities to cope with extreme life-threatening situations (Paton and Long 1996; Skertchly and Skertchly 2000). Exemplary examples are those of Diver (1999), (Mills 2000) who demonstrated superb survival skills when incarcerated after the Thredbo Village, Australia landslip, and Bulimer (1998), who was similarly incarcerated in his remote upturned yacht. Similar qualities were in evidence in, for instance, the recent inundations in Bangladesh and Mozambique (ABC/CNN 1999-2000) where many individuals and families had to cope on their own in highly dangerous environments for periods of up to weeks before outside help arrived. Such mature survival qualities are the outcomes of hereditary legacies and earlier enabling and developmental experiences (Seligman 1990, 1995; Gottman 1997; Diver 1999; Skertchly and Skertchly 2000).

As examples of the outstanding characteristics of emergency management agencies and their staff, the accounts of Junger, (1997); Skertchly and Skertchly, (1998; 2000); Mundle, (1999); and Brehm and Nelson, (2000), may be cited.

At the higher levels of human aggregation, similar qualities in organisational and institutionalised settings, would form the bases of the enduring solidarity necessary to mount successful response and recovery interventions. In order to optimise the probability of survival, whatever the size of the community (from small tribes/clans to mega-cities) and the features of the disaster and/or catastrophe, it is necessary to first live through the experience, and then be able to initiate, from secure and un-threatened safe resource locations, suitably scaled emer-

Optimising Catastrophe-Coping

Safer Human Communities is the systematic body of ekistic knowledge and capabilities concerned with optimising the probability of surviving natural and other hazards in the safest possible, sustainable, human settlements. It focuses comprehensively upon the many individual and societal functions and their interactive hazard mitigation and vulnerability reduction manifestations embracing all aspects of the hierarchy of increasingly complex and interdependent entities such as:

Individuals: Fostering mentally and physically healthy, robust and optimistic individuals with pertinent life-skills to endure deprivation. Capability to survive alone for at least a week in safe pods or shells.

Groups: Self-sufficient resources and capabilities to basically cope without external aid for several weeks. Easy access to safe havens.

Neighbourhoods: Sufficient redundant resources to support significant numbers of totally devastated members of immediate or near neighbours for several weeks. Access to robust shells/resources.

Communities: Sufficient institutionalised arrangements, resources and safe havens to cope for up to a month with substantially disabled local population components. Emergency management capabilities and resources.

Conurbations: Sufficient counter-disaster capabilities to manage major dysfunctional catastrophes for a large part of the population for extended periods.

Regions within countries: Availability of adequate manpower and resources to either evacuate or come to the aid of extensively devastated nearby population, for indefinite periods.

Countries: National counter-disaster capabilities sufficient to meet indefinitely, all but the most exceptional and disabling catastrophes.

Continents/Oceans: Kindred countries counter-disaster consortia.

World: United Nations and other global counter-disaster/aid bodies.

Table 4: Optimising catastrophe-coping: safer human communities

gency response interventions.

The work of Beer (1974, 1975) provides an especially pertinent, firm basis, for the necessary hierarchical hazard mitigation systems conceptual framework within a complex modern working society.

Over the generations ahead, the findings of a well-supported and adequately disseminated and acted upon, recognised new science of human survival-surviveology, progressively incorporated into sustainable human settlement development programmes, could make an invaluable contribution to ameliorating the impacts of natural and unnatural hazards, that have been and will continue to be, integral players in the turbulent drama of life on earth, and for the many on-going challenging human survival-coping situations presenting throughout the global commons.

Hope in life comes from the inter-connections among all the people of the world. We believe that if we all work for what we think individually is good, then we as a whole will achieve more power, more understanding, more harmony as we continue the journey. We don't find the individual being subjugated by the whole. We don't find the needs of the whole being subjugated by the increasing power of the individual. But we might see more understanding in the struggles between these extremes. We don't expect the system to eventually become perfect. But we will feel

better and better about it. We will find the journey more and more exciting, but we don't expect it to end.

Should we then feel that we are getting smarter and smarter, more and more in control of nature, as we evolve? Not really. Just better connected-connected into better shape... If we have the individual will, we can collectively make our world what we want. (Berners-Lee 1999, 227-8).

Through understanding the dangers of our hazardous world and building and managing capabilities to minimise their adverse effects we can maximise our prospects for building safer human communities (Elms 1998; Heath 1998; Robertson 1999; Theobald 1999; Skertchly and Skertchly 1999; EMA 2000).

In order to cope best with all future hazard contingencies we should plan and manage communities around the world with a core concern for the enduring safety and well-being of all people within the global commons.

The words of White (2000) are most apposite:

If (the world) is to benefit fully from the growing and deepening knowledge of natural hazards, some effective method must be found to translate that understanding into operative public policy and private procedures. Currently, these policies and procedures are disparate and partly counter-productive. Can the interested professional and citizen groups take

initiatives to achieve a unified public program?

Looking back over 25 years, and trying to look ahead to a time when we do not suffer unnecessarily from extreme natural events, these questions seem to me an urgent challenge for all concerned citizens.

It is hoped, then, that, in the immediate future, many emergency workers and citizens will respond to the major unresolved challenges that are entailed to effectively assist humankind throughout the world to cope best with the certainty of increasingly complex catastrophes and disasters in the dauntingly challenging turbulent times that lie ahead. A significant response and future commitment will foster safer human communities.

References

ABC/CNN 1999-2000 *Australian Broadcasting Commission and Cable News Network Documentaries.*

ADPC 1999 *Managing Disasters (In Asia and the Pacific)—A Review of Lessons Learned During The International decade for Natural Disaster Reduction.* Asian Disaster Preparedness Centre.

Argyris C. 1993, *Knowledge for Action,* Jossey-Bass, San Francisco.

Beatley T. 1995, 'Planning and Sustainability', *Journal of Planning Literature*, vol. 9, no. 4, pp. 370-382.

Beer. S. 1974, *Designing Freedom,* John Wiley, London.

Beer. S. 1975, *Platform for Change,* John Wiley, London.

Berke P.R. 1995, 'Natural Hazard Reduction and Sustainable Development', *Journal of Planning Literature*, vol. 9, no. 4, pp. 382-395.

Berners-Lee T. 1999, *Weaving the Web,* Orien Business Books, London.

Berz G. 1999, *Topics 2000: Natural Catastrophes-the current position,* Munich Re Group, Munich.

Blackie P., Cannon. T., Davis I. and Wisner B. 1994, *At Risk: Natural hazards, people's vulnerabilities and disasters,* Routledge, London.

Blanke E. and Smith R., eds. 1999, *Cities in Transition: New Challenges, New Responsibilities,* Macmillan, London.

Bossel H. 1999, *Indicators for Sustainable Development,* International Institute for Sustainable Development, Winnipeg.

Bossomaier T. and Green D. 1998, *Pattern in the Sand: Computers, complexity and life,* Allen and Unwin, Sydney.

Brehm J. and Nelson P. 2000, *That Others May Live: The Real Heroes of the Perfect Storm,* Ebury Press, London.

Brookes H. 1992, 'Concepts of Sustai-

nable Development and Environmentally Sound Technology', *ATAS Bulletin*, No. 7, pp. 19-24.

Bryant E.A. 1992, *Natural Hazards*, Cambridge University Press, Cambridge.

Bulmer A. 1998, *Survival (Documentary)*, ABC, Sydney.

Campbell R. 1999, 'Controlling crisis chaos', *Journal of Emergency Management Australia*, vol. 14, no. 3, pp. 51-54.

Capra F. 1997, *The Web of Life*, Harper Collins, London.

Clark P.A. 1972, *Action Research and Organizational Change*, Harper and Row, London.

Clarke D.D and Crossland J. 1985, *Action Systems*, Methuen, London.

Davis, L. 1992 *Natural Disasters: From the Black Plague to the Eruption of Mt Pinatubo*. New York and Oxford: Facts on File.

Diver S. and Bouda S. 1999, *Survival*, Macmillan, Sydney.

Doxiadis C.A. 1968, *Ekistics*, London and New York.

Elms D., ed. 1998, *Owning the Future*, University of Canterbury, Canterbury.

EMA 2000, *Safer Communities Awards*, EMA, Canberra.

Friedman M. and R. 1985, *Tyranny of the Status Quo*, Penguin Books, London.

Fuchs R.J., ed. 1994, *Mega-city Growth and the Future*, United Nations University Press, Tokyo and New York.

Gottman J. 1997, *The Heart of Parenting: How to raise an emotionally Intelligent Child*, Bloomsbury, London.

Guidette C. 2000, *Insured Losses*, Insurance Services Office Inc (ISO), NY.

Halley N. 1999, *The Best Ever Book of Disasters—Natural, Historical, Environmental, Future*, Kingfisher Publications.

Hamilton R.M. 1999, *Disaster Reduction: A safer world in the 21st century*, International Decade for Disaster Reduction, Switzerland.

Heath R. 1998, *Crisis Management for Managers and Executives*, Financial Times/Pitman Publishing, London.

Hewitt K. ed. 1983, *Interpretations of Calamity*, Allen and Unwin, Boston.

Higgins R. 1980, *The Seventh Enemy: the human factor in the global crisis*, Pan Books, London.

Hobsbawm E. 1996, *The Age of Extremes: A History of the World, 1914-1991*, Vintage Books, New York.

IDNDR 1996, *Cities at Risk: Making cities safer...before disaster strikes*, IDNDR, Geneva.

IPCC 1996, *Climate Change 1995*, Cambridge University Press, Cambridge.

Johns A. 1999, *Dreadful Visitations: Confronting Natural Catastrophe in the*

Age of Enlightenment, Routledge, New York and London.

JNDS 1995, 'The Great Hanshin Earthquake', *Journal of Natural Disaster Science (Special edition)*, vol. 16, no. 3.

Junger S. 1997, *The Perfect Storm*, The Fourth Estate, London.

Kundzewicz Z.W. and Kaczmarek Z. 2000, 'Coping with hydrological extremes' *Water International*, vol. 25, no. 1, pp. 66-75.

Kugler P. N. & Lintern G. 1995, 'Risk management and the evolution of instability in large-scale, industrial systems', in P. Hancock, J. Flach, J. Caird, & K. Vicente, eds., *Local applications of the ecological approach to human-machine systems*, Lawrence Erlbaum Associates, Hillsdale, NJ, pp.416-450.

Leach W. 1999, *Country of Exiles: The Destruction of Place in American Life*, Pantheon Books, New York.

Lewis J. 1999, *Development in Disaster-Prone Places: Studies of Vulnerability*, Intermediate Technology Publications, London.

Lintern G. 1992, 'Risk management: The irremedial incompleteness of rules', *Proceedings of the IEEE International Conference on Systems, Man, and Cybernetics*, IEEE, Piscataway, NJ, pp. 833-836.

Lo, Fu-Chen and Yeung, Yue-man, eds. 1998, *Globalization and the World of Large Cities*, United Nations University Press, Tokyo and New York.

Machado L. 1990, *The Brain of the Brain: The Key to the Mysteries of Man*, *Cidado do Cerebro*, Rio de Janeiro.

Main, H. and Williams, S.W., eds. 1994, *Environment and housing in third world cities*, John Wiley, Chichester and New York.

Mans J. 2000, 20 die in Dutch blast (at Enschede)', *Northern territory News*, May 15, 9.

McDonald G.J. 1999, *Climate and Catastrophic Weather Events*, International Institute for Applied Systems Analysis, Vienna.

McGranahan G. and Songsore J. 1994, 'Wealth, health and the urban household', *Environment* no. 36, vol. 6, pp. 4-11, 40-45.

McEntire D.A. 2000, 'Sustainability or invulnerable development', *Australian Journal of Emergency Management*, vol. 15, no. 1, pp. 58-61.

Mills L. 2000, 'Trapped in a frozen tomb', *Readers Digest*, April.

Mitchell J.K. Devine N. and Jagger K. 1989, 'A contextual model of natural hazard', *Geographical Review*, vol. 89, no. 4, pp. 391-409.

Mitchell J.K. 1992, 'Natural hazards and sustainable development', summarised in Berke loc cit.

Mitchell J.K. and Ericksen N.J. 1992,

'Effects of climate change on weather-related disasters', in Mintzer I.M. *Confronting Climate Change*, Cambridge University Press, Cambridge.

Mitchell J.K. 1996, 'Improving community responses to industrial disasters', in J.K. Mitchell ed., *The long road to recovery: Community responses to industrial disaster*, United Nations University Press, Tokyo.

Mitchell J.K. ed. 1999, *Crucibles of Hazard: Mega-Cities and Disasters in Transition*, United Nations University Press, Tokyo.

Mundle R. 1999, *Fatal Storm*, Harper-Collins, Sydney.

Myers M.F. and White G.F. 1993, 'The challenge of the Mississippi flood', *Environment*, vol. 35, no. 10, pp. 6-9, 25-35.

Newson L. 1995, *The Atlas of the World's Worst Natural Disasters*, Dorling Kindersley Ltd, London.

O'Connor J. and McDermott I. 1997, *The Art of Systems Thinking*, Harper Collins/Thorsons, London.

Oliver-Smith A. ed., 1986, *Natural Disasters and Cultural Responses*, Studies in Third World Societies.

Paton D. and Long 1996, *Psychological Aspects of Disasters: Impact, Coping and Intervention*, Dunmore Press, Palmerston North.

PCCIP 1997, *Critical Foundations: Protecting America's Infrastructures*, President's Commission on Critical Infrastructure, Washington.

Perrow C. 1984, *Normal Accidents*, Basic Books, New York.

Rasmussen J. 1997, 'Risk management in a dynamic society: A modelling problem', *Safety Science*, 27, pp. 183-213.

Reed E. S. 1996, *Encountering the world: Toward an ecological psychology*, Oxford University Press, New York.

Reed E.S. 1996, *The Necessity of Experience*, Oxford University Press, New York.

Robertson J. 1999, *The New Economics of Sustainable Development: A Briefing for Policy Makers*, Kogan Page, London.

Romei S. 2000, 'Don't let the love bugs bite', *The Australian*, May 13-14, p.30.

Rose C. and Nicholl M. 1997, *Accelerated Learning for the 21st Century*, Delacorte, New York.

Satterthwaite D. 1996, 'Revisiting Urban Habitats', *Environment* vol. 38, no. 9, pp. 25-28.

Satterthwaite D. 1999, *The Earthscan Reader in Sustainable Cities*, Earthscan Publications, London.

Seligman M. 1990, *Learned Optimism*, Random House, Sydney.

Seligman M. 1995, *The Optimistic Child*, Random House, Sydney.



Dr Brendan Nelson MP, Parliamentary Secretary to the Minister for Defence (right), launched the Australian Safer Communities Awards in Canberra on 28 February 2001. He is with (from left) Station Officer Ron Hourigan, ACT Fire Brigade; David Templeman, Director General EMA; and John Quiggan, ACT Ambulance Acting Director. Entries for the Awards close on 31 May—see www.ema.gov.au for more details.

Dr Brendan Nelson assumes Parliamentary Responsibility for emergency management

Dr Brendan Nelson was recently appointed the Parliamentary Secretary to the Minister for Defence. Minister Reith has specifically delegated to Dr Nelson Portfolio responsibility in respect of Counter Disaster and Emergency Assistance. Dr Nelson is therefore now responsible for Commonwealth emergency management, including civil defence. Under Commonwealth policy, the Parliamentary Secretary is now able to call on the resources of all Commonwealth agencies in responding to emergencies.

Dr Nelson has already shown a keen interest in Emergency Management having become directly involved in the recent operational support activities undertaken by the Australian Defence Force in response to flooding in the Northern Territory and North-Eastern New South Wales. His enthusiasm for Emergency Management issues has seen him launch the Community Safety Awards, participate in the Global Disaster Information Network held in Canberra in March, and in supporting EMA's activities relating to the International Year of Volunteers.

In addition to his Emergency Management role, Dr Nelson has also assumed responsibility for management of the Cadets Scheme and issues relating to the ADF Reserves. Dr Nelson's other main area of responsibility is the Defence Estate, which recently involved him officiating the hand back to the NSW State Government, on behalf of the people, five key Defence holdings on the Sydney Harbour foreshore.

Dr Nelson is well known for his involvement in Health,

Medical and Social issues (smoking, drugs, aboriginal health, youth suicide). He was National President of the Australian Medical Association in 1993-95. Dr Nelson has been Chair of the Sydney Airport Community Forum, considering issues of long term traffic management noise abatement. He has also been a key contributor in Government's policy development on health and communications.

Disaster coordination

EMA was kept busy during the latter part of February and the first two weeks of March in coordinating Commonwealth assistance to the following disasters:

Floods in Northern Territory

In late February, rain from Tropical Cyclone Winsome resulted in areas south of Katherine in Northern Territory becoming affected by widespread flooding. In particular, the isolated communities of Kalkarindji and Daguragu were severely effected with over 400 people requiring evacuation.

On 20 February, the Northern Territory Government requested Commonwealth assistance with the evacuation to Katherine of the affected people and the air transport of six tonnes of electrical equipment back into Kalkarindji. The Australian Defence Force was requested to undertake the task which was effected using a C130 aircraft from Sydney.

Subsequently, a further request was received for the air transport of 20 tonnes of food from Darwin to Borroloola which had also become isolated by flood waters. This task was completed using the same ADF aircraft.

Gibson Desert flooding

Heavy rain from Tropical Cyclone Abigail caused widespread flooding in the headwaters of the Fitzroy River in the Gibson Desert area of Western Australia and led to the inundation of the remote community of Kiwirrkurra. Due to potential health problems, a decision was made by the WA State Emergency Service (WASES) to evacuate the 160 person remote (predominately aboriginal) community.

As the closest communities from which an evacuation could be mounted were in the Northern Territory, cross-border consultation between WASES and NTES led to a decision that the latter would assume responsibility for the evacuation. The NTES plan was for small locally sourced helicopters to ferry evacuees from Kiwirrkurra to Kintore just inside the Northern Territory from where they would be moved by larger helicopters to Ayers Rock and then bussed to Alice Springs.

On 5 March, the Northern Territory Government requested Commonwealth assistance for the transportation of the

evacuees from Kintore to Ayers Rock. The ADF was requested to undertake the task which involved the use of a Townsville based Chinook helicopter.

The task was unique due to the remoteness of the community and emphasised the need for isolated communities to have a risk management plan as emergency assistance may take some time to arrive. Also, the cooperation in planning between WASES and NTES was an outstanding success.

Northern New South Wales flooding

Intense rainfall along the New South Wales Coast in the vicinity of Grafton and Kempsey during the first week of March led to a number of towns and communities being flooded and isolated, and the failure of some lifelines.

On 10 March, the New South Wales Government requested Commonwealth assistance with the evacuation of around 1000 people from the towns of Gladstone and Smithtown, and the conduct of aerial reconnaissance and food-resupply to isolated properties.

The task was undertaken during the period 11 to 15 March by the ADF using and eight Navy and Army helicopters from Nowra, Oakey and Townsville.

For further information contact:

Don Patterson
phone: 02 6266 5165
email: dpatterson@ema.gov.au

International Search and Rescue convention

The increasing number of major disasters requiring international assistance led the Secretary General of United Nations to recommend in July 2000 that a convention be developed to formalise arrangements for the provision of such assistance. In particular the convention was to be aimed at providing a working framework for the resolution of complex issues such as air space control, customs regulations and host and assisting nation responsibilities.

It was proposed that a core group of interested countries be formed to undertake the initial drafting work. Australia has accepted an invitation to become a member of the core group which met in Geneva during the period 22/23 February 2001.

For further information contact:

Trevor Haines
phone: 02 6266 5169
email: thaines@ema.gov.au

De-orbit of the Mir Space Station

EMA's planning and coordination skills were tested during the early part of 2001 when the organisation was given lead responsibility for national coordination of Australia's interests in the return of the ageing Mir Space Station.

EMA drew heavily on the experiences gained from the Year 2000 Date Change in planning for Mir's re-entry. Activities undertaken included information exchange between national and international stakeholders,

development of a Commonwealth contingency plan, and management of the media.

For further information contact:

Rod McKinnon
phone: 02 6266 5328
email: rmckinnon@ema.defence.gov.au

What's on at AEMI

Program of activities for 2000/2001

The Program of Activities for the financial year 2000/2001 and information on AEMI activities can be found on the EMA website, www.ema.gov.au. Alternatively information is provided in the *AEMI Handbook 2000/2001*.

Contact AEMI

phone: 03 54215100 or
email: aemi@aemi.gov.au for a copy of the handbook to be sent to you.

New course in emergency Planning

A new course in emergency planning is to be developed by AEMI in cooperation with the States and Territories this year. The last course in emergency planning was conducted a number of years ago. Emergency planning is a key activity in preparing for emergencies; it requires the development of agreements relating to organisational responsibilities, communication and resource management for emergency response and recovery.

The purpose of the course is to enable participants to participate in the development of emergency response and recovery plans within their area of responsibility.

At the end of the course participants should be able to:

- describe how emergency planning fits into the emergency risk management process
- explain how to develop emergency plans, taking into account relevant legislation, policies and principles.

For further information on this course contact:

Peter Koob
phone: 03 54215283
email: pkoob@ema.gov.au

Continuing professional development module on Land Use Planning for Safer Communities

A draft manual entitled *Planning Safer Communities: Land Use Planning for Natural Hazards* has been developed for Emergency Management Australia in consultation with all State and Territory planning agencies and emergency management organisations. The draft manual is the subject of continuing consultation with the Senior Planning Officials.

A continuing professional development (CPD) module will be created in partnership with the Royal Australian

Planning Institute for existing land use planners and environmental managers based on these guidelines. It is expected that the CPD module will be trialed at AEMI on 24-25 September 2001.

For further information on this CPD module contact:

Peter Koob
phone: 03 54215283
email: pkoob@ema.gov.au

Graduate Certificate in Disaster Management

Swinburne University of Technology has decided to grant advanced standing in the Graduate Certificate in Disaster Management to individuals who have successfully completed appropriate courses delivered by AEMI.

The courses that have been reviewed and accepted are:

- Introduction to Emergency Risk Management
- Understanding Emergency Risk Management
- Implementing Emergency Risk Management
- Recovery Management
- Evacuation Management

In addition to attending the courses a candidate would be required to complete an assessment task for each of the six modules that make up the Swinburne graduate certificate. Granting of advanced standing involves a significant reduction in cost of the Graduate Certificate.

In the near future details of the Graduate Diploma and Masters Program in Disaster Management will be released.

For more information contact:

Ariel Pearce Manager of the International Disaster Management Centre
phone: 03 92145146
email: aapearce@swin.edu.au

Training Needs Assessment

A training needs assessment project is currently in progress. The focus of the project is Australia wide and involves seeking views on emergency management education and training from a diverse range of people. This includes those people who have full time responsibilities in the industry and from those with differing levels of emergency management responsibilities.

In consultation with representatives from all States and Territories a number of data gathering methods are being employed. The material generated by this process will be reviewed at a workshop to held in early October at AEMI. The outcome of this workshop will be a draft report that will be circulated to all stakeholders for comment. The final report will be presented to Dudley Mc Arde, Director of AEMI, in November 2001.

For further information on this training needs assessment contact:

Paul Quinn at AEMI
phone: 03 54215225
email: pquinn@ema.gov.au

School Education News

School Education Workshop

School Education is recognised, and supported by EMA, as a long-term risk reduction strategy with a range of positive outcomes related to general education, as well as community awareness and participation. The establishment of the School Education Working Party (SEWP) in 2000 was an expression of EMA's growing commitment in this field.

The SEWP conducted two workshops last year and outcomes included:

- a draft policy
- a set of guidelines for the preparation and production of resources for emergency management school education
- the beginning of a resources audit and
- the creation of networks between SEWP members and state/territory emergency management communities

Current membership of the SEWP includes representatives from each of the states and territories. Organisations represented include South Australian SES; Western Australia FESA; ACT Department of Education and Community Services; QLD Rural Fire Service; NT Education department; NSW SES; VIC CFA & MFESB.

The March 2001 workshop focussed on the theme(s) of consolidation and partnerships. It is hoped that by creating relationships with Curriculum Corporation and subject associations like the Geography Teachers Association of Victoria, EMA will be able to:

- help with the development of PD programs for teachers
- access marketing and promotion vehicles for EMA teaching products
- participate in initiatives like the Curriculum Corporation's Schools On-line Curriculum Content Initiative (SOCCI)

Hazards Happen update

The Teacher's Guide to Hazards Happen has been completed and will shortly be published. It will then be sent to the purchasers of the CD-ROM and accompany each sale thereafter. It is a terrific complement to the CD and contains teacher friendly information and advice on the aims of each lesson; what to look for when assessing students; learning outcomes; how to prepare for and implement the lessons. Primarily suited to the SOSE/Geography key learning area.

For further information on Hazards Happen, or the SEWP contact:

Russell Forster, School Education Officer
Phone: 03 54215242
Email: rforster@ema.gov.au

Information and Emergency Management

The management of information in relation to emergency and disaster management is developing as a significant focus for some organisations in the sector. Although many of the current issues have been considered repeatedly over the past ten years or so (e.g. Hazard Management: Better Information for the 21st Century - workshop held in 1994) new ideas and technologies make it timely to re-examine information related problems and solutions.

An Information Management and Business Group has been created within EMA. The Information Management function of the group will be twofold. First, the Group will engage with State and Territory organisations to maximise the benefit they, and the emergency management sector, can obtain from information currently being generated. The Group will seek to assist organisations and agencies working on emergency management matters by collecting and disseminating best practice concepts in the management of information and providing forums for issues relating to the management of information to be discussed. Second, it will seek to maximise the efficiency of the organisation's internal mechanisms to manage information, its generation, capture, storage and dissemination.

For further information contact:

Rob Lee

phone: 03 5421 5245

email: rlee@ema.gov.au

EMA publication news

New and revised publications now available (as noted below in each category):

Australian Emergency Manuals Series:

Part IV – Skills for Emergency Services Personnel
Manual 11 – Vertical Rescue (2nd Edition)

Part V – The Management of Training
Manual 2 – Managing Exercises

(Copies for EM agencies available through your State / Territory Emergency Service training section. Other inquiries to EMA.)

Mount Macedon Papers

Note: These workshop records were published in booklet form for all 'Papers' on workshops held up to the end of 1998. All Mount Macedon Papers from then onwards will be available on the EMA Web site commencing with the three noted below:

Psychological Services Workshop (No 2/1999)

Landslip Management Workshop (No 3/1999)

The Dennis Mileti Workshop (No 4/1999)

Available on the EMA Web site.

EMA addresses for publication orders

(first check above for appropriate state or territory authority or EMA office)

Emergency Management Australia
PO Box 1020
Dickson ACT 2602
Australia

Australian Emergency Management Institute
Mt Macedon Road
Mt Macedon VIC 3441
Australia

Senge P.M. 1990, *The Fifth Discipline*, Random House, Sydney.

Shiels A.J. and Shiels 1991, *Preventable Disasters: Why Governments Fail*, Rowman and Littlefield, Savage, Maryland.

Skertchly A. 1990, *Ekistic Priorities Programme Categories*, Northern Territory University, Darwin.

Skertchly A. and Skertchly K. 1999, *Lifelines (NT) Study: People and Communities of the Northern Territory of Australia*, EMA, Canberra.

Skertchly A. and Skertchly K. 2000, 'Traditional Aboriginal knowledge and sustained human survival in the face of severe natural hazards in the Australian monsoon region: some lessons from the past for today and tomorrow', *The Australian Journal of Emergency Management*, vol. 14, no. 4, pp. 42-50.

Skertchly A. and Skertchly K. 2000,

'Human Aspects of the Katherine-Daly Flood Disaster', *The Australian Journal of Emergency Management*, vol. 15, no. 1. pp. 47-52.

Theobald R. 1999, *Visions and Pathways for the 21st century, essays and verses*, Southern Cross University Press, Lismore.

UNCHS 1996, *United Nations Conference on Human Settlements, (Habitat 2), United Nations, New York.*

White G.F. 2000, 'The Natural Hazards Scene', *Natural Hazards Observer*, vol. 29, no. 3, pp. 1-2.

World Problems and Potential 1985, *Year-Book of World Problems and Human Potential*, Union of International Associations and Mankind 2000, Brussels.

World Resources Institute, 1996, *World Resources 1996-96*, Special issue on the urban environment, WRI, UNEP, UNDP, World Bank, Washington D.C.

Zamecka A. and Buchanan G. 1999, *Disaster Risk Management*, Department of Emergency Services, Brisbane.

Authors

Dr Allan Skertchly has qualifications in the biological, physical, psychological and social sciences. He is Principal Consultant-Hazard Mitigator with S.M.I.L.E. Darwin.

Ms Kristen Skertchly has a honours degree in environmental science and is a Senior Scientist with the Department of Lands, Planning and the Environment of the Northern Territory Government.

For the 'valuable contribution by S.M.I.L.E. to building safer communities' both authors were recipients of the recent Inaugural Safer Communities Awards conducted by Emergency Management Australia.

This article has been refereed

Australasian Disaster and Hazard Research Directory

- Add an outline of your project
- Update information
- Add a hotlink to your site
- Add online documents

Search online by:

- Hazard
- Disaster
- Country
- Researcher
- Keyword

A tool for the new Millennium

The Australasian Disaster and Hazard Research Directory

is the only directory of its type in the world that allows you direct access to information. The project is a joint partnership between the Natural Hazards Research Centre and Emergency Management Australia.

Do you know ...

What research is occurring in your area?
What is new in your area of interest or expertise?
Who is researching what?

Do you want ...

To avoid duplication of research?
To save money?
To collaborate with other researchers?
To expand your contacts and knowledge?
To update contact details such as email, website or postal and phone/fax details?
To learn about research taking place in neighbouring countries?

This online directory will assist in all these questions. It is an invaluable tool for researchers, practitioners and decision-makers in the field of disaster or hazard management. It will be an important source of information for the new millennium. The online directory provides a new and wider view of hazards and disaster research in the Australasian and Southeast Asia region, and focuses on natural and technological hazards and disasters starting from 1993.

www.es.mq.edu.au/NHRC/ema.html



For further information contact:

Keqing Chen
Natural Hazards Research Centre
Macquarie University
North Ryde NSW 2109 Australia
Phone: +61 2 9850 8433
Fax: +61 2 9850 9394
kchen@laurel.ocs.mq.edu.au

or

Professor Russell Blong
Natural Hazards Research Centre
Macquarie University
North Ryde NSW 2109 Australia
Phone: +61 2 9850 8683
Fax: +61 2 9850 9394
rblong@laurel.ocs.mq.edu.au

www.es.mq.edu.au/NHRC/ema.html

Some Hazards covered by the directory:

Aviation accidents, animal diseases, bushfires, chemical hazards, climatic changes, cyclones, dams, droughts, erosion, earthquakes, fires, floods, hailstorms, heatwaves, industrial accidents/hazards, insect infestation, land degradation, landslides, lightning, maritime disasters, monsoons, natural or technological disasters/hazards, space debris, tsunamis, tornadoes, volcanoes, wastes, weather hazards, windstorms.

Dam safety risk treatments

Introduction

One of the noticeable outcomes of the community emergency risk management process in many areas has been the scrutiny of dam safety by the general community and emergency managers undertaking the risk analysis process. At the same time some dam safety engineers have been utilising risk management principles to assess the risks to their dams. Dams that are categorised as a high hazard should have an emergency action plan that outlines procedures for the safe operation of the dam during an emergency. However, many of these emergency action plans do not interface with or use the terminology that is consistent with local emergency arrangements. Current emergency management principles and practices are now fairly stable but the terminology in use by the community is changing all the time as they become more aware of the risks around them and the prevention strategies that are being implemented.

Dam Safety awareness

There are also many risk treatment options within the engineering field that will change the likelihood or consequences of a flood affected by a dam or a dam failure. Some of these options may save the dam structure but also cause an increase of the consequences within the community. Emergency managers and the community need to actively communicate with the dam owner or operator to ensure that they gain an understanding of these changes to the risks associated with dam operation. This liaison needs to be increased when a dam is undergoing repairs or alterations as these activities change the risk exposure for the community, dam owner/operator and the contractor undertaking the repair work.

Some of the risk treatment options for dam safety involve strategies to change the capacity of the spillway to handle revised maximum floods. An increase in spillway capacity can help save the dam from overtopping, however, these options often have an affect on the downstream community. Emergency managers need to be aware of these options as many create other associated risks while they are saving the dam.

A spillway fuseplug is a strategy used in many countries for increasing the capacity of a dam to cope with the probable maximum flood (PMF) whilst

by Steve Warren, Regional Officer
(Emergency Management),
Victoria State Emergency Service.

retaining a degree of security. The fuseplug is usually built in an emergency spillway of the dam and is constructed of material that will erode easily when water overtops the fuseplug. When a flood enters the dam, the normal spillway is used until the inflow exceeds its capacity and the water overtops the first level of the fuseplug. This causes the fuseplug to erode before the dam wall is overtopped and thus saves the dam. The fuseplugs are often designed to erode at different water heights so there is an increasing fuse effect. The risk downstream is an increase to the extreme flooding levels, but hopefully the dam will be saved.

Spillway design is very important so that the PMF will pass through the dam and not over the top of the dam. On dams that have limited spillway capacity, a labyrinth design could be used to increase the capacity of the spillway without increasing the spillway width. The labyrinth spillway will allow greater spillway flow to save the dam. However, the use of a spillway fusegate that is designed to topple over when the water exiting the spillway reaches a certain height is a different matter. Once toppled, the fusegate allows increased water to suddenly exit via the spillway. The risk to the downstream community is a sudden increase in the quantity of spillway discharge as the toppled fusegate does not return to its original position after the initial flood peak.

Other innovations in spillway design include the use of pneumatic assisted gates to raise or lower the spillway height. These gates allow a structure such as a weir or spillway to increase its holding capacity to prevent excessive flooding downstream. The risk is the sudden deflation of part or all of the airbags that will cause a wave of water to flood downstream. These gates are often used to increase the capacity of the dam to hold more water during flood events. The failure to inflate the gate would also increase the affect of the flood event.

There are many differing strategies used

to make a dam safer which have a possibility of changing the risks to downstream communities. The liaison between the dam owner/operator, community and emergency management planner is vital to ensure ongoing community safety.

Risk treatment

The risk treatment process starts with the extreme and high risks from the analytical stage and after these are formed into some priority, the group undertaking the risk management process then discusses the various options.

Vulnerable community

The vulnerable elements of the community are again considered at this point in the risk management process for each risk. Much of the information on community vulnerability has been gathered earlier in the risk management process but it is now consolidated for each risk before the options are considered so that a direct comparison of the affects or secondary risks can be made with each option. Vulnerability of the community with regard to dam safety could include access or egress, warning times, risk acceptance or disbelief, communication systems, monitoring systems and demographics of the area downstream or isolation by the dam operation.

Options

Of course, the first option is to accept the risk. In many cases this is not possible in the community safety context. If this option is taken, the risk would only analysed again during subsequent reviews or when factors affecting the likelihood or consequence are changed.

The second option is to avoid the risk. One example of how this can be achieved is the total removal of the dam. Overseas examples show that this is occurring when the repair costs are too great for the dam owner to make the dam safe, or when there are other reasons such as the need for environment flows and enhancing fish migration. The actual removal of a dam may avoid some risks but there could be many other implications due to a change in the flood peak without the dam.

The third option is to transfer the risk. This is usually achieved through contracting out the operation of a dam and/or insurance to cover any possible litigation from consequences of dam operation or

failure. In most cases of risk transfer, there is still a component of the risk or a new risk that remains with the owner or operator regardless of the contract or insurance policy. These risks may range from a change in the public's perception of the owner through to the legal issues of adequate contract management.

To treat the risk through a reduction in likelihood or consequences is the fourth option.

A reduction in *likelihood* can be achieved by:

- river level telemetry
- rainfall telemetry
- operational procedures
- training
- backup systems
- dam design & spillway operation
- maintenance

Reducing *consequences* can be achieved by:

- evacuation plans
- warning systems
- dam design features

Residual risk

Residual risk will always be there, it is the risk of not undertaking the risk treatment options in a timely manner due to funding or other restraints and also any risk that is left over after risk treatments are implemented. In fact, emergency management plans and arrangements are designed to treat residual risk and this is their place within the process. In the ideal world the risk treatment options would eliminate the need for emergency management plans.

Action plans

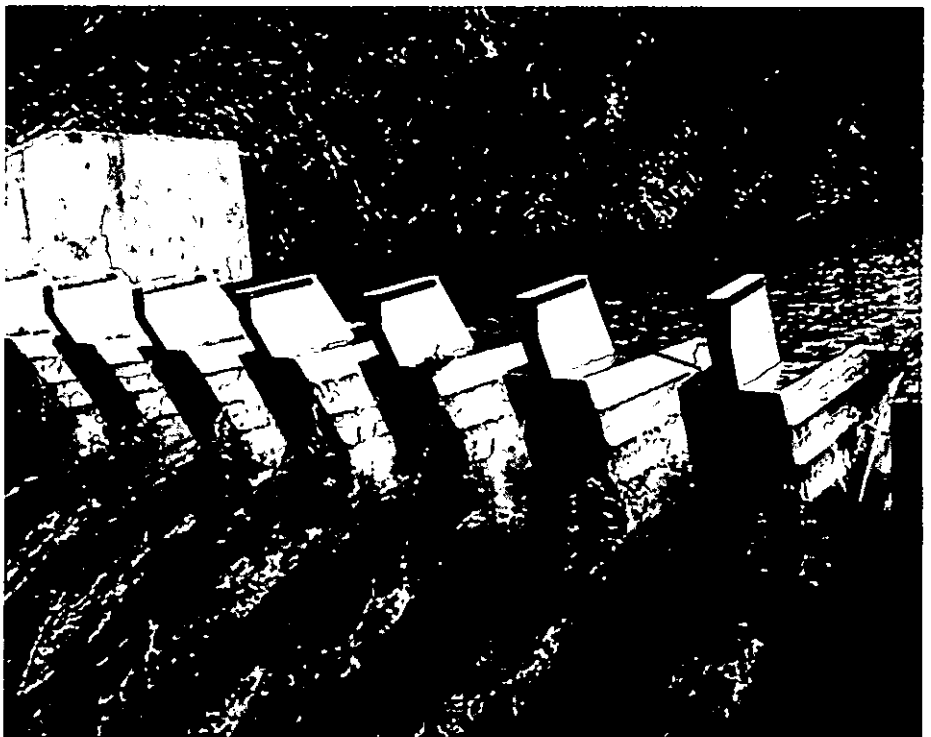
When the treatment options have been agreed upon, then action plans are completed to ensure that the strategies are undertaken, resources are allocated, responsibilities are clear, timing is agreed upon and a process of reporting and monitoring is included to complete the tasks.

Monitor & review

The entire risk treatment system is then reviewed as part of the normal cycle or as changes occur to either the likelihood or consequences.

Conclusion

It is clearly evident that the dam owner/operator, regulators, community and emergency management planners need to establish clear communication and an understanding of each other's roles and responsibilities within the community and dam safety fields. Dam safety is only one of many specialist areas where the facilitation skills of the emergency



Top: Fuseplug emergency spillway. Above: Fusegate spillway using the labyrinth design.

management planner are required to ensure an improvement in overall community safety.

References

- Standards Australia 1999 AS/NZS 4360: 1999 *Risk Management*.
- Emergency Management Australia 2000, *Guidelines on Coordination of Emergency Management Planning for Floods Affected by Dams (Draft)*.
- Victoria State Emergency Service 1998, *Community Emergency Risk Management – Facilitators Resource Kit*.
- Warren S. 1999, *Dam Safety—Emergency*

Management Planning. Combined Emergency Services Foundation.

Author

Steve Warren is an emergency management planner with the Victoria State Emergency Service. He often lectures on the practical application of the Community Emergency Risk Management process. He has studied dam safety in the USA and has recently returned from an AusAID mission on emergency management in Mozambique after the devastating floods.

Email: stevew@ses.vic.gov.au

New Books

Australian Volunteers at Work— 101 Stories.

Edited by Joy Noble and Roger Dick

*Reviewed by Conrad Powell, Executive Officer,
South Australian Volunteer Fire Brigades
Association*

Published by Wakefield Press

Retail price \$24.95 incl GST

190pp

ISBN: 1 86254 534 0

Available from Wakefield Press,
Volunteering SA and VFBA

Released on 5 December 2000 at the launch of International Year of the Volunteer 2001, the book contains delightful interviews with volunteers throughout Australia and from a spectrum of volunteering activity that will amaze readers. In the self effacing way of volunteers, most interviewees said 'Why interview me? I'm nothing special — you must see "so and so"'. Fortunately the editors stuck with their first choices to represent the sector.

Story after story shows what can be achieved by individuals joining together in a common vision and demonstrates that most volunteers are activists — doing something about real needs which range from saving lives to saving the environment. Views range from immense satisfaction and fulfillment in their roles, to on occasion, 'I don't want to be a volunteer, I want to be paid'.

Some patterns can be discerned from the whole, including;

- at present most volunteering is alive and well, with some sectors starting to show strain
- as governments withdraw from the services sector, the replacement volunteer effort is not being resourced to ensure long term sustainability
- most volunteers are involved in several areas of volunteering activity
- most new volunteers are head hunted one on one by other volunteers
- volunteers incur significant personal costs as part of their commitment

The book contains seven emergency service stories, including two from the South Australian Country Fire Service, and the cover is a CFS picture with two firefighters in action.

As a whole, the book is an optimistic story, written by representative people in the volunteering sector who are making a difference in their own lives, their communities and the world. Alice Shirreff from Melbourne sums it up with 'The love in your heart wasn't put there to stay, love isn't love

till you give it away'. Young Matthew Charlton of Perth who volunteers in a range of areas says it this way — 'I think volunteers are underrated. When you watch the news about 98% is about bad stuff that is happening in the world, but when you look into it there is really about 95% of good stuff and only 5% of bad stuff'.

The book was sponsored by Volunteering Australia with the support of Emergency Management Australia, Canberra. It is a wonderful record of our civilisation and those who make it work, and a significant contribution to International Year of the Volunteer.

Review of Aberfan: Government and Disasters

Iain McLean and Martin Johnes

*Reviewed by Philip Buckle
RMIT University*

Published by Welsh Academic Press

274pp

ISBN: 1 86057 033X

'In 1984 a judge presiding over a libel case ruled that the word Aberfan "had passed into the currency of ordinary language and that it requires no explanation". What happened at Aberfan on 21 October 1966 left an indelible mark on the valleys of South Wales. Even today, the name of Aberfan evokes sadness and contemplation. The shock was felt beyond south Wales too. Most British people born before 1960 remember what they were doing when they heard the tragic news... Aberfan...has become part of the nation's collective memory. Certain historical events assume such positions because of the signals they give out about our lives and place within society. Disasters in particular are laden with such cultural resonances' (pp84–5).

Aberfan is a banner to human loss and suffering like Chernobyl and Bifra. In this case especially poignant because so many of the victims were schoolchildren who carried the hopes and aspirations of a small Welsh village.

The authors of *Aberfan: Government and Disasters* start their book with a first chapter composed of statements from villagers, media and officials at the time of the disaster as well as recollections all the sadder for being made many years after the event.

This chapter is graphic and intensely sad and threw the rest of the book into contrast. The reader is left seeking some relief from the surrogate experience of the tragedy. The next 2 chapters do not provide it.

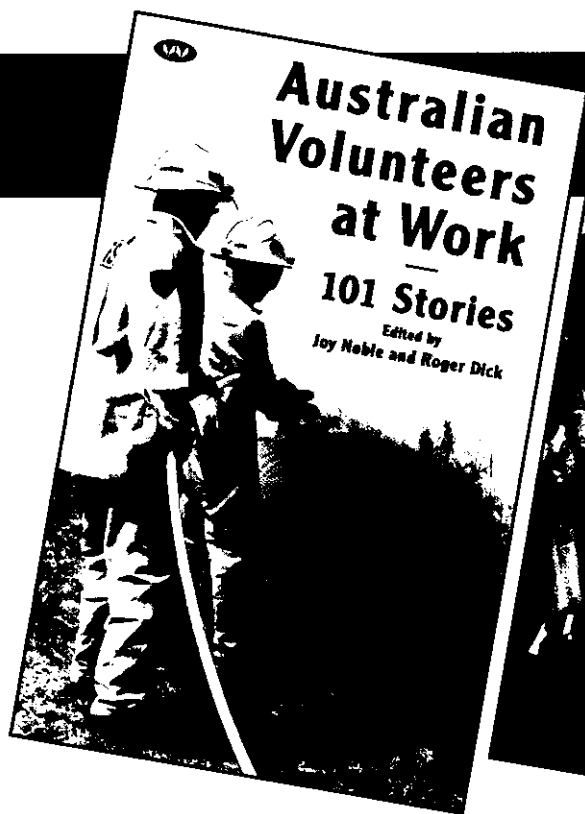
Instead they deal in a detailed and academic way (almost pedantic) with the response of the National Coal Board, the Government, the local municipal Council and the villagers to the search and rescue and recovery process and to the efforts to assign responsibility for the event. As such these chapters are thorough, if uninspiring.

Towards the end of chapter 3 there are some isolated statements that point to a greater depth of sympathy and understanding from the authors. Page 70 and following has some tantalising glimpses into the dynamics of disasters. The relationship between municipalities and the community, the difficulties in administering appeal funds, the commitment of local people to move their communities forward and the complex interactions and considerations that enmesh disaster operations in the political process. On page 78 lessons for emergency management are suggested, but very briefly.

What we are left with are hints for better practice, rather than issues or lessons that can enlighten us about how to do better in the future.

Chapter 4 discusses definitions of disaster in a workmanlike if uninspiring manner and chapter 5 goes on to discuss psych-social responses to the Aberfan disaster and strategies for their amelioration. The various responses, and the ways in which different groups reacted, are put into the context of Aberfan and this usefully highlights key issues and support and treatment regimes. The authors note that for all the good and innovative work done at Aberfan, lessons were not learnt — at least in Britain — and at subsequent disasters such as the Bradford football stadium fire and the Zeebrugge ferry sinking, the practical work of supporting the bereaved, injured and distressed had to be re-learned.

The discussion that follows is insightful and useful in identifying some of the reasons behind the un-learning of lessons. Poor funding, lack of mechanisms to distribute information, poor coordination between agencies. The same issues we hear again and again. A useful review. It would have been more useful still had it looked at structural issues behind disaster management. Whether, for example, there is a class bias to disaster management in the (still) stratified society of the United Kingdom; if there were slag heaps in Knightsbridge they would better managed and more closely monitored than was the case at remote, working class Aberfan. Whether disasters are such infrequent events that they do not capture



public or political attention beyond the immediate dramatic impact (this seems a bit ironic when talking of Britain at the moment) and whether this is an outcome of how the media is managed as entertainment, or whether events such as the slag heap at Aberfan are inherently risky activities built into the competitive and cost-minimisation nature of capitalist enterprise or whether we are all willing to live with certain degrees of risk (usually accepting higher levels of risk for people remote from us than for ourselves or our community).

Putting the debate and the review into a broader context would have been useful.

This applies also to the chapters that deal with the management of appeal funds, compensation claims for bereavement and holding corporations accountable for the public riskiness of their activities.

The final chapter on Government and disasters reviews the British Government's actions in dealing with certain risks in the twentieth century, particularly risks at overcrowded football stadiums. For the authors risks such as overcrowding or fire seem largely dependent on inadequate regulation and monitoring.

This highlights the general approach of the authors who view disaster management — at least disaster prevention — as a function of the legal and regulatory systems of contemporary society. Without doubt these systems do focus the attention of Government and society in particular ways and on particular issues. But they are in turn themselves sub-systems or derivatives of broader systems comprising mores and values, power relationships and structures and economic relationships. For a deeper understanding of risks, hazards and disasters we need, eventually, to look at these broader systems and structures.

In the end I am left wondering who the audience is for the book. If it is the research

community, then this is indulging a group that needs to more clearly assess its relevance to the practice of emergency management. If it is emergency service organisations then the book is too heavy going for most practitioners to take time to read — given their responsibilities for actually doing the job. If it is the community then the book is too dense and insufficiently engaging for most people and does not draw out practicable lessons for local activists. If it is for government, then the book only points to important issues and offering glimpses of solutions to recurrent problems in emergency management; but it does not offer usable solutions or strategies.

A worthy but in the end disappointing book. It is scholarly and has many points that are lucid and insightful. But it does not pursue them or draw out their practical consequences — at least not in a way that can be used by practitioners or planners or communities. This book seems to me, therefore, to be a useful review of some important social issues in disaster management and to be a mine of ideas, which can well be the start of further serious research

In the end perhaps this work stands in the shadow of the first chapter with the many stories of grief and bewilderment and anger which still express such anguished feeling after more than 3 decades.

The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response

*Reviewed by Robyn Layton QC
LLM Barrister, Member of International Labour
Organization Committee of Experts (Geneva);*

*Chair of the Human Rights Committee of the
Law Society of South Australia*

The past few decades have seen a growth in the number of humanitarian organisations and relief agencies demonstrating an increased willingness to provide international assistance in situations of disaster, armed conflict and other major emergencies. Such change, whilst being welcome, also brings with it the challenge of coordinating the 'humanitarian circus' which descends upon an affected area, bringing with it all the confusion and chaos of a multitude of organisations with differing methodologies, philosophies and resources.

In recent years, a concerted effort has been made by various organisations to operate in a coordinated manner to more effectively meet the needs of persons affected by disasters. This book is the impressive result of some of that work.

The Sphere Project is a programme of the Steering Committee for Humanitarian Response (SCHR) and InterAction with VOICE, ICRC and ICVA. It was launched in 1997 for the purpose of developing a set of universal minimum standards in core areas of humanitarian assistance.

The Humanitarian Charter and the accompanying Minimum Standards are the product of the Sphere Project. A first trial edition of this book was released in 1998 and this first final edition was published in 2000. An acknowledgment section at the back of the book, lists on my crude estimation, at least a thousand individuals, agencies and organisations having contributed a wealth of

....continued overleaf

New Books contd.....

experience and expertise to the publication.

The significance of this work lies in the ambitious nature of the project itself. It is remarkable that the extensive consultation process involving such a broad range of interest groups, was able to reach consensus. That in itself demonstrates that the contents of the Charter and the Minimum Standards are truly reflective of the core values and practices of humanitarian assistance.

The book is a comprehensive, well structured and easily read 'what to do' guide for persons and organisations coping with disaster management. It is divided into three parts. The first part contains the Humanitarian Charter. The second, being the bulk of the book, sets out the Minimum Standards. The third part consists of annexes which include a summary of the Minimum Standards, the Code of Conduct for the ICRC and NGO's in Disaster Response Programmes, a detailed index to the book and pro-forma reporting forms.

The Humanitarian Charter provides the legal and theoretical framework which supports the Minimum Standards. It is a succinct document embodying the core principles to be adopted by humanitarian agencies when providing assistance. The Charter commences by stating the belief that all possible steps should be taken to alleviate human suffering and asserts the right of affected civilians to receive protection and assistance. This expresses the core ideology underlying the Sphere Project and underpins the developed Minimum Standards.

The Charter then outlines the three principles governing the provision of humanitarian assistance: the right to life with dignity, the distinction between combatants and non-combatants and the principle of non-refoulement. All three principles draw extensively from the existing body of international law, including international humanitarian law and human rights instruments.

The Charter also defines the roles and responsibilities of the primary parties involved in a disaster or conflict, noting that the initial responsibility for ensuring that basic needs are met in fact lie with those persons affected by the calamity. In the event that this proves inadequate, the Charter affirms that primary responsibility for assistance then lies with the state, according to obligations which are outlined in international law. The role of humanitarian organisations only arises when the people and the state are unable or unwilling to adequately fulfill this function. In defining the role and

responsibilities of these organisations which fill the gap of humanitarian assistance, the Charter recognises the unique legal position of the ICRC and UNHCR. The Charter also acknowledges the need for organisations to exercise caution when providing assistance in a conflict zone, so as not to further jeopardise the safety of civilians.

Finally, the Charter refers to the Minimum Standards which are adopted as the minimum accepted norms for the provision of humanitarian assistance. It expresses the intention that agencies be held accountable for maintaining these standards through their internal accountability structures. Whilst the Charter is a general statement of humanitarian principles, the standards do not purport to deal with the complete range of possible humanitarian concerns or forms of assistance. Further they do not attempt to deal with larger issues of humanitarian concern, for example the strategies appropriate in circumstances of armed conflict.

The Minimum Standards are divided into five main areas of disaster response: water supply and sanitation; nutrition; food aid; shelter and site planning and health services. Each area is divided into separate sections of the book, easily distinguished by thumb tabs.

The commencement of each section reaffirms the three core principles of the Charter and highlights the significance of achieving universal minimum standards in each area. There is also a description in each section of 'Finding your way around this chapter' and an overview of the content including bibliographies and guidance notes.

Each section is broken down further into sub-sections relevant to the nature of the disaster response required. Shelter and site planning, for example, is broken down into components of analysis, housing, clothing, household items, site selection and planning and human resource capacity and training. Under each of these headings are a series of 'standards', which consist of a general statement of a desired outcome, for example: 'Families have access to household utensils, soap for personal hygiene and tools for their dignity and well-being'. This structure is adopted throughout the book.

The standards themselves are by no means revolutionary and are recognised as reflecting the existing objectives of many humanitarian agencies. They are, however, consolidated and adapted to reflect current knowledge and best practice. This text is distinguished by Key Indicators which accompany each of the listed

standards. The Key Indicators reflect the actual measures for determining whether the standards have been achieved. In this way, the Minimum Standards provide a detailed, functional tool for providing, monitoring and evaluating the effectiveness of humanitarian assistance.

The Key Indicators are listed in simple bullet-point format and specify such detail as: 'Each person has access to 250g of soap per month' and 'The covered area available per person averages 3.5-4.5m²'. The nature and level of detail provided in the Key Indicators varies depending on the standard to be met, but overall is very precise.

A significant aspect of the Minimum Standards is the frequent reference to the recognition of culture and religion. The Standards emphasise the importance of adopting a consultative approach and in many instances specifically urge consultation with the community on issues of cultural significance such as burial practices, food preparation and clothing.

The Minimum Standards also place great emphasis on gender equity and attempt to ensure that women are specifically included in consultation processes. There is recognition of the particular vulnerability of women and children, especially young women, as the subjects of sexual and other violence. It is also recognised that cultural and social factors have a major influence on the roles performed by women within society, resulting in some forms of assistance affecting women in different ways to men. As a result, several of the Key Indicators require that the specific needs of women be considered by agencies in seeking to achieve the minimum standards.

Despite the labeling of these standards as 'minimum', there is recognition that the ability to achieve these aims is entirely dependent upon the resources available and circumstances in each situation. Thus, the standards can also be viewed as objectives to work towards during the period of assistance.

This work is not only relevant to those working in international humanitarian organisations, but can also provide significant assistance to any agency or individual involved in emergency assistance or community development at any level. The simple, bullet-point style and the practical measures used for standards assessment can be applied to any scale of event and provides a good working tool for the preparation of emergency operational procedures.

Report announcement

Economic Costs of Natural Disasters in Australia. Report sheds new light on disaster costs

A report released by the Bureau of Transport Economics (BTE) sheds new light on the costs to the Australian community of natural disasters. The study was commissioned by the Commonwealth Government, to set out to determine the costs of disasters to Australia over the period 1967 to 1999 and to come to a robust method for costing the economic impact of natural disasters. The report concluded that natural disasters cost Australia \$37.8 billion over the period, an average of \$1.14 billion per year or around \$85 per year per person. Most of the costs of natural disasters that are reported in the media are really just educated guesses.

The report is the first step in a Disaster Mitigation Research Study which is a collaborative Australian and New Zealand effort with participation from the insurance industry. The next step is to look at the benefits of undertaking mitigation. Senator Macdonald the Minister for Regional Services and territories and Local Government said that *Emergency Services and Disaster Management was largely a State responsibility and the study would also help States examine the impact of disasters and the benefit of the States providing mitigation measures.*

The Commonwealth currently assists the States and disaster struck communities with a significant proportion of the disaster relief bill through Defence assistance, the Natural Disaster Relief Arrangements, one-off disaster relief packages and a number of mitigation measures. For example the Commonwealth has provided \$667 million in NDRA payments to the States over the past ten years and implemented the Regional Flood Mitigation program to provide \$60 million in flood mitigation works over three years.

The next stage of the study will assist the States to quantify the savings and benefits from mitigation and make better long term decisions about targeting areas at risk, and by directing government funds to mitigation projects that will give best value for money.

Key findings of the BTE report 103 on the Economic Costs of Natural Disasters in Australia are:

Disaster costs

- Natural disasters, with an individual event cost of over \$10 million, cost the Australian community \$37.8 billion in 1999 prices over the period 1967 to 1999 (including the costs of deaths and injuries).

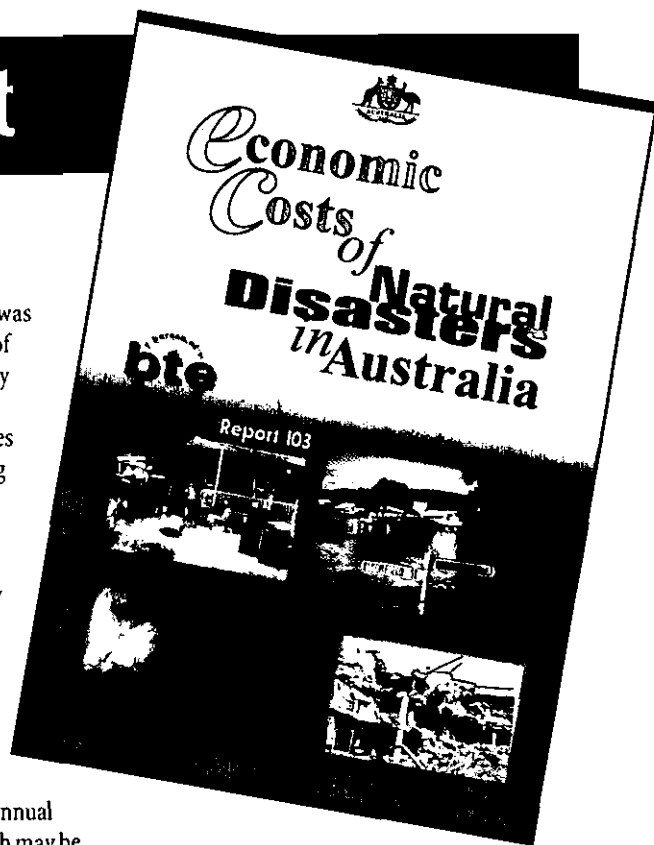
- The average annual cost of these disasters between 1967 and 1999 was \$1.14 billion (including the costs of deaths and injuries). Approximately \$85 per year per person.
- The estimated total cost of fatalities and injuries due to disasters during the period 1967 to 1999 was \$1.4 billion at an average cost of \$41 million per year
- The average annual cost is strongly influenced by three extreme events—Cyclone Tracy (1974), the Newcastle earthquake (1989) and the Sydney hailstorm (1999). If the costs of these three events are removed from the calculations, the average annual cost declines to \$860 million, which may be a better 'baseline cost'.
- The annual cost of disasters is highly variable. As a result, it is not possible to assess whether the annual cost is increasing or decreasing over time.

Numbers of disasters

- There have been 265 natural disasters, costing more than \$10 million each, during the period 1967 to 1999.
- There is some evidence that the number of disasters per year is increasing due partly to better reporting in recent years and possibly to increasing population in vulnerable areas.

Regional findings

- New South Wales and Queensland accounted for 66 per cent of total disaster costs and 53 per cent of the total number of disasters over the period 1967 to 1999. The other States and Territories were Northern Territory (13 per cent); Victoria (9 per cent); Western Australia (6 per cent); South Australia (4 per cent) Tasmania (2 per cent) and Australian Capital Territory (0.02 per cent). No events were recorded for Norfolk Island or the Indian Ocean Territories.
- Floods were the most costly of all disaster types, contributing \$10.4 billion or 29% of the total cost. Storms (26 per cent of total cost) and cyclones (24 per cent) caused similar levels of damage. The combined cost of floods, storms and cyclones was almost 80 per cent of total disaster cost. They also accounted for 89 per cent of the total number of disasters. The costs of bushfires were a relatively small proportion of total disaster costs, but bushfires are the most hazardous type of disaster in terms of deaths and injuries.
- The two most costly hazard types for each



State and Territory are:

- New South Wales (floods and storms)
- Queensland (floods and tropical cyclones)
- Victoria (floods, bushfires)
- Western Australia (tropical cyclones and storms)
- South Australia (floods and storms)
- Tasmania (bushfires and floods)
- Northern Territory (tropical cyclones and floods)
- Australian Capital Territory (bushfires and storms)

Findings on methods of estimation

- There is considerable variation in the methods used to estimate past disaster costs, mostly in the estimation of indirect costs.
- The use of a consistent framework for estimating cost, based on that developed in this report, can provide a better basis for assessing mitigation proposals.
- There are very few methods for the adequate estimation of intangible costs and more research is needed in this area.

Further information:

Sharyn Kierce
Bureau of Transport Economics
Dept of Transport & Regional Services
GPO Box 501, Canberra ACT 2601
Ph: 02 6274 7176, Fax: 02 6274 6816
Email: Sharyn.Kierce@dotrs.gov.au

Copies of the report are available for purchase from Ausinfo
GPO Box 84, Canberra, ACT 2601, Aust.
Ph: 02 6295 4861, Fax: 02 6295 4888
Freecall within Australia 132 447
www.ausinfo.gov.au

Managing biological emergencies: a new approach

Introduction

The term 'emergency' is most often used in the community to relate to the risk of natural or technological events like floods, cyclones, fires and air crashes. But there is another recognised source of risk—biological risk. Biological emergencies are in some ways more complex than those from traditional sources.

What is a biological emergency? In this paper we define 'biological emergency' by a set of attributes:

- a biological emergency occurs infrequently to a biological system and is usually caused by a biological entity
- a biological emergency has the potential to spread actively outside the immediately affected area
- often little is known of the biological agent so managers are working in an uncertain environment
- a biological emergency has the likelihood to spread not only spatially but contextually. An adverse biological event impacts not only on the immediate environment but has social, community, trade and international relations aspects. These may be out of proportion with the actual physical event
- biological emergencies tend to be 'slow on-set' events (compared to a fire or flood) and often make an increasing demand on resources over weeks or months rather than days
- emergency managers in biological emergencies require advanced tracking techniques to follow the emergency. The tracking relies heavily on collected intelligence from testing schemes as the presence and spread of the problem is often not immediately apparent. This is sometimes referred to as an epidemiological approach to the issue.

Examples of the type of biological emergencies considered in this paper are: pest invasions in various environments, disease outbreaks in humans, plants and animals, and food poisoning outbreaks.

Profiles of biological emergencies

To illustrate the claim that biological emergencies can be more complex than those from traditional sources, we will look at the linkages and areas of influence

by Grant Rawlin, Principal Veterinary Officer, National Offices of Animal and Plant Health, Canberra, ACT and Roger Jones, Director TEM, Mount Macedon Victoria

of a variety of real-world biological emergencies which have occurred both in Australia and in our region. We can best do this in a series of brief and simplified case-studies presented in a standardised 'report-card' format (see pages 42 and 43).

We have not attempted an exhaustive narrative of these occurrences, but have simplified them in order to emphasise the following points:

- biological emergencies tend to have an expanding field of effects beyond the immediately perceived area of impact
- biological emergency management involves a variety of organisations
- the managers of situations or enterprises that may be a potential source of biological risk are not necessarily the managers of a resultant biological emergency
- often organisations with responsibility for biological emergency management also have the ability to influence risk management of the issues.

Biological emergency management today

In Australia, biological emergencies are handled by a variety of Commonwealth and State/Territory government groups depending on their areas of responsibility. For the purposes of this paper the areas of responsibility are considered to extend only to national and state level. There are other private and government organisations that are involved in the process of preparedness and response at other levels.

In the case of some biological emergencies there is clear responsibility and a practised response, but in other areas this is not so.

Potentially epidemic diseases in the human species are handled primarily by communicable disease structures of Commonwealth and State health depart-

ments. Potentially epidemic diseases in other animal species and plants are handled primarily by the veterinary and plant health services of State and Commonwealth agriculture or primary industry departments. Within these structures there are established relationships and coordination mechanisms that are in normal operation or can be activated in an emergency. These systems are focused on that specific type of biological emergency. For example, in the case of animal diseases there is an interstate coordination system focused on the Consultative Committee on Emergency Animal Diseases that allows Chief Veterinary Officers to communicate on a national basis. A variety of operations manuals and response structures are contained in AUSVETPLAN (the national Australian Veterinary Emergency Plan) and many functions of training and development are carried out by a government/industry organisation known as Animal Health Australia. Similarly the system has a single responsible ministerial committee.

But if the disease is in wild animals or plants the issue of responsibility is clouded by the responsibilities of wildlife agencies or environment agencies (SCARM 1997). In the case of a response to new environmental pests, the responsible authority is determined largely on the basis of the environment in which the pest is found. A marine pest may be primarily the responsibility of a fisheries department, an environmental protection authority or a transport department, while a freshwater aquatic pest may fall to a National Parks authority or water authority. This issue was the subject of intense development in the marine environment during and after the detection and control of the incursion of the black striped mussel in Darwin in 1999 but it is less developed in other environments (SCC/SCFA 2000).

In the case of food poisoning health authorities have clear responsibility under the various health acts but other organisations also have roles. For example, at the Commonwealth level, the Department of Health and Aged Care, the Australia/New Zealand Food Authority and Agriculture Fisheries and Forestry, Australia all have stakes in policy,

coordination and response to food safety issues.

The existing management models, such as AUSVETPLAN in animal health, are often based on event management and have connections with the larger emergency management community through State, Territory and local-level event-management plans (generally known as DISPLANs or emergency response plans). The present AUSVETPLAN arrangements for example are largely response-oriented. They deal principally with response organisation and procedures, planning, training and exercising (in other words primarily with response and preparedness for it).

As the AUSVETPLAN Summary Document makes clear, the animal health emergency management plans and many similar systems were developed in the early 1980s and often assumed the ready availability of combat and support resources within the direct policy direction and control of a single government authority. In the case of AUSVETPLAN, the designated authorities were the various agriculture and primary industry departments and the response itself and many resources essential to it were often under direct control of a Chief Veterinary Officer. Since that time there have been significant changes in the way in which these operational resources are handled. As a result many of the preparedness and response resources are held outside the direct influence of the Chief Veterinary officers or have been out-sourced to the private sector.

Increasingly, given the spread of resources across both the public and private sectors, rapid access to needed resources for emergency response purposes and the application of those resources requires high-level policy intervention and interdepartmental, multi-agency and even multi-sectoral coordination. Each particular area of biological emergency operations has its individualities, but this trend for more complex higher coordination appears to be common across disciplines.

The changing face of modern emergency management

Superficially, the general emergency management arrangements in Australia would appear not to suffer the diffusion of responsibilities apparent in the management of biological emergencies as discussed in the preceding section. At national level, a Department of Defence agency, Emergency Management Australia, is 'the Federal agency responsible for

reducing the impact of natural and human-caused disasters on the Australian community' (EMA 2000a).

Each State and Territory has, under legislation or in a Cabinet-approved arrangement, a formal emergency management or counter-disaster organisation, a State or Territory emergency response management plan and arrangements and a management structure extending down to regional and local government levels. A National Emergency Management Committee consisting of the heads of the relevant Federal, State and Territory organisations provides a regular forum for the discussion of emergency management matters and issues, and is supported by a number of regularly-convened sub-committees (EMA 1998a).

However, the form of 'emergency' towards which these management structures are directed is 'an *event*, actual or imminent, which endangers or threatens to endanger life, property or the environment and which requires a significant and coordinated response' (EMA 1998b, emphasis added). While the nationally-agreed emergency management concepts and principles embrace 'comprehensive and integrated emergency management', encompassing prevention, preparedness, response and recovery (EMA 1998c), it is clear that the primary focus of the national emergency management structure is on the preparedness for and response to emergencies as *events*. The arrangements generally designate specific agencies at State and Territory level as 'control' or 'lead combat' agencies for the management of particular types of emergency, with police authorities generally responsible for coordinating the provision of the resources such 'control' or 'lead combat' agencies might require.

The prevention or mitigation of hazards as the sources of such events has received increasing attention within the emergency management system in recent years, but progress has been somewhat limited as emergency management authorities have little direct jurisdiction in this area. Similarly, while emergency management arrangements are seen to encompass recovery ('measures which support emergency-affected individuals and communities in the reconstruction of the physical infrastructure and restoration of emotional, economic and physical well-being', EMA 2000b), in reality they are generally limited to the relief and early restoration phases of the longer-term community recovery processes (Haas et al 1977, Comfort 1988).

To add further complexity to the general

emergency management scene, the potential sources of risk are also seen to be diversifying. Traditionally, the risk of emergencies and disasters has been seen to emanate primarily from 'natural hazards' (largely of geophysical or meteorological origin) and 'man-made hazards' (industrial hazards and war), and to result in a threat to life and property. Accordingly, it has been a relatively simple matter to designate an appropriate 'control' or 'lead combat' agency to deal with each type of hazard and hazard-outcome (often, as in Australia, with the police given responsibility for coordinating the efforts and resources of supporting agencies).

The recognition of biological and socio-political hazards as sources of risk, however, and the identification of more complex types of emergencies and disasters which can result from interactions between various types of hazards (Parker and Tapsell 1995) gives rise to events which may not be as readily susceptible to a DISPLAN-type response management arrangement as a flood, fire or cyclone impact or a release of hazardous materials. A biological emergency such as an epidemic disease in the human species overlaid on a major drought or flood event can present a far more complex management problem than any one of those events occurring singly.

Indeed, some hazards may result in little direct threat to life and property, but impact severely on the social and economic well-being of a community (as in the 2-week failure of gas supply in Victoria in 1998) or cause significant and continuing trade disruption (a typical end-result of an emergency animal disease outbreak). Such events may make little if any direct demand on the emergency services (police, fire, ambulance etc.) which have traditionally been seen as 'responders to emergency'.

Seeking a conceptual basis for dealing with such complex issues, the emergency management community has recently shifted its focus from *hazards* to more general concepts of *risk*, examining the interaction of hazards as 'sources of risk' with those vulnerabilities which can be identified as 'elements at risk'. It is clear, for example, that a cyclone is a 'source of risk' but only has the potential to create an emergency or disaster if it should impact the 'elements at risk' in a vulnerable community in its path.

This shift in focus has been advantageous, as it helps to demonstrate that reducing the 'susceptibilities to risk' or vulnerabilities in a community can be just

Case studies in 'Report Card' format

#1 – Foot and mouth disease, South Korea, 2000

The agent

This is an animal disease caused by a highly infectious virus not present in Australia. It causes death in a low proportion of infected sheep, cattle, goats and pigs but it causes very marked decreases in production in all these species. In April, 2000 there was an emergency involving this disease in South Korea. (Pro-med web-site April, 2000)

Immediate effects

Loss of production in ruminants. Loss of farming industry income to the nation.

Secondary effects

Cost of control of the disease. For example, in Korea the authorities restricted animal movements, destroyed high risk and affected animals, disinfected premises and vaccinated almost 1 million cloven footed animals.

Tertiary effects

Banning of many livestock products from export markets.

Impact on the Community

Disruption of employment and trade as well as social dislocation especially in rural areas

Who would manage this kind of emergency in Australia?

State, Commonwealth and Industry animal health emergency structures

Who manages the risk in Australia?

State and Commonwealth agriculture and primary industry departments and industry bodies.

Point for Attention

This disease directly only affects some species of animals but has enormous social and trade effects even if quickly controlled.

#2 – E.coli O157 contamination of food, Hamburger Disease in USA, 1993

The agent

The bacteria E.coli is a normal part of animal and human gut flora. The subtype O157 can cause severe disease. A batch of processed hamburger meat that was supplied to a large restaurant chain carried the bacteria. Illness was detected in over 500 people, over 100 were hospitalised, and 4 died (USDA, 1993).

Immediate effects

Sickness in people leading to death in several cases.

Secondary effects

Large scale tracking and removal of product from shops.

Tertiary effects

Links were made to live cattle producers and meatworks practices that then had to be reviewed. This involved Australia as well as the USA because Australia is a major producer of beef for the US market.

Impact on the Community

Loss of faith in food supply system.

Socio-economic effects to industries associated with meat production.

Who would manage this kind of emergency in Australia?

Primarily Health emergency structures but also agriculture emergency structures.

Who manages the risk in Australia?

Health departments, agriculture and primary industry departments, industry bodies.

Point for Attention

A modern food safety emergency can be very large because of manufacturing and distribution practices. Due to the chain of food production, the emergency response can spread from human orientated investigations to processing technology and to agriculture. This can occur in animal and plant products as well as water supplies.

#3 – Nipah virus, Malaysia 1998

The agent

A newly discovered virus that caused an outbreak of disease in pigs and also a fatal encephalitis in humans in Malaysia in 1998 (Ling 1999).

Immediate effects

Deaths and loss of production in pigs in several farms, 100 human deaths from over 300 cases of human encephalitis.

Secondary effects

Loss of local farming industry income. Cost of control of the disease – among other measures this involved the slaughter of about 1 million pigs

Tertiary effects

Trade bans were instituted by many countries.

Major social disruption was caused and included periods of community panic and virtual removal of a staple food item from local markets.

Impact on the Community

Health care costs, severe social dislocation in rural areas and to city areas.

Who would manage this kind of emergency in Australia?

Human health emergency structures, animal health emergency structures.

Who manages the risk in Australia?

Health departments, agriculture and primary industry departments, industry bodies.

Point for Attention

This situation would involve both human and animal health structures and has the potential for extreme social disruption.

#4 – Chlorflurazuron contamination, Australia 1995

The agent

This chemical is a pesticide contaminant that was found in several Australian beef exports in 1995 and there were no agreed limits so a detection became a violation. (Australian Animal Health Quarterly, Issue 1 1996)

Immediate effects

None

Secondary effects

Banning of Australian beef from several important export markets for a period.

Tertiary effects

Institution of testing and systems to prove Australian beef was again 'clean' and enable trade to continue.

Impact on the Community

Socio-economic effects to industries associated with meat export.

Who managed the emergency?

Animal health emergency structures

Who manages the risk?

Agriculture and primary industry departments, industry bodies.

Point for Attention

The pesticide appears to be of no immediate human or animal health danger but caused a substantial trade emergency.

as important as modifying the hazards to which that community may be subject. The 1995 development of the new Australian/New Zealand risk management standard (SA/SNZ 1995/1999) has undoubtedly assisted in this process; in 1996 the National Emergency Management Committee directed that 'industry-specific guidelines' should be developed to apply the new standard in the emergency management field. An 'Emergency Risk Management — Applications Guide' has recently been produced, endorsed by the standards authority as an 'appropriate derivation' of the standard (EMA 2000b).

In addition, a number of recent events in Australia's region, such as the Auckland power failure, the Sydney water crisis and hailstorm and Victoria's gas supply failure have demonstrated all too clearly that, while traditional DISPLAN-type arrangements may have a role in dealing with the *event* which initiates a community emergency, these arrangements have limited relevance in dealing with the *situation* that the event creates.

Such situations may require multi-agency management with a significant level of direct political involvement, and some of the public and private sector agencies which may be involved in the management of the situation may have had little previous involvement in emergency

management preparedness and response activities.

The focus of emergency management in Australia has therefore shifted from its previous hazard and event focus, to a broader concern with the management of risks to community safety and with the management of the situations which may result from hazard impact, including those situations which may result from disruption to utility, key facility and infrastructure 'lifelines' (EMA 1996). In this context, there has been increased emphasis on risk management tools and techniques and on arrangements for the higher-level management of significant community impact situations while still retaining and maintaining an appropriate response capability for responding to rapid-onset hazard events.

These developments have tended to validate the accepted Commonwealth concepts of 'comprehensive and integrated emergency management', with their emphasis upon an all-hazards, all-agencies, all-strategies (prevention/mitigation, preparedness, response and recovery) approach to the management of emergencies and disasters. However, they also make clear that giving effect to these concepts, particularly where critical resources may no longer be as readily available to response authorities, can

require the effective involvement of a large number of public and private sector agencies and the community itself.

Managing risks and managing emergencies

One of the points emphasised in the earlier section on biological emergency profiles was that the managers of biological risk are not necessarily the managers of a potential resultant biological emergency, although emergency managers often have the ability to influence the approach to risk management. This leads to a need to resolve the relative responsibilities of these two sets of managers.

In regard to the management of biological risk, there is an expectation that managers of an organisation, operation or process involving an element of biological risk will adopt an appropriate risk management regime to eliminate its potential for creating a biological emergency or at least to reduce any possible impact to a regulated or acceptable level. In theory, emergencies will not occur if the risk is managed effectively—as the Australian/New Zealand risk management standard AS/NZS 4360:1999 suggests, by some combination of ceasing the practice which creates the risk ('risk avoidance'), reducing the likelihood or consequence of the risk ('risk mitigation') or persuading someone else to bear the risk ('risk transfer'). In practice, of course, the existence of uncertainties and 'hidden or unknowable risks' (Handmer 1999) may make full removal of all risk unlikely.

AS/NZS 4360:1999 makes clear that risk management in an organisation is not simply the responsibility of those who may be formally designated as 'risk managers' in that organisation—it should be regarded as 'an integral part of good management practice...rather than be viewed or practised as a separate program'. Thus, risk management is an executive management responsibility, and the organisation's risk management process requires 'the active ongoing support of the organisation's Chief Executive Officer'.

Given the 'mega-department' composition of the various Commonwealth and State/Territory departments with statutory responsibility for the management of biological risk in the areas of human, animal, fish and plant health, it is likely that the risk management concerns of the Chief Executive Officers and executive managements of those departments are focused primarily on the organisational risks such departments inevitably face and that the biological risks

#5—Black Striped Mussel, Australia 1999

The agent

The black striped mussel is a small marine shellfish that causes severe fouling of boats, buoys and fixtures in the Pacific region but had not previously been seen in Australia. (Black-striped Mussel incursion Darwin - March/April 1999 - A case-study of actions undertaken in response to the Black-striped mussel infestation, 2000).

Immediate effects

Early infestation was detected in 3 marinas in Darwin in 1999. The pest had potential to severely interfere with shipping, ports and aquaculture structures. The Northern Territory government and then other Australian governments responded by poisoning the shellfish in the marinas. The pest was eradicated at a cost of approximately \$2 million.

Secondary Effects

There were few overseas effects but the response led to the realisation that Australia lacked a response system for emergency reaction to marine pest incursions. This has led to a new system being developed (SCC/SCFA Taskforce Report, 2000).

Impact on the Community

Restriction of use of commercial and recreational vessels and marinas for several weeks.

Who managed the emergency

Whole of government approach by Northern Territory (mainly Fisheries and emergency services), CSIRO, Universities. Later many Commonwealth and other State agencies were involved — mainly primary industry and environmental agencies.

Who manages the risk

Mainly Commonwealth and State agriculture, primary industry and environment agencies.

Points for attention

This response both in the field and on a national level was complex and had no precedent in the world. Treatment protocols and coordination systems were adapted from other areas. Tracing and checking of potentially infested vessels was very complex. The elimination operation involved approximately 15 State and Commonwealth government agencies and was successful in eliminating the pest.

which may arise in the areas of their particular health responsibilities only receive significant attention with the possibility or actuality of a major event.

In relation to the management of biological emergencies, it was noted earlier that the responsibility for the development and implementation of plans and programs to manage biological emergencies is scattered across a number of Commonwealth and State/Territory government instrumentalities. To some extent the very diversity of biological risks makes this inevitable, but it also makes for some potential difficulties in determining responsibility for the management of a possible or actual major event and its potential outcomes.

In addition, given the potential impacts of a major event and the inevitable involvement of a variety of public and private sector agencies in the management of that event and its outcomes, the responsibility for ensuring the effective coordination of those agencies in dealing with the total situation cannot rest with any single agency. As discussed earlier, a specific agency will be designated in disaster and emergency response planning ('DISPLAN') arrangements as the 'control' or 'lead combat authority' for managing the response to the event itself, but primary responsibility for 'community safety' in all its aspects must ultimately rest with governments in their legislated responsibility for the wide range of programs which seek 'to protect and preserve life and property'.

As the recent national 'Emergency Management Strategic Plan 2000-2005' indicates, the achievement of the vision of 'a safer community' requires 'cooperation and goodwill across governments, communities and organisations' (NESC 1999). If the vision of a community safe from the possibility of a biological emergency is to be attained, it is evident that the first priority is to require effective measures to be established for the management of biological risk. Such measures need to be supported by appropriate plans and arrangements to deal with biological emergencies involving a partnership between governments, risk-producing organisations and the community. Both activities require government monitoring and coordination, in the interests of the communities for whose safety they are ultimately responsible and accountable.

Towards a new approach to 'bio-risk management'

The 'case study' profiles demonstrate clearly why a new approach to the

management of biological risk is needed, in regard to at least two major issues:

- The impact of major biological events can have effects that reach potentially into almost all aspects of national and community life. While the responsibility for dealing with the event itself may fall primarily upon the relevant scientific specialists, emergency managers and their respective support agencies, the responsibility for dealing with the possible *outcomes* of such events extends far beyond their effective remit. Proper management of such outcomes requires both authority and resources which certainly extend beyond the warrant of any single government department or instrumentality.
- Managing a full-blown emergency resulting from a biosecurity breakdown or exotic disease incursion, for example, is probably the least preferred approach to the management of biological risk—once the emergency has occurred, it may be too late to reverse its possible effects on the nation and on individual communities, in health, environmental or socio-economic terms. Managing the risk itself, through prevention and mitigation programs which will either avoid the possibility of an emergency occurring or limit its effects if one should occur, should be the 'option of choice'.

These issues are of course not peculiar to emergencies of biological origin—they can be equally relevant to emergencies associated with natural, man-made and socio-political hazards. However, the critical first step in any risk management process is to 'establish the context' ('the strategic, organisational and risk management context in which the rest of the process will take place', SA/SNZ 1995/1999), and there are some characteristics in the general biological risk context which have implications in regard to the two issues identified above.

The need to deal comprehensively with the community impacts of major events, ensuring effective policy-making and resource coordination in such situations, has resulted in the 'whole of government' approaches to the management of major emergencies adopted in recent years in States such as Queensland and Victoria. A similar 'comprehensive and integrated approach' to situation management was taken by the Commonwealth and all States and Territories in preparing to deal with possible Y2K issues, and this in itself has established a general precedent for the future management of major community impact situations on a 'whole of government' basis.

On the somewhat more narrow question of the application of risk management tools, it needs to be borne in mind that processes such as that detailed in AS/NZS 4360:1999 are essentially generic and intended to have wide application. They require interpretation for application in a particular 'industry' (as the National Emergency Management Committee directed in 1996 in relation to the application of AS/NZS 4360 in the emergency management 'industry'). It is also important to note that AS/NZS 4360 is clearly oriented towards the risk management needs of a single organisation in addressing the risks specific to that organisation, measuring risk in the classic terms of the likelihood and consequences of 'something happening'.

However, community emergency management is fundamentally multi-organisational, multi-functional and of necessity focused on the range of hazards confronting a particular community. Risk in emergency management terms is 'a concept used to describe the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment' (EMA 2000b). Clearly, the responsibility for dealing with '... harmful consequences arising ...' cannot be vested totally in any one organisation or any single 'emergency manager'.

There is a further issue in regard to the application of the AS/NZS 4360 process in the management of community safety risk in general, and that concerns the final 'Treat Risks' step in the process. Risk 'treatments' encompass reduction of the likelihood and/or consequence of risk, risk transfer and risk avoidance. At the end of the 'treatment' process, there may be residual risks ('retained risks') which the organisation ranks as 'acceptable'. In such instances, the Standard notes that 'plans should be put in place to manage the consequences of these risks if they should occur, including a means of financing the risk'. In managing community safety risk, however, the issue of 'acceptable risk' is one which needs to be addressed in consultation with the community, and plans to manage the consequences of residual risks borne by the community are multi-organisational emergency management plans.

This supports our contention at the beginning of this section, that the management of a full-blown community emergency of biological origin should be regarded as the least preferred approach to the management of community safety risk. Risk 'treatments' in the management of community safety risk, including risks

of biological origin, should be primarily designed to remove risk or to mitigate its effects. Emergency management plans need to be based upon the best possible estimates of the nature and scale of resultant retained or 'residual' risk, with appropriate provision for the inevitable uncertainties in managing these types of risk.

These are the outcomes currently sought in the biosecurity programs which have been initiated in many bio-risk industries and areas, and if effective they would make a major contribution to the elimination or minimisation of the effects of future emergencies. However, these programs need to have a sound basis in current risk management principles and practices, and full commitment and co-operation by government instrumentalities, the relevant industries and scientific specialists, if they are to be effective.

In addition, while biological risk might arise from a multitude of sources, the attributes of biological emergencies as identified at the beginning of this paper share certain commonalities. There is clearly a need for more inter-agency and interdisciplinary interaction to ensure that future biological risk management and biological emergency management arrangements, processes and techniques will benefit from shared experiences and understandings.

Conclusion—searching for principles to develop new approaches

Biological emergencies tend to have an expanding field of effects past the immediate problem. Sometimes there can be no apparent problem in the field at all, but still major negative effects occur to sectors of Australia's community.

There are many organisations involved in the management of biological emergencies at the various levels of government. Often field operations will require expertise from many areas of government or private industry. Biological emergency management operations may closely involve the more conventional emergency services, but this involvement is not routine and their roles are often unfamiliar.

Making policy for biological emergency response often involves expertise (and responsibilities) held in several areas of government. This makes the making of policy as reliant on coordination and communication as is the field operation. Due to their wide range of impacts, biological emergencies can make the management of their impact on the

community more of a 'whole-of-government' issue than an issue for one government department alone.

Often organisations that have responsibility for emergency management in various biological areas will also have the ability to influence risk management of the issues. This is at variance with most conventional emergency organisations. Emergency management can be considered as the response capability requirement left over after risk management is addressed. There is a connection between emergency management and risk management processes which should enable better coordination of response needs with the most likely areas of concern.

This is not to say all emergencies can always be predicted—they cannot—but general areas of need may be identified. Biological emergencies are by their nature difficult to predict. Due to this unpredictability, response systems need to be flexible and act on the basis of the best information available at the time, although as noted earlier there is much potential benefit to be gained from greater inter-agency and inter-disciplinary interaction to share understandings about response system needs.

The following principles emerge for developing and applying the proposed new approaches to biological emergency management:

- facilitation for policy and operational coordination between agencies is paramount
- communication between management agencies will be needed both before and during an emergency situation
- communication with a variety of potential operation agencies is likely to be needed
- flexibility in response will be required and response plans may have to be altered in the face of changing information
- good intelligence during the emergency event is required as the problems are not usually directly observable by the responders
- government agencies responsible for the issues have the opportunity to treat emergency management as part of an overall risk management approach such as that of AS/NZS 4360:1999 and therefore influence the need and design of both emergency response systems and risk management systems.

Bibliography

ANAO (Australian National Audit Office), Commonwealth Emergency Management Arrangements, Report No. 41, April 2000.

Animal Health in Australia 1995, *Chlorflurazuron, The Field Response*, www.brs.gov.au/aphb/aha/aahr.htm

Australian Animal Health Quarterly, Issue 1, 1996.

Black-striped Mussel incursion, Darwin, March/April 1999, —A case-study of actions undertaken in response to the Black-striped mussel infestation, 2000

Comfort Louise K. ed., 1988, *Managing Disaster: Strategies and Policy Perspectives*, Duke University Press, Durham NC.

EMA 1996, *Record of the Lifelines Workshop*, Mt. Macedon Paper 3/1996, AGPS.

EMA 1998a, 'Australian Emergency Management Arrangements', *Australian Emergency Manuals Series, Part 1—The Fundamentals*, Manual 2.

EMA 1998b, 'Australian Emergency Management Glossary', *Australian Emergency Manuals Series, Part 1—The Fundamentals*, Manual 3.

EMA 1998c, 'Emergency Management Concepts and Principles', *Australian Emergency Manuals Series, Part 1—The Fundamentals*, Manual 1, 3rd ed.

EMA 2000a, Homepage www.ema.gov.au, last updated 28 March.

EMA 2000b, 'Emergency Risk Management—Applications Guide', *Australian Emergency Manuals Series, Part II—Approaches to Emergency Management*, Volume 1—Risk Management.

Haas J., Kates R. W. and Bowden M. J., 1977, *Reconstruction Following Disaster*, MIT Press, Cambridge MA.

Handmer J. 1999, 'Thinking about residual risk', unpublished paper as part of a European Commission-funded project (Social and Institutional Responses to Climatic Change and Climatic Hazards), 10 December.

Ling A. E. 1999, 'Lesson to be learnt from the Nipah Virus Outbreak in Singapore', *Singapore Medical Journal*, Vol. 40 no. 05, Singapore.

Parker D. J. and Tapsell S. 1995, 'Hazard Transformation and Hazard Management Issues in the London Megacity' in *Geo-Journal*, vol. 37, no. 3.

Pro-med, April 2000, 'Foot and mouth disease in South Korea.

SA/SNZ (Standards Australia/Standards New Zealand) 1995, *Risk Management, AS/NZS 4360*, Homebush NSW, (revised and amended as AS/NZS 4360:1999).

SCARM (Standing Committee on Agricultural Resource Management) 1997, Taskforce Report on 'Managing incursions of exotic pests weeds and diseases'.

SCC/SCFA (Joint Standing Committee on Conservation and Standing Committee on Fisheries and Aquaculture) 2000,

Report of the National Taskforce on the 'Prevention and Management of Marine Pest Incursions'.

USDA Report on *E. coli* 0157:H7, 21 May, 1993.

About the Authors:

Grant Rawlin: Principal Veterinary Officer, Office of the Chief Veterinary Officer, National Offices of Animal and Plant Health, Agriculture Fisheries and Forestry – Australia, Canberra ACT. He has worked in CSIRO as a researcher in animal virus diseases, Department of Agriculture Victoria as a field veterinarian and diagnostic pathologist. Dr Rawlin now works in Canberra on technological support of Australia's animal health policies,

particularly in emergency management systems and training. He has experience in the control of biological emergency situations in animal and plant health and marine pests.

Contact address:

Mr Grant Rawlin
Principal Veterinary Officer
National Offices of Animal and Plant Health
G.P.O. Box 858
Canberra, ACT
Grant.rawlin@affa.gov.au

Roger Jones: Director TEM Consultants Pty. Ltd., Mount Macedon Victoria. He has spent 25 years in emergency management policy development, operations, education and training at national and state levels in Australia and is a former director of Emergency Management Australia's Australian

Emergency Management Institute at Mount Macedon in Victoria. Among other consultancies at international, national and State levels, he recently undertook on behalf of Animal Health Australia a review of the management of the 1999 outbreak of Newcastle disease in NSW.

His contact address:

Mr Roger Jones
Director
TEM Consultants Pty Ltd
P.O. Box 142
Mount Macedon Victoria
temcons@netcon.net.au

This article has been refereed

Book Announcement

Community Risk in Mackay. A multi-hazard risk assessment

Editors: Miriam Middelman and Ken Granger

Cities Project, Australian Geological Survey Organisation, Canberra, Australia

All Australian urban communities face risks from a range of geohazards. Mitigation of these risks will improve community safety, sustainability and prosperity. However, due to the complexity of comparing the risks from different geohazards, few multi-hazard risk assessments have been attempted. This report is the second of AGSO's Cities Project multi-hazard risk assessments, and it develops further the methodology outlined in the Cairns study (*A.J.E.M.*, 14 (2), Winter 1999).

The research assesses the risk to the Mackay community from severe winds and storm tide from tropical cyclones, flooding of the Pioneer River, and earthquakes. It makes extensive use of AGSO's Risk-GIS method, which is a fusion of the decision support capabilities of geographical information systems (GIS) and the philosophy of risk management. The analysis of risk involves assessing the levels of hazard at Mackay, developing an understanding of the vulnerability of the elements that are at risk within the community, and synthesising a range of event scenarios. A comprehensive building database is used to generate damage assessments for the various scenarios. Each suburb is ranked for its contribution to overall community vulnerability and for its exposure to the various hazards. These two rankings determine total risk for each suburb by hazard. Finally, overall community risk from the various hazards is compared.

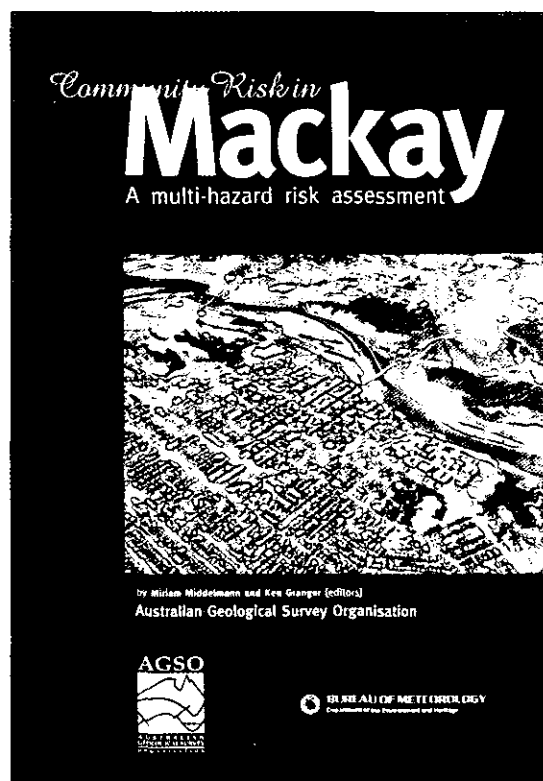
Floods in the Pioneer River pose the greatest geohazard risk to Mackay. In the ARI = 100 year scenario (which sets the minimum floor level for new buildings), 18% of all buildings would have

overfloor flooding, producing moderate or more severe damage and possibly structural failure. Numerous key facilities would be exposed to inundation. Severe wind and storm tide from tropical cyclones rank equal second in their risk to Mackay. Under an event with ARI = 1000 years (the design event for wind), almost 50% of buildings would suffer moderate or more severe damage. A storm tide scenario with a 100 year ARI (which sets the minimum floor level for new buildings) indicates that 10% of all buildings would have overfloor flooding, causing moderate or more severe damage and the possibility of structural failure. Earthquakes also pose a significant risk to Mackay. For a 475 year ARI scenario (as specified by the Australian earthquake loadings standard), about 16% of all buildings are expected to sustain damage, although about three-quarters of this damage will be slight. Electric power distribution, medical facilities and commercial businesses are especially at risk.

The Mackay community appears to accept a moderate level of risk for relatively frequent hazard events (ARI of 50 years or less). Increased community awareness regarding the possible impact of rarer, more severe hazard events could improve the public's understanding of risk, thereby making mitigation strategies easier to implement.

The report is a valuable resource for those responsible for, or interested in, the management of natural hazard risks, including concerned citizens, elected officials, professional engineers, planners and emergency managers.

The 300 page report, titled *Community Risk in Mackay. A multi-hazard risk assessment*, is published by AGSO (primary funder and research



leader) in conjunction with the Bureau of Meteorology and in cooperation with Mackay City Council and the Queensland Department of Emergency Services.

The report consists of an overview in a full colour booklet with comprehensive information in the attached CD-ROM. The full report is available on Compact Disk.

The booklet and CD-ROM are available from:
The Australian Geological Survey Office (AGSO)
PO Box 378
Canberra City 2601

The overview booklet can be viewed on AGSO's web page www.agso.gov.au

Responding to hazard effects: promoting resilience and adjustment adoption

Introduction

Central to contemporary emergency planning is the use of risk management principles to promote resilience to a range of potential hazards. These principles underpin the development of strategies designed to minimise the adverse effects of disruption (Kaniasty & Norris 1999; Lindell & Prater 1999; Lindell & Whitney 2000; Paton & Bishop 1996). Existing attempts to achieve this outcome have enjoyed limited success (Lindell & Whitney 2000; Paton et al., in press). Promoting this capability is also rendered more complex by the fact that reduction initiatives are typically undertaken during periods of hazard quiescence and focus on attempting to motivate people to deal with infrequently occurring and destructive or disruptive hazards (e.g., earthquakes, volcanic eruptions, landslides) whose nature and intensity do not lend themselves readily to mitigation by individual action (Sjöberg 2000; Spedden 1998). Effects perceived as insurmountable and emotionally threatening can lessen the likelihood of adjustment adoption. Focusing on hazards, loss and vulnerability may thus not represent the most appropriate paradigm for planning and encouraging adjustment adoption. An alternative involves identifying the factors that facilitate individual, community and institutional resilience (Buckle, Mars, & Smale 2000; Carver 1998; Tobin 1999; van den Eyde & Veno 1999; Violanti, Paton & Dunning 2000).

Resilience

Resilience describes the capacity of systems to maintain their integrity and the relationships and balance between elements in the presence of significant disturbances by drawing upon internal resources and competencies to manage the demands, challenges and changes encountered. Resilience can operate at several, interdependent levels. For example, the ability of a community to use its own resources to maintain its integrity and balance following disruption by hazard activity requires that attention be given to safeguarding the built environment and lifelines, economic and business continuity, the continuity of social and

by Douglas Paton, School of Psychology, Massey University, New Zealand, David Johnston Institute of Geological and Nuclear Sciences, Taupo, New Zealand, Leigh Smith School of Psychology, Curtin University, Western Australia, and Marian Millar School of Psychology, Massey University, New Zealand

administrative institutions (including the mechanisms linking them with community members), and the development of the capacities of individuals (Buckle et al. 2000; Chavis 1995; Eng & Parker 1994; Paton & Bishop 1996; Paton & Smith, in prep.; Tobin 1999).

While relationships between these levels have been modelled (Tobin 1999), the diversity of the elements proposed, the lack of an overarching theoretical framework, and a lack of operational definitions of core elements currently limit attempts to comprehensively test this model. This paper focuses on one element of Tobin's composite model, psychological resilience, and seeks to operationalise it. Specifically it discusses the psychological mechanisms that facilitate individual capability to resist adverse hazard effects and that underpin the adoption of measures to minimise disruption.

A focus on individual resilience and adjustment adoption is important in communities vulnerable to highly disruptive and destructive hazard activity that can temporarily incapacitate institutional resources. When this disruption occurs, individuals will be responsible for their safety and well-being until institutional resources recover. While adopting this approach, a conceptual and practical distinction between individual and collective (community) responses is acknowledged. We also discuss strategies to facilitate the development of individual resilience through empowerment. This approach provides a precursor to the development of a model capable of integrating individual and collective (community) resilience (Paton & Smith,

in prep) and provides links with models of institutional resilience (e.g., Buckle et al. 2000).

Resilience in an all-hazards environment

To be of value for emergency planning, resilience variables must have predictive validity independent of the community or hazard under investigation. This paper examines the ability of a model describing individual resilience to a toxic waste hazard (Bachrach & Zautra 1985) to predict resilience to volcanic hazard effects. If the utility of this model can be verified against another hazard, and with residents of a different community, the predictive capability of the model will be enhanced. The model described by Bachrach & Zautra (1985) comprised three factors: sense of community, coping style and self-efficacy.

Self-efficacy describes individuals' appraisal of their performance capability and influences their receptivity to information and the likelihood of their adopting risk reduction behaviours (Bennet & Murphy 1997; Lindell & Whitney 2000; Yates, Axom, & Tiedeman 1999). Problem-focused coping (confronting the problem) represents a mechanism for facilitating resilience (Bachrach & Zautra 1985; Yates, et al. 1999). Sense of community (feelings of belonging and attachment for people and places) facilitates involvement in community response following disaster and increases access to, and utilisation of, social support networks (Kaniasty & Norris 1999; van den Eyde & Veno 1999).

Assessing resilience

The capability of these variables to act as predictors of resilience can be illustrated using data collected from residents (Paton, et al., in press) of a community exposed to the effects of the eruptions at Ruapehu volcano, New Zealand, in 1995 and 1996. Two years of volcanic activity had resulted in significant disruption to the winter sports industry upon which this community is economically dependent. Residents were surveyed in June (n=92) and September (n=52) 1997 to assess the psychological impact of this disruption. Psychological impact was

assessed using the Hopkins Symptom Checklist – 21 (Green et al. 1988). To promote comparability, data on resilience variables (self-efficacy, coping style and sense of community) were collected with scales used by Bachrach and Zautra (1985). The present discussion focuses on the June data. Where individuals who responded to both surveys could be identified, these data were used to assess changes in the psychological impact of disruption. During the period between June and September, minor eruption activity and media reporting provided constant reminders of eruption threat. As a consequence, the surveys could be differentiated with respect to the threats faced by community members. In June, they faced both economic and eruption threats, whereas in September a good ski season reduced the economic threat.

Self-efficacy ($r = -0.27, p < 0.01$) and problem-focused coping ($r = -0.24, p < 0.05$) correlated significantly with stress scores in the direction anticipated if they constituted resilience resources. No significant correlation was found for sense of community ($r = -0.01, ns$). Regression analyses confirmed self-efficacy (Beta = $-0.24, p < 0.05$) and problem-focused coping (Beta = $-0.23, p < 0.05$) as predictors of psychological resilience. To assess the relative contributions of economic and eruption threat, the stress scores of 31 subjects who completed both surveys were compared. Mean stress scores dropped from 55 in July to 47 in September ($t = -10.66, p < 0.0001, df = 30$) with the initial recovery of economic activity.

Discussion

Psychological resilience to volcanic hazard effects

The data presented here provide support for the role of self-efficacy and problem-focused as indicators of psychological resilience to volcanic hazard effects. As a consequence of their ability to predict resilience to volcanic and toxic waste (Bachrach & Zautra 1985) hazards, and doing so in individuals drawn from different communities, the predictive validity of these variables within an all-hazards framework is enhanced.

While the anticipated role of 'sense of community' was not supported, this could reflect social fragmentation resulting from hazard activity. A clear distinction between a 'winter sports' group and an 'agricultural' group could be discerned in this community as a consequence of the differential implications of ash fall for their respective livelihoods. Ski field

employees were affected whereas those employed in agricultural were not. This distinction could have led to social fragmentation and limited opportunities to utilise social support networks within the wider community. This interpretation has implications for recovery planning. Because this group diversity did not exist prior to this hazard activity, and emerged as a consequence of a specific set of circumstances, recovery planning and intervention strategies should be guided by the anticipation of how hazard activity may differentially affect community dynamics (Paton & Bishop 1996). A failure to find the anticipated effect for 'sense of community' is thus understandable within this sample. It is important that future research continues to examine the potential of these variables to influence resilience and to explore the environmental contingencies that mediate their role.

Risk perception issues

During the first survey the community faced both economic and eruption threats. During the second the economic threat had subsided but the eruption threat remained. The significant decrease in stress scores suggests that respondents perceived economic and volcanic threats differently, and attributed greater salience to the former. If so, risk communication messages should focus on the specific implications of hazard effects for salient community activities. For example, information concerning ash threat would be attended to more readily if framed in terms of its effect on economic activity. Similarly, risk reduction strategies should focus on actions to safeguard economic integrity against disruption from these effects.

Economic factors may also influence the manner in which community members impose meaning on hazard activity. For example, some 91% of respondents were financially dependent upon winter sports for their livelihood. Their consequent vulnerability to ash and lahar activity led to these becoming salient components of their risk perception and motivated their participation in the surveys. Information from focus groups suggested that community members employed in agriculture, for whom ash fall did not have any direct consequences, attributed a lower level of risk to volcanic activity and influenced their low level of participation in the survey and their reluctance to support the expenditure of public funds on hazard adjustments for a problem they did not perceive to exist.

This conclusion is consistent with those suggesting that attitudes to hazard adjustments, rather than the characteristics of the hazard itself, are more predictive of risk perception (Lindell & Whitney 2000).

This discussion suggests that assessments of risk perception should accommodate the contingent and interactive influence of social, employment, geographical and temporal factors. These observations also post a warning for researchers. Given the differences in risk perception between groups that emerged as a consequence of their participation in specific economic activities, an analysis that included all community members could obscure important relationships. Those unaffected could restrict the variance of the dependent variable (e.g., stress), introducing a downward bias in the correlation coefficients (Lindell & Whitney 2000). In addition to providing insights into the mechanisms that underpin psychological resilience to disruption from hazard effects, the efficacy and coping variables described here also provide a basis for increasing the adoption of risk reduction behaviour.

Community involvement and risk reduction

Self-efficacy has been implicated as a determinant of the adoption of risk reduction behaviour in the Theory of Planned Behaviour (TPB) (Ajzen 1991; Bennett & Murphy 1997). This model is developed here to explore the relationship between risk perception and adjustment adoption (*figure 1*). A prominent role for self-efficacy and problem-focused coping is also evident in the Person-Relative-to-Event (PrE) model (Duval & Mulilis 1999; Mulilis & Duval 1995). Both the PrE model and the TPB model have demonstrated a capability to predict the adoption of risk reduction behaviours (Ballantyne et al. 2000; Bennett & Murphy 1997; Lindell & Whitney 2000; Duval & Mulilis 1999).

In this model, motivation to act is triggered by the perception of a threat, but the key elements are action-outcome expectancies, self-efficacy judgements, past experience, and social norms. Outcome expectancies, response efficacy (e.g., decisions regarding whether the person has the time, skills, resources to adopt and adjustment) and self-efficacy judgements are concerned with considering whether risk may be reduced and whether the required actions are within the capabilities of the individual or group. In this model, action-outcome expectancies precede efficacy judgements.

People make assumptions about whether outcomes are possible before considering engaging in behaviour (e.g., an intention to adopt a preparatory measure or to change risk behaviour). If favourable, the individual moves to the action phase; a phase strongly influenced by self-efficacy expectations. The number and quality of action plans and the amount of effort and perseverance invested in risk reduction behaviours is strongly dependent on one's perceived competence and experience (Bennett & Murphy 1997). Adjustment adoption is also influenced by past experience and is more likely to be maintained if supported by the social and structural environment (Tobin 1999).

This model illustrates the complexity of the response to risk and helps explain why the expected link between risk perception and adjustment adoption has proved elusive. For example, as discussed above, the level of perceived risk attributed to the same hazard event can be diverse. Further, irrespective of the level of perceived risk, people are unlikely to act if they perceive hazard effects as insurmountable (low outcome expectancy) or if they do not perceive themselves as having the competence to act (low self efficacy). Outcome expectancy could also be undermined by resource inadequacies (low response efficacy) or if people transfer responsibility (low perceived responsibility) from themselves to formal emergency management agencies (Ballantyne et al. 2000; Mulilis & Duval 1995; Lindell & Whitney 2000). Alternatively, the process could be disrupted if a normative bias elicited by prior experience lessened the threat attributed to a hazard or its consequences or resulted in an overestimation of performance capability.

According to this model, for risk reduction behaviour to occur, strategies must aim to develop the outcome expectancies, efficacy, experience and social context necessary for its realisation. Further, the model must be capable of functioning effectively during periods of quiescence for infrequently occurring hazards. One way of harnessing the potential of this model that we are currently exploring involves its application within a community empowerment process.

Community empowerment

In this study a small, but significant ($r = 0.20$, $p < 0.03$), correlation between self-efficacy and community involvement (e.g. membership of clubs, local action groups) was noted. While care must be taken in regard to assumptions of causality, this

raises the possibility that the observed resilience reflected a capacity developed from participation in dealing with salient issues affecting a community and the operation of generalised efficacy beliefs which facilitated peoples' ability to respond more effectively to unexpected adversity (Bennett & Murphy 1997; Lindell & Whitney 2000). Efficacy beliefs could thus be facilitated by enhancing the psychological capacity to respond effectively to day-to-day issues, increasing personal capacity to respond effectively to hazard effects even if not engaged in risk reduction activities per se. Accordingly, resilience can be developed by empowering community members by

... irrespective of the level of perceived risk, people are unlikely to act if they perceive hazard effects as insurmountable ... or if they do not perceive themselves as having the competence to act ...

facilitating their participation in identifying problems and in developing and implementing strategies to solve or contain problems in ways consistent with their needs, systems and values (Paton & Bishop 1996). The empowerment process will facilitate the development of individuals' self-efficacy and problem-focused coping. Developing strategies within this process may be important when dealing with infrequently occurring hazards and may encourage personal responsibility for safety.

Since valid and reliable measures of some of these constructs are available, they could serve as key performance indicators for assessing individual resilience and anticipating the likely effectiveness of risk communication and reduction programmes aimed at encouraging adjustment adoption. A measure of the ability of past experience to support the adoption of risk reduction behaviour be derived from Lindell and Prater's (1999) measure of hazard intrusiveness (thinking and talking

about, and getting information on, hazards). It may be advisable to include a measure of normalisation bias (Mileti & O'Brien 1992) to assess whether past experience reduces a propensity to adopt recommended behaviours.

Outcome expectancies and development

There remains the problem of creating outcome expectancies that support the adoption of risk reduction behaviours within an environment characterised by infrequent hazard activity. One way of tackling this issue involves developing strategies based on safeguarding or developing valued personal and community assets and practices.

Individuals are more likely to engage in behaviours when the outcome is valued and perceived as achievable. Realising the benefits of the above model requires a shift from a deficit or loss paradigm to one advocating beneficial effects. For example, a deficit or loss paradigm leads to strategies where community members are urged to spend money on strengthening or altering their house or building to reduce the loss from earthquake hazards. From a development or beneficial perspective, attention would focus on encouraging investment in structural alterations to increase the capital or re-sale value of a property or reduce insurance costs (i.e. the focus is on benefits accruing from adopting adjustments).

Benefits could be derived in other ways. For example, in the present study, collaboration between those affected resulted in their developing economic activities (e.g. volcano tourism, arts, crafts) to substitute for those disrupted by volcanic ash fall. Thus they did not focus on dealing with the ash fall problem (insurmountable) per se, but on alternative, more achievable and meaningful, ways of compensating for losses. Similarly, Becker et al. (2000) observed that 38% of their sample of 208 individuals noted benefits (e.g. improved plant growth, increased business and tourism opportunities, and enhanced sense of community) from their volcanic hazard experience.

Focusing on positive activities (e.g. enhancing property values, safeguarding local amenities, developing additional economic and employment resources), which can confer day-to-day benefits on individuals, rather than on uncontrollable and insurmountable threats such as earthquakes or ash fall, will provide for outcome expectancies that are more likely to support intentions to adopt adjustments,

promote resilience, and facilitate personal acceptance of responsibility. Information on beneficial consequences can inform the planning, hazard education and reduction processes and contribute to the development of programs designed to promote resilience, adjustment adoption and development. It is still important, however, to promote specific hazard awareness and the adoption and practice of risk reduction behaviours.

Hazard education and development

Because they are more powerful determinants of behaviour (Bennet & Murphy 1997) attention should be directed to developing specific efficacy. For example, the community development process could be supplemented by providing community members with hazard scenarios. These can be used by them to define the meaning that specific hazards have for them, identify the resources and information they need to define the problems posed by hazard consequences, and to formulate strategies to deal with them that are consistent with community perceptions, beliefs, attitudes and needs. The emergency planning role can be expanded to include assimilating and coordinating these perspectives and needs within their strategic planning, and seeking, as far as possible, to provide the information and resources necessary to sustain empowerment, self-help and resilience.

This process can also be used to identify and rectify misconceptions regarding hazards and their effects, and to encourage acceptance of personal responsibility for preparedness.

Maintaining the competencies that underpin resilience to adversity requires continued participation in problem solving activities and their integration with risk management initiatives. Managing this link between individual capacities and institutional resources has two implications for this process. The first relates to the need for coalitions or partnerships to perform a mediating role (Buckle et al. 2000; Chavis 1995; Eng & Parker 1994). The second involves developing planning models linking individual and community factors.

Relationship between individual and community action

Collective community behaviour can be thought of as the modal behaviour of the individuals who constitute the community. This modal behaviour may influence individual behaviour. In some models, such as the TPB described earlier, this

possibility is allowed for by the inclusion of an individual level variable measuring perceptions of normative behaviour. The problem with this approach is that it assumes all relevant trans-individual factors are perceived and that their effects can be captured this way. This may not be the case. Although individual level factors are nested in communities, it is important to realise that, for example, while related aggregate sense of community (SoC) and individual SoC and collective efficacy and individual efficacy are independent constructs (Eng & Parker 1994; Paton & Smith, in prep).

They are not interchangeable, nor do they operate at the same level. Each can independently contribute to the formation of individual and collective beliefs and behaviour. Further, communities can be characterised by factors that are not usually recorded at the individual level (e.g., geographical characteristics, economic indicators, objective risks). Some of these may be directly perceived or misperceived by individuals, however, many will have their effects without entering conscious appreciation. Two issues need to be addressed in developing models that integrate individual and community dimensions: the identification of appropriate indicators for individuals and communities, and the question of appropriate methodologies for research designs and data analyses.

The key to advancing knowledge in this field is the development of testable

models that combine an understanding of how people behave in the face of objective risks with how communities function as contexts in which these behaviours evolve and can be modified by planned interventions. Several suggestions as to how this might be achieved emerge from the resilience literature (Kaplan 1999).

Foremost amongst these is the suggestion that models must be focused on specific forms of risk and the specific personal and local factors that ameliorate or amplify negative outcomes or lead to desirable or beneficial outcomes (Paton & Smith, in prep; Tarter & Vanyukov 1999; Violanti et al. 2000). Here we advocate an analysis of the factors and their interactions that explain why some people and some communities fair better than others in the face of adversity. To describe such individuals and communities as 'resilient' falls well short of explaining why they fair better. The mechanisms that underpin this capacity must be defined and must be tested against actual disruption.

As a starting point, we need to differentiate individual and community level factors. The factors listed below are generic and must be tailored for specific hazards (earthquakes, cyclones, explosions, etc.) located in specific geographical and social settings. Appropriate indicators for individuals and communities are described in *table 1* and *table 2*. These lists are not exhaustive. Particular situations may

Personality	hardiness/vulnerability (intelligence, locus of control, neuroticism)
Behaviour	information seeking, networking, coping strategies
Beliefs	risk perception, self efficacy w.r.t. risk, SoC, action plans (behavioral intentions)
Knowledge	factual risk assessments, of resource availability, of appropriate behaviours
Experience	skills training, past hazard experience, interpretation of experience
Outcomes	change in beliefs and knowledge, adjustment adoption

Table 1: Examples of appropriate indicators for individual resilience

Community	aggregate Sense of Community, community competence
Geographical	hazards, risk, response constraints
Economic	income levels, industrialisation, social capital (public facilities)
Community	social institutions, emergency services, training resources,
Resource	public information (availability, access rates)
Outcomes	plans, knowledge, skills

Table 2: Examples of appropriate indicators for community resilience

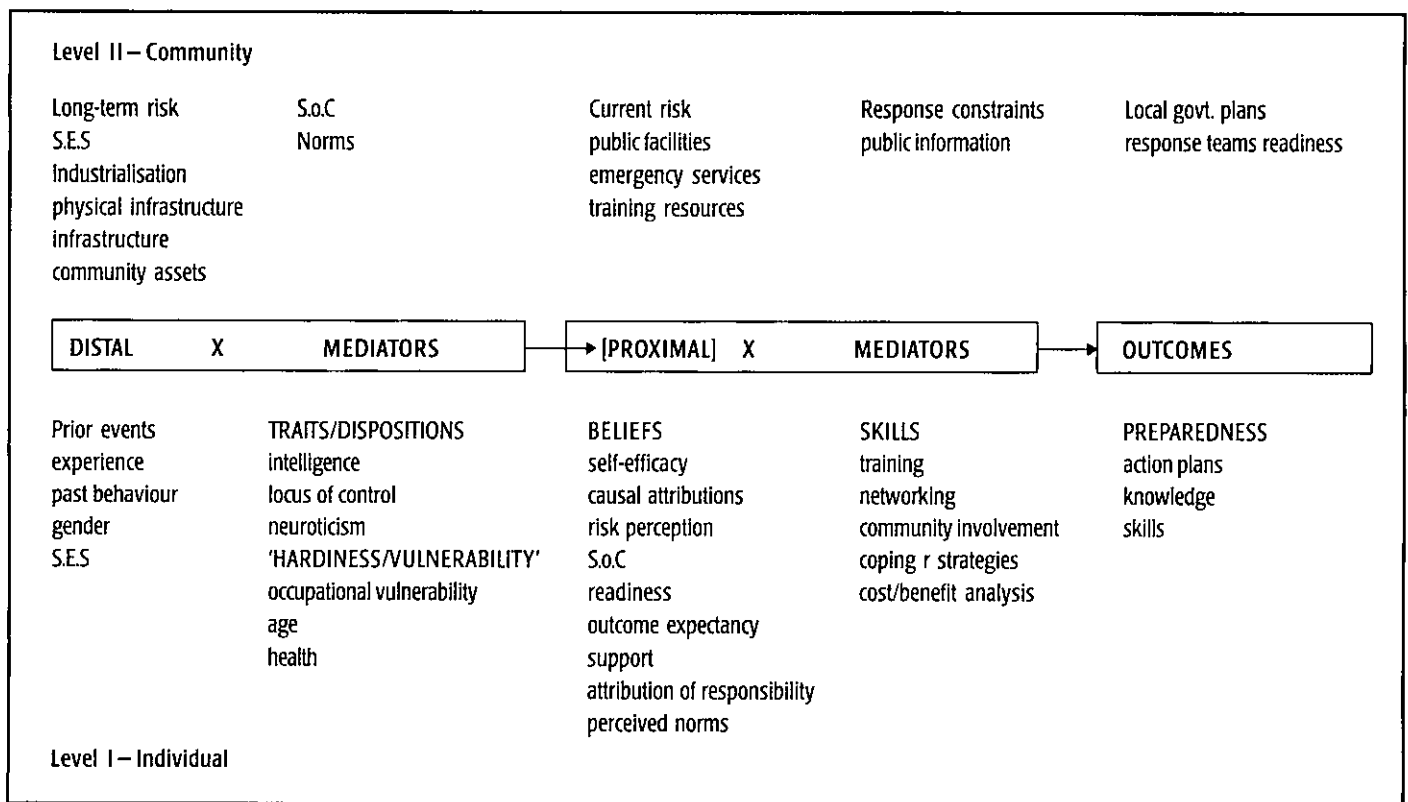


Figure 1: Generic community-individual levels model of preparedness development.

require additional information not covered here, and some measures may be more difficult to obtain than others.

Figure 1 incorporates these variables in a generic model for the development of individual and community preparedness. Distal elements are historical and structural factors that could serve as targets for strategic change. These influence contemporary (proximal) states. The latter represent the resources that underpin resilient capacity and whose efficacy is mediated by the availability of mechanisms that influence the attainment of desired outcomes at each level.

The purpose models such as those described in figure 1 serve to summarise variables known or hypothesised to affect outcomes germane to preparedness (Paton & Smith, in prep).

It is not intended as a working model. As we have suggested working models need to be tailored for specific hazards and settings and for practical purposes would need to be more parsimonious than the model in figure 1.

The issues identified here, and the solutions proposed to deal with them, are best conceptualised over time. Changes in hazard environments, periodic hazard activity, and changes within and between communities over time in prevailing beliefs and levels of preparedness mean that these issues need to be conceptualised within a longitudinal framework. We are currently developing a model, and the methodology, to describe the relationships

between these mechanisms and preparedness for us in planning intervention to develop individual and community resilience (Paton & Smith, in prep).

Conclusion

Evidence from empirical studies of community members exposed to toxic waste and volcanic hazards suggest that a model comprising efficacy, problem-focused coping, and sense of community can predict resilience to hazard effects and has explanatory power that transcends the specific characteristics of the hazard per se.

Consequently, it can be used to predict resilience and monitor intervention effectiveness within an all-hazards management framework. A second model, which includes outcome expectancy, efficacy, experience, and social norm factors, can provide a framework for hazard education and the encouragement of adjustment adoption.

The process can be facilitated by providing outcome expectancies based on benefits for community members. Since the presence and magnitude of these factors is, to some extent, a function of the level of personal involvement in community activities, the effectiveness of risk management initiatives can be promoted by integrating them with initiatives designed to encourage participation in dealing with personal and community issues.

The development of this field requires

the identification of factors that influence resilience at individual and community levels, and the development of models that describe the relationship between levels and the mechanisms that underpin a capacity within systems to maintain integrity and balance when faced with disruptive hazard activity. By ensuring that these strategies are developed and delivered within a resilience/growth framework, community disruption can be minimised and the potential for recovery and growth optimised.

References

- Ajzen I. 1991, 'The theory of planned behaviour', *Organisational Behaviour and Human Decision Processes*, no. 50, pp. 179–211.
- Bachrach K. M. and Zautra A. J. 1985, 'Coping with a community stressor: The threat of a hazardous waste facility', *Journal of Health and Social Behaviour*, no. 26, pp. 127–141.
- Ballantyne M., Paton D., Johnston D. Kozuch M. and Daly M. 2000, *Information on volcanic and earthquake hazards: The impact on awareness and preparation*, Institute of Geological & Nuclear Sciences Limited Science Report #2000/2, Wellington, New Zealand.
- Becker J., Smith R., Johnston D. and Munro A. 2000, 'Effects of the 1995–1996 Ruapehu Eruptions on Communities in Central North Island, New Zealand, and People's Perceptions of Volcanic Hazards After the Event', *Australasian Journal of Disaster and Trauma Studies*, in press.

Bennett P. and Murphy S. 1997, *Psychology and health promotion*, Open University Press, Buckingham.

Buckle P., Mars G. and Smale S. 2000, 'New approaches to assessing vulnerability and resilience', *Australian Journal of Emergency Management*, no. 15, pp. 8-15.

Carver C.S. 1998, 'Resilience and Thriving: Issues, models and linkages', *Journal of Social Issues*, no. 54, pp. 245-266.

Chavis D.M. 1995, 'Building community capacity to prevent violence through coalitions and partnerships', *Journal of Health Care for the Poor and Underserved*, no. 6, pp. 234-245.

Duval T.S. and Mulilis J.P. 1999, 'A Person-Relative-to-Event (PrE) Approach to Negative Threat Appeals and Earthquake Preparedness: A field study', *Journal of Applied Social Psychology*, no. 29, pp. 495-516.

Eng E. and Parker E. 1994, 'Measuring community competence in the Mississippi Delta: The interface between program evaluation and empowerment', *Health Education Quarterly*, no. 21, pp. 199-220.

Green D.E., Walkey F.H., McCormick I.A. and Taylor A.J.W. 1988, 'Development and evaluation of a 21 item version of the Hopkins Symptom Checklist with New Zealand and United States respondents', *Australian Journal of Psychology*, no. 40, pp. 61-70.

Kaniasty K. and Norris F.H. 1999, 'The experience of disaster: Individuals and communities sharing trauma', in R. Gist, R. and B. Lubin eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

Kaplan H.B. 1999, 'Toward an understanding of resilience: A critical review of definitions and models', in Glantz & Johnson, eds., *Resilience and development: Positive life adaptations*, Academic Press/Plenum Publishers, New York.

Lindell M.K. and Prater C.S. 1999, 'Household adoption of seismic hazard adjustments: A comparison of residents in two areas', *Proceedings of the Community Awareness and Hazards Mitigation Learning Workshop*, National Science Council, Republic of China, Taipei.

Lindell M.K. and Whitney D.J. 2000, 'Correlates of household seismic hazard adjustment adoption', *Risk Analysis*, no. 20, pp. 13-25.

Mileti D.S. and O'Brien P. 1993, 'Public response to aftershock warnings', *U.S. Geological Survey Professional Paper*, 1553-B, pp. 31-42.

Mulilis J.P. and Duval T.S. 1995, 'Negative Threat Appeals and Earthquake Preparedness: A Person-Relative-to-Event (PrE) model of coping with threat', *Journal*

of Applied Social Psychology, no. 25, pp. 1319-1339.

Paton D. and Bishop B. 1996, 'Disasters and communities: Promoting psychosocial well-being', in D. Paton and N. Long, eds., *Psychological Aspects of Disaster: Impact, Coping, and Intervention*, Dunmore Press, Palmerston North.

Paton D., Johnston D.M., Bebbington M., Lai C.-D., and Houghton B.F., in press. 'Direct and vicarious experience of volcanic hazards: Implications for risk perception and adjustment adoption', *The Australian Journal of Emergency Management*.

Paton D. and Smith L.M., in prep. 'Integrating individual and community models of readiness for natural hazard activity', *Natural Hazards*.

Sjöberg L. 2000, 'Factors in risk perception', *Risk Analysis*, no. 20, pp. 1-11.

Tarter R.E. & Vanyukov M. 1999, 'Revisiting the validity of the construct of resilience', in Glantz & Johnson, eds., *Resilience and development: Positive life adaptations*, Academic Press/Plenum Publishers, New York.

Tobin G.A. 1999, 'Sustainability and community resilience: The holy grail of

hazards planning', *Environmental Hazards*, no. 1, pp. 13-26.

Van den Eyde J. and Veno A. 1999, 'Coping with disastrous events: An empowerment model of community healing', in R. Gist, R. and B. Lubin, eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

Violanti J.M., Paton D. and Dunning C. 2000, *Posttraumatic Stress Intervention: Challenges, Issues and Perspectives*, Charles C. Thomas, Springfield, Ill.

Yates S., Axsom D. and Tiedeman K. 1999, 'The help seeking process for distress after disasters', in Gist R. and Lubin B. eds., *Response to Disaster*, Taylor & Francis, Philadelphia, PA.

Authors contact details:
Associate Professor Doug Paton
School of Psychology
Massey University
New Zealand

Email: D.Paton@massey.ac.nz

This article has been refereed

Conference announcement

Victorian Flood Management Conference Traralgon, October 2001

The next Victorian Flood Management Conference will be held in Traralgon in October 2001. It will be jointly hosted by the West Gippsland Catchment Management Authority and the Latrobe City Council.

From all accounts the inaugural Victorian Flood Management Conference held in Wangaratta in September 1999 was a significant step in raising awareness of flood management.

For the first time, local government planners, floodplain managers, emergency planners, consultants and people from other disciplines were able to come together to discuss developments in flood management. Presentations were made on a wide range of issues including the Victoria Flood Management Strategy, community involvement, the Victoria Planning Provisions, flood insurance, legal liability and flood mapping.

Since the last conference was held many of these issues have continued to evolve and new ones have emerged to command our attention

In a questionnaire taken at the end of the inaugural conference, many of the 140 delegates indicated that there was a strong need for further flood conferences to be held.

The second Victorian Flood Conference will be held in Traralgon from 9th to 11th October 2001. The Conference theme is *Planning for the Inevitable*, which should remind us that that we should never be complacent about the frequency of floods or their impact. This is well illustrated by the fact that the annual cost of damages from floods in Victoria is now estimated to be greater than \$56m and is continuing to grow.

The Chairman of the conference organising committee is Wayne Gilmour, Floodplain Manager with the West Gippsland Catchment Management Authority.

For more information, contact Wayne on: 03 5175 7800 (phone)

A conference brochure and call for papers will be released in the near future

Impact of Internet media in risk debates: the controversies over the Cassini-Huygens mission and the Anaheim Hills, California, landslide

Introduction

Media play a crucial role in the social construction of a given hazard. That is, media portrayal of a given hazard or disaster affects individual perceptions and agency reactions to a given situation or event. A common criticism is of the sensationalism that media can bring to hazard stories, which can raise public concern about minimal risks or can hamper efforts to respond to a disaster (Dymon and Boscoe 1996; Elliott 1989; Mazur 1998, 1994; Smith 1992; Stallings 1994). Much more troubling is evidence suggesting systematic bias in media coverage, to the detriment of the poorest and most vulnerable elements in society (Davis 1998; Rodrigue, Rovai, and Place 1997; Singer and Endreny 1994).

For example, during the Northridge earthquake that struck Los Angeles in 1994, the geography of print media attention differed markedly from the actual geography of buildings that had been red-tagged (condemned) and yellow-tagged (marked for limited access to make repairs). This finding emerged in various studies of the earthquake by Eugenie Rovai, Susan Place, and myself, when we did a simple linear regression of place name mentions in the dominant English and Spanish language regional newspapers, the *Los Angeles Times* and *La Opinión*, against damaged buildings inspected by the Los Angeles City Department of Building and Safety (1994). Variation in actual damages by the 36 named communities within the City of Los Angeles accounted for 34 percent of the variation in media coverage, a highly significant ($\text{prob} = 0.0001$) if weak relationship (e.g., Rodrigue, Rovai, and Place 1997).

Concentrating on the 17 communities with large residuals above (8) and below (9) the regression line of expected coverage, we found that the grossly overcovered communities were 61.2 percent non-Hispanic white and had population-weighted *per capita* incomes of US\$26,069; grossly undercovered communities were only 21.7 percent non-Hispanic white and had weighted *per capita* incomes of only US\$14,145 (based

by Christine M. Rodrigue, Professor of Geography, California State University, Long Beach, CA

on data from the 1990 U.S. Census). Furthermore, mental maps of the disaster were elicited from a random sample of 245 people in the region, of whom 52 actually responded to the survey, and they accorded nearly perfectly with the media geography rather than with the actual pattern of damage (the media geography accounted for 95 percent of the variation in residents' mental maps, $\text{prob} = 0.0000$) (Rodrigue, Rovai, and Place 1997).

Most disturbingly, areas that were disproportionately overcovered were recovering at a rate significantly higher than the areas that were disproportionately undercovered. That is, red-tagged buildings were being bulldozed and removed from the database and yellow-tagged buildings were being repaired, re-inspected, and then placed in the green-tagged (safe for routine human occupancy) category much faster (-41.9 percent from 26 April to 12 August) than in the rest of the city and especially faster than in the areas undercovered by the two newspapers (-33.8 percent, the difference having a prob-value of 0.0003). Media skew, then, has serious ramifications for people's understanding of and perceptions of a hazard situation or disastrous event and for the equity of response, recovery, and reconstruction.

A number of media critics have pointed out that media skew can emanate simply from the business orientation of a private corporation, which dictates a need that media capture the largest possible audience for their advertisers. This orientation commonly results in sensationalism, a preference for story hooks that emphasise human conflict rather than issues and scientific content, and stories targeting the interests of the kind of audience the advertisers are trying to reach. Usually, though not always, this desirable market segment is the more prosperous fifth of the population, which

in American society is disproportionately non-Hispanic white. Other sources of skew can include the interests of a parent corporation, which typically includes many other businesses than just a media outlet. This interlocking ownership can lead to pressure to kill stories that show the parent corporation or its other subsidiaries in an unflattering light (Bagdikian 1992; Herman and Chomsky 1988; Lee and Solomon 1991; Stevens 1998). These effects can distort audience perception of many issues of importance to a democratic society, not just hazards and disasters, and there seems little that can be done at present to alter such effects in a hierarchically organised, audience-passive media structure, with its extraordinarily high costs of entry for alternative voices.

My next project took this interest in media and hazard into the arena of technological risks, specifically the controversy over the plutonium on board the Cassini-Huygens spacecraft. Through my subscriptions to various listservers, I began receiving a great deal of email messages on the subject in summer and fall of 1997, as the planned launch of October 1997 approached. I became interested in this controversy, particularly as both sides of that controversy were found in my circle of friends. This project widened my interest in media from the audience-passive traditional print, television, and radio media to the uses of the much more interactive Internet in the controversy. Internet media may compensate for the biasing influence of capital concentration in the print and broadcast media due to the low cost of entry into broad-based communication the Internet affords. The biases of wealth and power are not completely flattened in these new media, however, given that Internet access remains quite uneven socioeconomically, spatially, and along gender lines to the point of common criticisms of 'cybersegregation' (Gates 1999; Rodrigue 1993; Fischer 1999) or the 'digital divide' (e.g. Irwin 2000). While my initial interest in these more interactive media channels concerned the technological risk debate raised around

Cassini, I am presently beginning to examine their use in natural hazards controversies, too, initially a battle over landslides in Anaheim Hills, California, a suburb of Los Angeles.

In this paper, I will focus on the Cassini controversy and introduce the Anaheim Hills one. For each, I'll present a brief background on the risk assessment and risk management policy issues brought up in the debate and then analyse the uses of the Internet in the controversies. For the Cassini case, I'll concentrate on UseNet and, for Anaheim Hills, the web. I'll then wrap up with the dilemma facing politicians with risk management responsibilities when Internet activism generates large-scale constituent queries and protests. Is there some way those of us in the hazards community can apply the lessons of Cassini and Anaheim to create pressure for disaster-resilient communities?·

Cassini

The first case study is the Cassini-Huygens mission. Launched in October of 1997, the Cassini orbiter will spend four years on tour in the Saturn system beginning in 2004 and drop the European Huygens probe onto its largest moon, Titan. This is physically the largest and scientifically the most ambitious mission ever undertaken by the National Aeronautics and Space Administration (NASA) or its European partners, the European Space Agency (ESA) and the Agenzia Spaziale Italiana (ASI) (Spilker 1997).

Background to the Cassini controversy

The controversy around the mission erupted as a result of NASA's decision to utilise radioisotope thermoelectric generators (RTGs) and thermal units (RHUs) to generate electrical power for the instruments and to keep them at operating temperatures in the deep cold (< 10° K) 1.4 billion kilometers from the sun (NASA 1995, 1997). RTGs and RHUs contain ceramicised plutonium-238 dioxide.

Besides the launch of ceramicised plutonium, another related point of controversy was the trajectory getting Cassini from Earth to Saturn. The spacecraft is so immense that no launch vehicle could impart the velocity required for a direct shot to Saturn. So, over its seven year cruise to Saturn, the spacecraft picks up speed through gravitational slingshots by various planets, one of which was Earth (NASA 1995, 1997). Many people became concerned that the RTGs and RHUs could possibly explode or pulverise in the event of a flyby accident and give huge numbers of people a carcinogenic dose of

plutonium as the dust circulated through the planet's atmosphere (e.g., Chong 1997; Grossman 1996; Hoffman 1997a; Kaku 1997).

NASA had had an environmental impact analysis performed for it by a variety of internal and external agencies and researchers. These had reported extremely small probabilities for excess cancer deaths from plutonium releases during launch or swingby. In the 1995 *Final Environmental Impact Statement*, for any of the launch phases, all estimates for expectation and maximum scenarios were below one health effect, i.e., surplus death (NASA 1995, p. 4.56, 4.62). For an inadvertant entry during the Earth swingby, depending on the angle of re-entry, the estimate ranged from 1910 to 3480 excess deaths (calculated without any *de minimis* assumption of an allegedly harmless dose of 0.001 rem) developing over five decades, a level that would not be statistically observable amongst the 1 billion or so deaths normally expected in that time frame (NASA 1995, p. 4.63). These estimates were revised downward in the *Final Supplemental EIS* of 1997 after application of new probabilistic safety analyses and more detailed accident descriptions and environments. For launch accidents, expected surplus deaths again remained below 1, and worst case scenarios resulted in less than 1 percent probabilities of from 0.55 to 1.50 surplus deaths being exceeded, depending on the time of failure (NASA 1997, p. 2.22). For inadvertant entry failures, there was a substantial drop in expected excess deaths, to 120, with a 1 percent probability of 450 surplus deaths being exceeded (NASA 1997, p. 2.22-2.23).

Anti-Cassini activists were skeptical of any risk assessment performed for NASA and came up with their own figures, ranging from over 200,000 (Kaku 1997) through 1 million (attributed to John Gofman by Grossman 1997) to as many as 40,000,000 (attributed to Ernest J. Sternglass by Grossman 1997). The opponents further claimed that NASA was imposing an unnecessary risk, because they argued that solar power would have been an option, even out at Saturn, where incoming solar radiation is 1 percent that at Earth (Turner 1997).

By 1995, a movement began to abort the October 1997 launch of Cassini. The launch went forward, so the movement then focused on aborting the flyby. The movement was unsuccessful in stopping either of these events, but it did generate an enormous amount of controversy and a lot of pressure on Congress. Several

senators and representatives signed a public petition against the mission, and California Senator Barbara Boxer commissioned a study entitled, 'Space exploration — power sources for deep space problems' from the U.S. Government Accounting Office (GAO 1998). State and local government representatives also received pressure to declare their jurisdictions in opposition to the launch or flyby. Several responded, including the Massachusetts House of Representatives, which passed a resolution to abort the launch, as did the Newton, Massachusetts, City Council (Hoffman 1997) and the Santa Cruz, California, City Council (City of Santa Cruz 1997). The movement may not have achieved its original goals, but it did succeed in making RTG and RHU use controversial, which may affect the design, authorisation, and funding of future missions.

UseNet Activism over Cassini

I became interested in how the Internet was being used to build both opposition to Cassini and support for Cassini. Besides a number of print media and television pieces on the controversy, most of the day-to-day activism took place on email and listservers, the web, and on UseNet. I was interested in the immediacy of communication amongst individuals enabled by the Internet, so I was more interested in email and UseNet. UseNet became my focus, because all UseNet discussions have been archived in a searchable site by Déja.com since the beginning of the controversy, back in 1995.

Hypotheses: I went through these postings to evaluate several hypotheses that follow from hazards literature in general and technological risk literature in particular. Based on this literature, I expected UseNet comments to focus on perceived control over hazard exposure, because people often will tolerate high levels of risk if they are the ones making the choice but will become very upset over even vanishingly small risks if they feel the exposure is imposed on them (Fischhoff 1994; Shrader-Frechette 1990). I also expected discussion of fairness and equity in the allocation of the mission's costs and benefits, as this has emerged as a theme affecting people's acceptance of risk (Margolis 1996). A central expectation was that dread would dominate the discussion because of the nuclear issues involved (Covello 1991; Slovic 1991). Another expected theme was mistrust of public institutions in protecting the public (Douglas and Wildavsky 1982; Margolis

1996). I also expected different takes on the issue amongst different demographic segments of the population, as there seem to be gender, ethnic, age, and other demographic differences in hazard perception, attitudes, and behaviour (Blanchard-Boehm 1997; Mulilis 1999). Lastly, I expected opponents to dominate discussion, because their motivations (particularly dread) are emotionally more compelling than those of mission proponents, e.g. the romance of space exploration and curiosity about Saturn and Titan (Douglas and Wildavsky 1982; Margolis 1996).

Data and Methods: Using Déja.com's search engine, I searched through the population of 19,853 messages posted on 'Cassini' from April 1995 through March 1999. I sampled the discussion by going through the top 250 messages month by month, working backwards. This yielded comments by 937 authors who had, amongst them, posted 8020 messages. The authors were classified by stance (based on their most recent postings), central concerns they raised, gender, and whether their messages were original compositions or largely forwards from someone else.

Findings: I was rather surprised to learn that the great majority of UseNet authors were supportive of the mission: 60 percent were supporters; 21 percent were opponents; and 19 percent were neutral (Table 1).

The only demographic difference I could pick out amongst the authors was gender (Table 2). This debate was overwhelmingly a male preserve: Fewer than 5 percent of authors were female, and they contributed only 3 percent of the posts. Both genders were likelier to support Cassini than to oppose it, but there is a gender-gap. Only 45 percent of the women were mission-supporters, versus 63% of the men; 38 percent of the women were opponents, while only 18 percent of the men were. Had the genders been equally represented amongst the authors, the proponents would still have been in the majority, but the disparity would not have been so extreme.

I examined the specific concerns of authors in all three positions to understand what activated them to contribute to the social debate over Cassini (Table 3). Opponents were dominated by three subtypes:

- 24 percent simply passed on messages originating from about half a dozen people or organisations, often without comment
- another 24 percent wrote independent

Stance	Gender	Individuals		Posts	
		#	%	#	%
Neutral 19.0% of authors 13.3% of posts	female	7	3.9	10	0.9
	male	139	78.1	930	87.5
	organisation	4	2.2	14	1.3
	unknown	28	15.7	109	10.3
	authors posts	178	100.0	1063	100.0
Opponent 20.7% of authors 31.3% of posts	female	16	8.2	103	4.1
	male	132	68.0	2067	82.4
	organisation	6	3.1	121	4.8
	unknown	40	20.6	217	8.7
	authors posts	194	100.0	2508	100.0
Proponent 60.3% of authors 55.5% of posts	female	19	3.4	154	3.5
	male	468	82.8	3946	88.7
	organisation	3	0.5	24	0.5
	unknown	75	13.3	325	7.3
	authors posts	565	100.0	4449	100.0
937 = n (authors)					
8020 = n (posts made by these authors)					

Table 1: Stance by gender

Gender	Stance	Individuals		Posts	
		#	%	#	%
Female 4.5% of authors 3.3% of posts	neutral	7	16.7	10	3.7
	opponent	16	38.1	103	38.6
	proponent	19	45.2	154	57.7
authors posts		42	100.0	267	100.0
Male 78.0% of authors 86.6% of posts	neutral	139	18.8	930	13.4
	opponent	132	17.9	2067	29.8
	proponent	468	63.3	3946	56.8
authors posts		739	100.0	6943	100.0
Organisation 1.5% of authors 2.0% of posts	neutral	4	30.8	14	8.8
	opponent	6	46.2	121	76.1
	proponent	3	23.1	24	15.1
authors posts		13	100.0	159	100.0
Unknown 16.0% of authors 8.1% of posts	neutral	28	19.6	109	16.7
	opponent	40	28.0	217	33.3
	proponent	75	52.4	325	49.9
authors posts		143	100.0	651	100.0
937 = n (authors)					
8020 = n (posts made by these authors)					

Table 2: Gender by stance

expressions of concern about the risks of plutonium in general or during the launch and flyby phases of this mission in particular

- 21 percent were people interested in Nostradamus and astrology, who expressed great fear that Cassini was the 'King of Terror' that Nostradamus had

Neutral Issues	#	%
Technical questions/answers	72	40.4
Asking/providing basic information	20	11.2
Passing on others' messages	14	7.9
Nostradamus fan asking basic question	13	7.3
Risk question	12	6.7
Flames	7	3.9
Costs, taxes	6	3.4
Politics/bureaucratisation	5	2.8
Privatisation of space	4	2.2
Vulnerability of big mission	2	1.1
Other	23	12.9
sum	178	100.0

Opponent issues	#	%
Passing on others' msgs	46	23.7
Risk	46	23.7
Nostradamus/astrology/666 fears	41	21.1
Calls to action	11	5.7
Costs, scale, opportunity costs	9	4.6
Censorship by media	7	3.6
Conspiracy/militarisation of space	6	3.1
Flames	4	2.1
Privatisation of space better than NASA	3	1.5
Other	21	10.8
sum	194	100.0

Proponent issues	#	%
Opponents a small # unqualified Luddites	95	16.8
Risk overstated, disproportionate	91	16.1
Enthusiasm for the mission and space	73	12.9
Flames	59	10.4
Orbit/trajectory aimed to be safe	36	6.4
Passing on others's messages	36	6.4
Past nuke/RTG failures didn't kill life on Earth	27	4.8
Solar not feasible	22	3.9
Big missions=big results	20	3.5
Nostradamus critiques	23	4.1
Cass budget doesn't allow for cruise science	16	2.8
Opportunity costs of opponent activism	11	1.9
Media censorship/bias against science	9	1.6
Calls to action	8	1.4
Privatisation critique for large-scale missions	4	0.7
Other	35	6.2
sum	565	100.0

937 = n (authors)

Table 3: Central concerns raised by stance

predicted would come from the skies and destroy Earth in summer of 1999 (the Earth flyby took place in August 1999).

Proponents, given their much larger numbers, discussed a wider range of issues and concerns, with no one issue commanding as many as a fifth of the authors. The most common statement (17 percent) was that the opposition was very small if very vocal and unqualified to

comment. Sixteen percent opined that the risk of the mission or of RTGs was being grossly overstated. Thirteen percent simply enthused about the mission and its goals. Another 10 percent engaged in rather nasty 'flaming' of the opponents. Only 6 percent forwarded on other people's or organisations' messages, usually something from a NASA publicity office.

Contrary to the expectations of hazards

literature, there was no concern expressed over the issue of control over the plutonium exposure, not even amongst the opponents. Fairness questions are often raised as an explanation for public activism over technological risk, but only 2 percent of authors raised the issue of fairness and that in a manner tangential to the risk of plutonium exposure (most of these complained about how NASA's monopoly over the space enterprise was unfair to the private sector). There was also a gender gap, which has occasionally emerged in other hazards perception studies (Blanchard-Boehm 1997; Mulilis 1999). The gap is statistically significant with a *Chi-square* prob-value of 0.005 but extremely weak with a Cramér's V of 0.117.

Perfectly in accordance with prior literature, however, dread is the central axis in this hazards debate. Two thirds of opponents expressed dread of nuclear contamination, and the Nostradamus discussants were terrified that Cassini would bring about the predicted end of the world. Over a quarter of the proponents addressed the dread factor, too, mainly by trivialising the probability of an accident and the consequences of an accident should one occur.

Another factor mentioned in hazards literature is mistrust of public institutions, and it shows up in this debate. Six opponents say that there is a NASA conspiracy to militarise space and the plutonium on Cassini is the camel's nose in the tent, and another 7 stated that the media were censoring the plutonium risks of Cassini. Both of these arguments are often cited in the 46 messages forwarded by opponents. Even a few proponents (9) said they thought the media were biased towards the opponents and were not letting NASA have a chance to defend the mission and its goals. So, mistrust of national government and of media is common in this debate and, in the case of the media, is shared by both sides.

This sample may not be a representative sample of all those on the Internet with an opinion on Cassini: It is more than likely that people who bestir themselves to contribute to the debate are in some way self-interested in its outcome. These may be employees of NASA, the ESA, the ASI, or employees of their subcontractors or, conversely, committed and activism-prone members of opposition organisations.

To examine self-selection bias, I removed all people with emails originating from the space agencies, companies doing contract work for them, and academic institutions with sizable grants with them,

as well as those who posted from activist organisation addresses. It remains possible that such individuals also maintain private email accounts not associated with their work affiliations and, so, would not be culled in this manner. The easily identifiable affiliates made up 18 percent of the authors. Suggestively, they contributed 26 percent of the messages, a disproportion suggestive of their passion on the subject (Table 4).

By removing them, the database dropped to 765 individuals and 5912 messages originating with people having no discernible ties with Cassini and the organisations that oppose it. Of the remaining authors, 20 percent are neutral, trivially more than was the case with the full database. They posted 16 percent of messages, however, a somewhat greater percentage than did the neutrals in the original database. Twenty-three percent of the authors in the reduced database are opponents, a slightly greater percentage than in the original, but they posted fully 39 percent of the messages, which is quite a bit higher than was seen in the full database. The public left in the database who oppose the mission emerge as more likely to communicate their feelings. The percentage of proponents in the revised database dropped slightly, from 60 percent to 57 percent, but these are less passionate about their sentiments than was the case when identifiable employees of NASA and related institutions were left in. That is, the percentage of posts from non-self-interested proponents dropped to 46 percent from the 56 percent seen in the original database.

In all, the public left in the database were basically indistinguishable from the full database in terms of the proportions of individuals adhering to the three positions. Those individuals left in the database who oppose the mission, however, are more passionately communicative about their views, which offers some support to the expectation that the emotional basis of opposition, dread of nuclear contamination, is more compelling than that of support for the mission. Indeed, though supporters left in the database dominated as individuals, their support was considerably more tepid emotionally than when identifiably self-interested persons remained in the database, at least as judged from the number of posts they offered on the subject.

Discussion: The Cassini controversy demonstrates the empowerment the Internet offers to political activists. A handful of people can alert others to gravely concerning issues and enlist them

Stance	Individuals		Posts	
	#	%	#	%
Neutral	156	20.4	968	16.4
Opponent	174	22.7	2233	37.8
Proponent	435	56.9	2711	45.6

765 = n (authors)
5912 = n (posts made by these authors)

Table 4: Stance with self-interested persons omitted

to spread the news. The population notified of the issue expands exponentially and, if even a small number of those exposed to the idea respond politically, the result can be tremendous political pressure. Potentially very empowering to ordinary citizens, the Internet offers a counterweight to the political power of great corporations and wealthy individuals. This counterweight function does, however, remain tempered by the continuing underrepresentation of the voices of the poor, of minorities, and of women in cyberspace.

This kind of Internet activism reflects some of the work done by John-Paul Mulilis and Shelley Duval on person-relative-to-event approaches in hazard perception and reaction (1995). Their model is built on the relationship between perceived magnitude of threatening events and perceived resources to do something about them. The originating half dozen or so activists often stress the dire consequences of exposure to plutonium and claim that the danger of exposure from Cassini is drastically greater than NASA admits, messages that constitute negative threat appeals in the field of social psychology. The Internet makes activism through the forward button so easy that it raises readers' appraisal of their resources for coping with the threat. The predicted outcome of this conjunction of high-magnitude negative threat appeals and high-coping resources is a high level of the problem-focused coping behaviour represented by Internet activism.

The demagogic use of the Internet, however, remains the shadow of empowerment. Appeals to conspiracies, *ad hominem* attacks, exaggeration, and other emotionally-manipulative devices are the hallmark of demagoguery, and they are abundant in this debate, particularly amongst the opponents but also amongst flame-prone proponents. As pointed out by Henry W. Fischer, there is a '...greater likelihood of the diffusion of inap-

propriate disaster relevant information ... The inherent advantage of democratisation provided by the Internet through the levelling of hierarchies also creates at least one unintended consequence. Those who are truly expert may appear equal to those who have no background in the field' (1999 p. 63). The complex nature of Cassini and of many other both technological and natural hazard controversies makes them inaccessible to the average citizen, who yet must decide whether to act politically about this or similar situations or, worse, for a democratic society, remain uninformed and apathetic. This is a dilemma we all face as citizens: We must make judgments, and there is no way any of us can spend the time to look into issues far from our training.

So, we have shortcuts to opinions—we tend to defer to the opinions of people and organisations we trust, our reference groups (Johnson 1993; Margolis 1996; Slovic 1991). The problem with this is that it is possible for a handful of people to hijack this mechanism of trust and, through the ease and exponential expansion of activism-by-the-forward button, mobilise a lot of us into a politically potent movement, deflecting our energies from other causes that would normally attract our attention. In this case, attention to a relatively trivial hazard may result in inattention to a more significant hazard well within our powers to do something about.

Risk management decision-makers, particularly politicians, would be well-reminded that they are hearing from an unrepresentative selection of their voting and contributing constituents in technological risk debates, as in most other issues. This sample may be responding to self-interest, demagoguery, or the rational consideration of risks and benefits: The source of political pressure may not be too apparent when decision-makers consider policy to manage a hazard. 'The outcome? Information may be incorporated into public policy, which leads to

ineffective or inappropriate disaster mitigation or response activities' (Fischer 1999, p. 63). While one would hope they rely on risk assessment science in framing their responses, they must navigate a sea of political risk and uncertainty, with its own Type I and Type II statistical hazards to their own careers! Do they assume the volume of pressure they receive represents the feelings of their constituents and then help enact risk management policy that would gall the bulk of their constituents (Scylla)? or do they assume the pressure is not representative and blithely neglect an issue that proves to be important to voting constituents (Charibdis)?

Anaheim Hills landslide

The second case study, one I am just beginning to analyse, involves the use of the web by one deeply angry victim of a landslide in the Anaheim Hills area of Orange County, one of the suburbs to the southeast of Los Angeles proper. This individual took to the Internet after the slump occurred, so the character of his activism is *ex-post facto*, unlike the anti-Cassini activists' work. Rather than a single focus on stopping a specific event perceived as hazardous, this site has several foci. The author, Gerald M. Steiner, wishes to expose the prior knowledge of landslide hazard on the part of elected city government officials and, therefore, their culpability in what he characterises as failure to disclose. He seeks to educate others on the nature of landslide hazards in the region and provide them with one-stop access to United States Geological Survey (USGS), Federal Emergency Management Agency (FEMA), and California Division of Mines and Geology information and maps they can peruse before making purchase offers on homes in Orange County. Another purpose is to provide a forum for other victims of the slides to share their stories and to stay abreast of current developments in their legal actions against the City of Anaheim.

Background to the Anaheim Hills controversy

This case involves the slump of a 25-acre (62 hectare) hillslope from the 16th to the 17th of January 1993 in a neighbourhood of luxury homes on view sites in the Anaheim Hills (Woo and Powell 1993). This development was started in 1973 on known ancient landslides that had experienced some sliding in the early 1960s, and the slide may have been activated by leakage from polyethylene plastic water conduits the City had adopted as its specification before this development, in 1967. In the wake of the slide, a few dozen

families were evacuated and more than 200 affected by other symptoms of ground slippage, so eventually about 250 households sued the City of Anaheim (Spencer 1993). The legal firm they engaged had won a similar suit elsewhere in Southern California, and the residents expected to be made whole for the loss of their homes or the costs of structural repairs and mitigations. The situation exposed a loophole in real-estate disclosure laws in California, which allowed sellers and realtors to disclose as mitigated areas of significant landslide hazard, even when the efficacy of the mitigation implemented is contested.

The mitigation chosen by the City here entailed dewatering wells, which did not work here. Rather than pay the claims and perform structural mitigations, the City instead spent nearly 9 million dollars in legal fees (Schrader 1998), claiming that the residents helped create the slide by overwatering their lawns and because of leaky backyard swimming pools (Pepper 1998). The legal firm representing the homeowners worked out a settlement yielding approximately US\$32,000-36,000 per household and forcing them into a Geological Hazard Abatement District (GHAD) to self-fund the maintenance of 150 pumps and wells (Clark and McLarty 1999).

On the basis of extrapolation from another GHAD in a geologically similar landslide situation (the Big Rock slide area in Malibu, Los Angeles County), the Anaheim Hills GHAD is estimated to require US\$5,000 per year per household after the City's initial donation of US\$3.5 million runs out in a few years (Steiner 2000). Gerald M. Steiner and Sandra J. Steiner, affected homeowners, sued their attorneys for failure of fiduciary responsibility (Steiner and Steiner v. Pillsbury Madison & Sutro, LLP 1999). In this morass of conflicting claims and accusations and lawsuits, Gerald Steiner built an absolutely amazing website: <http://anaheim-landslide.com>

Anaheim Hills victim activism on the Web

This website contains hundreds of pages and links. Some of these are the author's sarcastic commentaries on the process and the politicians and lawyers involved. Others are maps from the USGS or California Division of Mines and Geology, showing hazard-prone areas. Still others are geological reports and environmental impact statements and news reports from the *Orange County Register*, the local newspaper. The site includes a timeline of

the history of Anaheim Hills and its landslides, copies of the legal actions and depositions, myriad photographs of the damages, videos of politicians and lawyers making contradictory statements, and two dozen letters Steiner has received from other victims of the disaster, documenting their suffering and their support for his efforts, as well as queries from people wanting to know if they should buy a particular home in the area. Much attention is devoted to *caveat emptor*.

Steiner's Purpose: Steiner has said that his site helps level the public-opinion playing field between the neighbors and the city, with its team of top attorneys. 'I think in future, political action will be a basic part of the Internet' (quoted in Pepper 1998). The City has tried to close down the web site, saying that the site is full of misinformation (Pepper 1998). The site is obviously one-sided, but it also brings together a tremendous amount of landslide and earthquake hazard information and maps, about which it would normally never occur to a home-buyer to ask. As such, it is extremely informative, the more so since its controversial character makes the site popular and entertaining. It casts light on a loophole in the disclosure process that contributed to a faulty hazard perception on the part of residents and potential residents. It also yields an informative if jaundiced perspective on the dialogue between geological risk assessment and the very political process of risk management decision-making in local governmental bodies, a process that exposed a lot of people unawares to a potentially lethal and financially devastating hazard.

Discussion: As with the UseNet discussions of Cassini, this one-person web campaign stirs up a good deal of anti-government sentiment and draws on popular suspicion of government and risk management planners, this time at the local level. It, too, draws on dread, in this case the horror of waking up in the middle of the night hearing your home creaking and having the local police forcibly evict you from your disintegrating home. Steiner details the impacts of these events on his neighbors and himself—divorces, medical interventions for suicidal actions, bankruptcies, weight loss, and drug problems—with a 'this could be you if you buy in the hills of Orange County' tone.

Unlike the Cassini debate, this site is all about fairness and control. Steiner feels that local government and realtors did not disclose enough information for potential homebuyers to understand the risk they

were assuming moving into the hillsides of Southern California. Without the disclosure necessary for informed consent in risk assumption, Steiner feels that homeowners needlessly lost control over their risk exposure. This is bound up with fairness and equity issues, in that the City's actions and the settlement imposed on the affected homeowners, in Steiner's view, leaves them holding a bag they never knew was being handed to them.

There is an interesting fairness and equity dimension to this controversy that escapes Mr. Steiner's notice. These people are like hazards victims everywhere in the degree and poignancy of their individual sufferings. Unlike victims of, say, mudslides in Central American villages and shantytowns or in the poverty-stricken Appalachians of the eastern United States, however, they have been able to publicise their own stories through the access of one of their own to web-authoring skills and domain-hosting resources. The appalling losses of these at least originally very prosperous households are out there online, due to easy access to the requisite financial and technological resources by middle class and professional people. Others like them, also with access to the Internet, can learn from their tragedies and begin to insulate themselves from the potential devastation of landslides. Other more marginalised victims suffer silently, uninformed of their risk exposure, stricken by disaster, unable to get their own stories out, and overlooked by society — Herman's and Chomsky's 'unworthy' victims (1988).

So far, this tacit fairness issue affects all social organising on the Internet. The Cassini activists, too, are middle and professional class people (professors of journalism and of physics, physicians, and the owner of a software company). At this point in time, interactive civic action offers tremendous empowerment to individuals already relatively privileged in this society: Cybersegregation still divides those with access to this medium and those without, those comfortable with it and those still awkward around it. The potential of democratic oversight of risk assessment and risk management awaits the effective arrival of the poor, of minorities, of working class people, and, at least in the case of Cassini, of women. The empowerment of these now marginal voices in these dialogues can only make interactive media a fascinating channel for the hazards community to watch.

In closing

In the meanwhile, those of us in the

hazards community might want to learn from Mr. Steiner and his do-it-yourself hazards education program and from the various participants in the Cassini controversy. They remind us of the obstacles and limits posed by the traditional print and broadcast media and model possible ways around them.

Emergency managers and disaster planners face difficulties with the conventional media both in the predisaster phase and in the various post-disaster phases (emergency response, restoration, and reconstruction). Before a disaster, the need to get hazard information into the hands of the public may be stymied by the fact that hazards education does not generally have a news 'hook': it is not 'newsworthy',

**One way to slip
information past the
control of traditional
media decision-
makers is to take to
the Internet.**

unless some event occurs that can 'peg' the story (e.g. the anniversary of the Newcastle earthquake). Of the many potential hook events, though, getting media attention may depend on the existence of sensational human drama and conflict in the story, as expressed in the adage, 'if it bleeds, it leads'. In short, disaster planners are at a disadvantage in trying to get their messages across to the populations for which they are responsible: they do not control the media, and the concerns of the media do not ordinarily dovetail with those of disaster planners.

Activists share this disadvantage. They, too, do not control the media. Unlike disaster planners, however, they are better able to generate the kinds of hook events that might snag coverage: they can stage demonstrations or create fanfare over allegations of risk coverups. This relative advantage can be squandered, however, if reporters are summoned over much and begin to think of a group as on the fringe and 'crying wolf'.

The situation is little better for emergency managers in the wake of a disastrous event. Again, they generally enjoy little

control over media activities and representations. In a disaster, media will search out the sensational or picturesque. People in deep need may be overlooked, due to social bias in media. Media can propagate myths about disasters that can compound the work of emergency managers and cause them to squander resources needed elsewhere. Perhaps worst of all, media attention spans are quite short, so enduring needs to communicate information during recovery and reconstruction phases may not be met by media. About all that can be done to control the flow of information is to establish media contact offices during a disaster during the brief windows of opportunity created by journalists' attempts to learn about an event before they settle on a 'spin'.

In short, traditional print and broadcast media wring out the sensation and drama in a disastrous event and then move on to other, more 'newsworthy' stories, leaving information needs unmet. Such media are out of the control of emergency managers and disaster planners. Activists are only marginally more capable of hooking coverage.

One way to slip information past the control of traditional media decision-makers is to take to the Internet. The Internet requires a vanishingly small price of entry compared with that required in the highly oligopolistic conventional media. It is also growing explosively, if unevenly, into a densely interacting global community. There are different facets of the Internet that offer different channels to the public. The World Wide Web functions in much the way that a newspaper, magazine, journal, radio show, television show, performance, or art work would: material is posted and waits passively for an audience to find its way to it. It competes with other material similarly posted for audience attention. Unlike newspaper stories and broadcasts, however, web pages are more enduring and easier to find.

Like these other traditional venues, though, increasing audience exposure requires advertisement. For the world wide web (www), advertisement can consist of purchasing banner advertisements on other, related web pages or arranging a reciprocal and *gratis* exchange of banner advertisements or links. Too, a web address (URL) can be registered with search engines at their web sites, so that active searchers for particular types of information can find a site. Related to search engine registration, it is also possible to include 'meta-tags' in the header portion of a web document to offer

lists of keywords that search engine 'spiders' can use to classify and prioritise sites they find on their own as they 'crawl' through the web. Also, frequent changes to a web site make it more attractive to search engines.

Another way to advertise a web page is through the Internet equivalent of direct mail campaigns: announcements through email address books or on listservers. Probably most disaster planners and emergency managers are familiar with email and maintain their own address books to exchange information among colleagues (and, at home, to swap bad jokes with friends and family!). This activity can be used to notify others of a web page or any other sort of information, but most personal email lists are too limited to be of use—at first. The thing to remember is that email can be used like a chain letter, requesting the direct recipients to forward the information on to anyone who they think might be interested. This introduces the exponential expansion of a pyramid scheme or chain letter and was widely exploited by many of the Cassini activists.

Listservers are automatic email lists of people who take the initiative to subscribe to a list of interest to them. To email everyone on the list, one need not maintain one's own address book or manually enter the address of every individual: one simply sends a message to the list name (often merely by hitting the 'reply' or 'respond' button), just as though to write a single person. The listserver software (e.g. Listserv, Listproc, and Majordomo) then automatically routes the message to all on the list. Each list may have anywhere from a dozen to several thousand subscribers. Getting information out on a listserver and requesting that the message be sent to anyone the recipients think might be interested dramatically increases the compounding power of chain letter mathematics. This was one of the principal avenues utilised by the Cassini activists to get their messages out and propagating exponentially.

Still another channel that might be explored to get information past the controls of traditional media is UseNet. UseNet is the Internet equivalent of a bulletin board. Unlike listservers, UseNet postings may be read by anyone curious enough to visit a news board, search for a subject on the Déja.com UseNet search engine or, increasingly, through any search engine. Like listservers, however, people must subscribe to a board to have posting privileges. UseNet boards can have mil-

lions of readers and thousands of subscribers, each of whom can forward information to their email and listserver circles (and other UseNet news boards). Much of the early activism around Cassini was conducted on UseNet, and my suspicion is that UseNet provided the initial exponential ripple in cyberspace that produced very effective political pressure on elected risk management decision-makers. The anti-Cassini movement traces back, on UseNet, at least, to approximately six individuals!

To be sure, there is now much hazards information online by responsible agencies and institutions (and a fair amount of misinformation by less moderate elements). Disaster planners, especially, and emergency managers might want to explore having their staff follow UseNet bulletin boards to identify appropriate places for postings. The Déja.com search engine (www.deja.com/home_ps.shtml) can provide access to these. Staff could also be encouraged to post messages from an agency on relevant community or subject boards and ask readers to forward them to anyone who might be interested in the information. Similarly, staff might be encouraged to identify and subscribe to appropriate listservers and post similar messages from time to time. Appropriate lists might be found at CataList (<http://www.lsoft.com/catalist.html>), Liszt (<http://www.liszt.com/>), or PAML (<http://paml.net/>). Web page development is a necessary anchor for such information dissemination, and web pages should be modified fairly frequently to maintain search engine revisits—and serve as occasions for communicating through listservers and UseNet.

To be sure, such transparent communication might backfire. NASA's publicity offices utilise the web, UseNet, and listservers—and may thereby have made themselves a target for anti-nuclear activism. Even so, communication of information beyond the controls and interests of conventional media serve the democratic purpose of creating an informed citizenry and, hopefully, a proactive and cooperative one with the information necessary to prepare for disaster and cope with it afterwards.

I know no safe depository of the ultimate powers of society but the people themselves; and if we think them not enlightened enough to exercise their control with a wholesome discretion, the remedy is not to take it from them, but to inform their discretion (Jefferson 1821).

References

- Bagdikian B.H. 1997, *The media monopoly*, 5th ed. Beacon, Boston.
- Blanchard-Boehm D. 1997, 'Risk communication in Southern California: Ethnic and gender response to 1995 revised, upgraded earthquake probabilities', Natural Hazards Center, University of Colorado, Boulder, *Quick Response Report* 94. www.colorado.EDU/hazards/qr/qr94.html.
- Chong D. 1997, 'Nukes in space: The final frontier? NASA to launch nuclear-powered space probe', *Awareness Magazine*, Sept/Oct, www.awarenessmag.com/so7_nuke.htm.
- City of Santa Cruz, 1997, City Council minutes of 9/9/97. www.ci.santa-cruz.ca.us/cc/archives/97/9-9m.html.
- Clark D.W. and McLarty M.W. 1999, 'Plan of control prepared for proposed Santiago Geologic Hazard Abatement District, Anaheim Hills, Anaheim, California', <http://anaheim-landslide.com/ghazarddescription.htm>
- Covello V. 1991, 'Risk comparisons and risk communication', in *Communicating risk to the public*, ed. R.E. Kasperson and P.J.M. Stallen, Kluwer, Dordrecht, NL.
- Davis M. 1998, *Ecology of fear: Los Angeles and the imagination of disaster*, Metropolitan Books, New York.
- Douglas M. and Wildavsky A. 1982, *Risk and culture: An essay on the selection of technical and environmental dangers*, University of California Press, Berkeley, Los Angeles and London.
- Dymon U.J. and Boscoe F.P. 1996, Newspaper reporting in wake of the 1995 spring floods in Northern California. Natural Hazards Center, University of Colorado, Boulder, *Quick Response Report* 81. www.colorado.EDU/hazards/qr/qr81.html.
- Elliott D. 1989, 'Tales from the Darkside: Ethical implications of disaster coverage', in *Bad tidings: Communication and catastrophe*, ed. L. Masel Walters, L. Wilkins, and T. Walters, pp. 161–170. Lawrence Erlbaum Associates, Hillsdale, New Jersey.
- Fischer H.W. III. 1999, 'Using cyberspace to enhance disaster mitigation, planning and response: Opportunities and limitations', *Australian Journal of Emergency Management* vol. 14, no. 3, pp.60–64. www.ema.gov.au/5virtuallibrary/pdfs/voll4no3/fischer.pdf.
- Fischhoff Baruch, 1994, 'Acceptable risk: A conceptual proposal', *Risk* 5, no. 1, p.1 ff, www.fplc.edu/risk/vol5/winter/Fischhof.htm.
- Gates H.L. 1999, 'One Internet, two nations', *New York Times*, Op-Ed section (October 31), www.tecnet.or.jp/~furuno/cybersegregation.htm.

- Grossman K. 1997, 'The risk of Cassini probe plutonium', *Christian Science Monitor* (10 October), www.lightparty.com/Misc/CASSINI.html.
- Grossman K. 1996, 'Risking the world: Nuclear proliferation in space', *Covert Action Quarterly*, no. 57 (summer), p.60.
- Herman E.S. and Chomsky N. 1988, *Manufacturing consent: The political economy of the mass media*, Pantheon Books, New York.
- Hoffman R.D. 1997a, 'Cassini: An in-depth look' (30 January), www.animatedsoftware.com/cassini/cassiplu.htm.
- Hoffman R.D. 1997b, 'Massachusetts State House of Representatives passes Anti-Cassini resolution!' *Stop Cassini Newsletter* 44 (17 September), www.animatedsoftware.com/cassini/nltrs/nltr0044.htm.
- Irwin N. 2000, 'CC cites a higher-speed digital divide', *Washington Post* (4 August), p.E-3.
- Jefferson T. 1821, Letter to William C. Jarvis, Monticello, September 28, 1821, included in *Thomas Jefferson on democracy*, ed. Saul K. Padover, abridged by Samuel K. Padover, Mentor Books, Denver, Colorado (1953), 1993.
- Johnson B. 1993, 'Advancing understanding of knowledge's role in lay risk perception', *Risk* 4, no. 3, p. 189 ff, www.fplc.edu/risk/vol4/summer/johnson.htm.
- Kaku M. 1997, 'A scientific critique of the accident risks from the Cassini space mission', *The Real News Page* (August), www.americanreview.net/kaku1.htm.
- Lee M.A. and Solomon N. 1991, *Unreliable sources: A guide to detecting bias in news media*, Carol Publishing Group, New York.
- Los Angeles City Department of Building and Safety 1994, 'Northridge earthquake 1994', Compressed comma separated files, EQ0426S and EQ0812S (26 April and 12 August editions).
- Margolis H. 1996, *Dealing with risk: Why the public and the experts disagree on environmental issues*, The University of Chicago Press, Chicago and London.
- Mazur A. 1998, *A hazardous inquiry: the Rashomon effect at Love Canal*, Harvard University Press, Cambridge, Massachusetts, and London.
- Mazur A. 1994, 'Technical risk in the mass media', *Risk* 5, no. 3, p. 189 ff, www.fplc.edu/risk/vol5/summer/mazurint.htm.
- Mullis J-P. 1999, 'Gender and earthquake preparedness', *Australian Journal of Emergency Management*, vol. 14, no.1 pp. 41-50, www.ema.gov.au/5virtuallibrary/pdfs/vol14no1/mullis.pdf.
- Mullis J-P and Duval T.S. 1995, 'Negative threat appeals and earthquake preparedness: A person-relative-to-event (PrE) model of coping with threat', *Journal of Applied Social Psychology*, vol. 25, no. 15, pp. 1319-1339.
- NASA. 1997, *Final supplemental environmental impact statement for the Cassini mission*, Office of Space Science, National Aeronautics and Space Administration, Washington, DC., www.jpl.nasa.gov/cassini/rtg/introlinks.htm.
- NASA. 1995, *Final environmental impact statement for the Cassini mission*, Solar Exploration Division, Office of Space Science, National Aeronautics and Space Administration, Washington, DC. www.jpl.nasa.gov/cassini/rtg/introlinks.htm.
- Pepper A. 1998, 'Landslide web site skewers Anaheim: A resident whose \$1.2 million home was damaged in 1993 goes online with his side of the story', *Orange County Register* (9 February), <http://anaheim-landslide.com/slide009w.htm>.
- Rodrigue C.M. 1993, 'Cybersegregation': Neologism I coined for a lecture in Geography 109, geographical research and writing (September), California State University, Chico, popularized and attributed to me by an activist student, Boise D. Jones, now Executive Director of Adopt-a-Bike/Computer in San Bernardino, California.
- Rodrigue C.M., Rovai E. and Place S.E. 1997, 'Construction of the "Northridge" earthquake in Los Angeles' English and Spanish print media: Damage, attention, and skewed recovery', Presentation to the *Southern California Environment and* www.csulb.edu/~rodrigue/scehc97.html.
- Schrader E. 1998, 'Five years after landslide, suits still inching along', *Los Angeles Times* (18 January), Orange County edition, Metro section, <http://anaheim-landslide.com/latimes1.htm>.
- Schrader-Frechette K.S. 1990, 'Perceived risks versus actual risks: Managing hazards through negotiation', *Risk* 1, no. 4, p. 341, www.fplc.edu/risk/vol1/fall/shraderF.htm.
- Singer E. and Endreny P.M. 1994, 'Reporting on risk: How the mass media portray accidents, diseases, disasters and other hazards', *Risk* 5, no. 3, p.261 ff. www.fplc.edu/risk/vol5/summer/singer.htm.
- Slovic P. 1991, 'Beyond numbers: A broader perspective on risk perception and risk communication', in *Acceptable evidence: Science and values in risk management*, ed. D.G. Mayo and R.D. Hollander, pp. 48-65, Oxford University Press, New York and Oxford.
- Smith C. 1992, *Media and apocalypse: News coverage of the Yellowstone forest fires, Exxon Valdez oil spill, and Loma Prieta earthquake*, Greenwood Press, Westport, Connecticut and London.
- Spencer, T. 1993, 'Anaheim: Landslide damage claims blame city', *Los Angeles Times* (17 June), Orange County edition, Metro section.
- Spilker L.J. ed. 1997, *Passage to a ringed world: the Cassini-Huygens mission to Saturn and Titan*, National Aeronautics and Space Administration, Washington, DC.
- Stallings R.A. 1994, 'Hindsight, organizational routines and media risk coverage', *Risk* 5, no. 3, p.271 ff. www.fplc.edu/risk/vol5/summer/stalling.htm
- Steiner G.M. 2000, 'Anaheim Hills landslide update', Web site referenced in second case study, available at: <http://anaheim-landslide.com>.
- Steiner and Steiner v. Pillsbury Madison & Sutro, LLP. 1999, Available at: <http://anaheim-landslide.com/suit2.htm>.
- Stevens E.L. 1998, Mouse-ke-fear, *Brill's Content* (November) p. 94-103.
- Turner J. 1997, 'Nuking the final frontier', *Shift* 5 (4 Available at *ShiftOnline*: www.shift.com/shiftonline/html/5.4_cassini_1.html).
- United States Bureau of the Census 1990, *Census of Population and Housing*. Summary Tape File 3A, Geography: California, Los Angeles County, www.census.gov/datamap/www/06.html.
- United States Government Accounting Office 1998, 'Space exploration — power sources for deep space problems', *GAO/NSIAD-98-102*, www.govnews.org/mhonarc/gov/us/fed/congress/gao/reports/_msg00544.html.
- Woo L. and Powell L-L. 1993, 'No end in sight for Anaheim Hills slide', *Orange County Register* (12 February).

About the Author

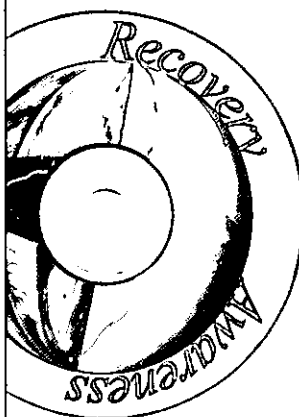
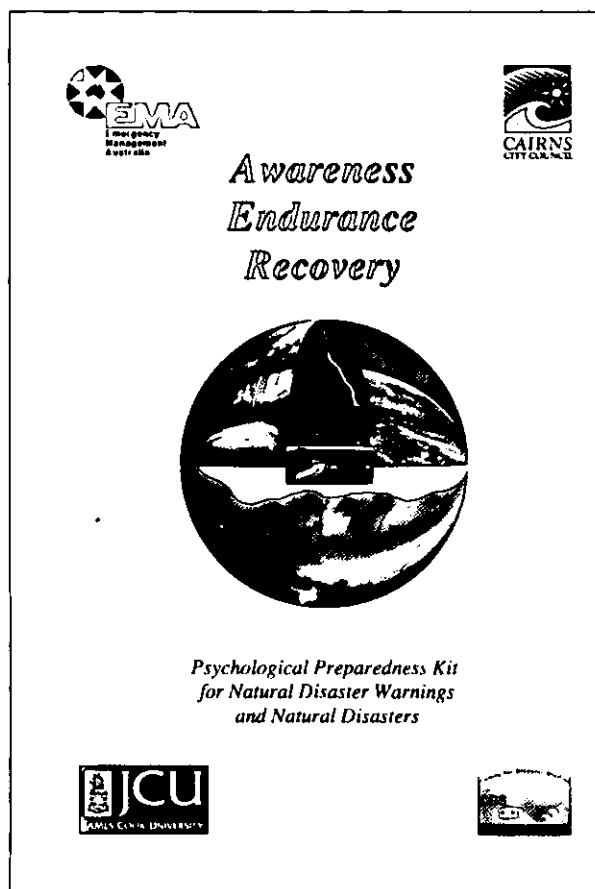
A native of Los Angeles, Chrys Rodrigue is presently Professor of Geography at California State University, Long Beach. Her Ph.D. was earned in 1987 in the Graduate School of Geography at Clark University in Massachusetts, where she was influenced by its hazards orientation.

Presently, her research interests lie in the social construction of a variety of hazards, particularly in terms of media representation of disasters and its impacts in reinforcing patterns of vulnerability to them. She is particularly concerned with equity issues in access to information and in disaster response, recovery, and reconstruction. Her research and teaching interests are more fully described at <http://www.csulb.edu/~rodrigue/>, and she serves as her department's webmaster: <http://www.csulb.edu/geography/>. Her contact address is Christine M. Rodrigue, Professor of Geography, California State University, Long Beach, CA 90840-1101 USA.

Email: rodrigue@csulb.edu

This article has been refereed

New Books



cognitive-behavioural model of coping with stress called Stress Inoculation. This is a very widely used and well-validated approach to managing stressful life events. It is also very simple and is usually understood without much detailed explanation. Also, the approach can be 'taught' by non-professionals since it does not involve psychological jargon or complex theories. The principle of the approach is a simple one, how we think about something will effect how we feel about it, and what we do about it. Thus if we think that we will not handle a situation then we probably will not. Or alternatively, if we think there is no need to prepare for a disaster, even in the face of information that we should, then we may be caught out.

The program gives specific skills in managing an upcoming stress, specifically an impending disaster, and provides ways of recognizing and changing ways of thinking that would be counterproductive into thinking that will maximize psychological and physical survival.

The materials were generated and field-tested in the context of a cyclone, and there is some cyclone-specific content. However there would be little alteration required in order to make the kit applicable to other forms of disaster such as bushfires, earthquakes or tornadoes, although it would clearly be of most use in communities where there was an ongoing risk of the disaster occurring.

In summary, this a high quality, practical and usable tool to add to established protocols for risk minimization associated with disasters.

Justin Kenardy is Associate Professor of Clinical Psychology at the University of Queensland. His particular interest is in the prevention of and early intervention for post-traumatic stress. He has published extensively in this area and is currently studying the impact of traumatic stress in children.

Awareness Endurance Recovery: Psychological Preparedness for Natural Disaster Warnings and Natural Disasters—Trainer's Manual kit.

*Reviewed by Dr Justin Kenardy
School of Psychology
The University of Queensland*

Management of disasters is usually focussed on the practical issues of infrastructure maintenance, access to resources and assistance, and physical survival. In the face of an impending disaster, such as a cyclone, the population can be prepared in advance through warnings and advice about these issues. However, there is often a level of distress associated with the experience of disaster that has not been addressed beforehand, and as with the physical factors mentioned, it is also true of psychological response that an ounce of prevention is worth a pound of cure. It is with this in mind that Shirley Morrissey and Joseph Reser have developed a program to develop

psychological preparedness in a community before a disaster.

The Psychological Preparedness Kit for Natural Disaster Warnings and Natural Disasters is essentially a complete training and dissemination package for the program. It includes a trainers manual with step-by-step details of how the program might be presented. This manual refers to other components of the kit and provides helpful hints and time guides to assist the trainer. The kit also includes a participant's guide, overhead transparencies, associated handouts and questionnaires. Also included is a CD-ROM that contains files of all of the materials included in the kit, there is also a instructions on generation of the kit materials form the CD-ROM, including printing details.

The content of the kit focuses on a

Disaster Events Calendar

May 2-4, 2001
Sydney, Australia

Sixth Annual Emergencies 2001 Conference

Offered by IBC Conferences

Contact: IBC Conferences

GPO Box 2728

Sydney, NSW 2001

Australia

phone: 02 8235 5359

fax: 02 9290 3844

email: registration@informa.com.au

www.ibcoz.com/emergencies

June 3-8, 2001

Charlotte, North Carolina, USA

Association of State Floodplain Managers

(ASFPM) 25th National Conference

The Association of State Floodplain Managers is an organisation of professionals involved in floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning and recovery. The group has become a respected voice in floodplain management practice and policy in the United States because it represents the flood hazard specialists of local, state and federal government, the research community, the insurance industry, and the fields of engineering, hydrologic forecasting, emergency response, water resources, and others.

Contact: ASFPM

2809 Fish Hatchery Road

Suite 204

Madison, WI 53713-3120, USA

phone: 608 274 0123

fax: 608 274 0696

email: asfpm@floods.org

www.floods.org/conf-aus.htm

June 6-7, 2001

Emmitsburg, Maryland

Emergency Management Higher Education Conference

Host: Federal Emergency Management Agency

Emergency Management Institute

Higher Education Project

(Participation by invitation only.)

Contact: Dr. Wayne Blanchard

Higher Education Project Manager

FEMA, EMI, Building N

Room 430

16825 South Seton Avenue

Emmitsburg, MD 21727

phone: 301 447 1262

fax: 301 447 1598

email: wayne.blanchard@fema.gov

June 17-21, 2001

Davos, Switzerland

Landslides: Causes, Impacts and Countermeasures

Contact: Conference Secretary

Deutsche Montan Technology

Franz-Fischer-Weg 61

45307 Essen, Germany

phone: 49 201 172 1886

fax: 49-201-172-1777

email: kuehne@dmtd.de

www.engfnd.org/1av.html

June 17-22, 2001

Newport Beach, California

Eighth International Conference on Structural Safety and Reliability (ICOSSAR '01).

(Includes sessions on hazards analysis, earthquake engineering, wind engineering, and other hazards-related issues.)

Organised by: International Association for

Structural Safety and Reliability

Contact: ICOSSAR '01 Secretariat

University of Colorado

College of Engineering and Applied Science

Campus Box 422

Boulder, CO, USA 80309-0422

phone: 303 492 7006

fax: 303 492 0353

email: corotis@colorado.edu

or icosar@usc.edu

www.colorado.edu/engineering/ICOSSAR

June 18-19, 2001

Coventry University, UK

Disaster Management: Developing Best Practice

Key themes include emergency planning and response, post-trauma interventions, risk management, the role of volunteers, issues for the emergency services, the media and disasters and multidisciplinary approaches.

Sponsor: Association of Traumatic Stress

Specialists

Contact: Dr Anne Eyre

Centre for Disaster Management

Coventry University

Priory Street

Coventry CV1 5FB, UK

phone/fax: 0 2476 888485

email: a.eyre@cov.ac.uk

June 19-22, 2001

Oslo, Norway

The International Emergency Management Society (TIEMS) Eight Annual Conference

Contact: Monica Kjolo

AS Quasar Consultants

P.O. Box 388

Skoyen, N-0212 Oslo, Norway

phone: +47 22 73 08 60

fax: +47 22 73 08 10

For more information about TIEMS and the

conference, see: www.tiems.org

or contact: info@tiems.org.

June 25-27, 2001

Cardiff, Wales, U.K.:

Damage Assessment of Structures (DAMAS 2001)

Contact: C. Summers

DAMAS Secretariat

CPD Unit

Cardiff School of Engineering

P.O. Box 685

The Parade

Cardiff CF2 3TA, U.K.

email: summerc@cardiff.ac.uk

June 28-July 1, 2001

Las Vegas, Nevada

Conference 2001-Las Vegas: Critical Incident Stress Management Suite of Workshops

Offered by: International Critical Incident Stress Foundation (ICISF) in cooperation with the Southern Nevada Critical Incident Stress Management Network.

Contact: ICISF

10176 Baltimore National Pike

Unit 201

Ellicott City, MD 21042

phone: 410 750 9600

fax: 410 750 9601

www.icisf.org

or the Southern Nevada Critical Incident Stress

Management Network

email: training@sncismn.com

www.sncismn.com

July 2-6, 2001

Eindhoven, The Netherlands

Third European and African Conference on Wind Engineering

Contact: 3EACWE Congress Office

Eindhoven University of Technology

P.O. Box 513

5600 MB Eindhoven

The Netherlands

fax: +31 40 2458195

email: congressoffice@tue.nl

www.bwk.tue.nl/bwk/events/3eacwe

July 2-13, 2001

Bangkok, Thailand

Sixth International Course on Community Based Disaster Management (CBDM-6)

Offered by: Asian Disaster Preparedness Center (ADPC)

Contact: Training and Education Division

Asian Disaster Preparedness Center

P.O. Box 4

Klong Luang

Pathumthani 12120

Thailand

phone: 66 2 524 5386/524 5362

fax: 66 2 524 5350/524 5360

email: tedadpc@ait.ac.th

www.adpc.ait.ac.th

July 16-20, 2001

Mt. Macedon, Victoria, Australia

Emergency Management Training Course for Public Health Professionals

Offered by: Australian Emergency Management Institute (AEMI).

Note: AEMI offers dozens of training courses and

other activities throughout the year. For a

schedule and registration information, contact

Judy Parker

AEMI, Main Road

Mt. Macedon, Victoria 344

Australia

phone: 03 5421 5288

fax: 03 5421 5272

email: jparker@ema.gov.au

www.ema.gov.au

Disaster Events Calendar

July 24-August 23, 2001
Faringdon, Oxfordshire

2001 International Disaster Management Training Course

Offered by: Disaster Management Centre
Cranfield University, U.K.
Closing date for applications: June 23, 2001
Contact: Disaster Management Centre
Cranfield University
RMCS, Shrivenham
Swindon, Wiltshire SN6 8LA, U.K.
phone: +44 0 1793 785287
fax: +44 0 1793 785883
email: dsprep@rmcs.cranfield.ac.uk
www.rmcs.cranfield.ac.uk/dmc

Note: the above training course will be immediately followed by the Second International Course on Training of Trainers (ToT) for Disaster Management. August 27-August 31, 2001. Closing date for applications is August 1, 2001. Contact the Disaster Management Centre at the address above for additional information.

August 1-4, 2001
Laxenburg, Austria

First Annual Meeting on Integrated Disaster Risk Management: Reducing Socio-Economic Vulnerability

Sponsor: International Institute for Applied Systems Analysis (IIASA) and Kyoto University's Disaster Prevention Research Institute (DPRI)
Additional information and registration: www.iiasa.ac.at/Research/RMP/dpri2001
or contact: Helene Pankl
Conference Secretariat
IIASA, A-2361
Laxenburg, Austria
phone: 43 2236 807 456
fax: 43 2236 807 466
email: pankl@iiasa.ac.at
or Joanne Linnerooth-Bayer
IIASA, A-2361
Laxenburg, Austria
phone: 43 2236 807 308
fax: 43 2236 807 466
email: idrm@iiasa.ac.at

August 1-4, 2001
Stanford University, California

Crowding the Rim. International Geohazards Summit

Contact: Crowding the Rim Summit
c/o David Howell
U.S. Geological Survey M/S 975
345 Middlefield Road
Menlo Park, CA 94025 U.S.A.
phone: 650 329 5430
fax: (650) 329-4999
email: ctrsummit@usgs.gov
www.crowdingtherim.org/details.html

August 6-10, 2001
Orlando, Florida

International Conference on Disaster Management

Hosted by: International Association of Disaster Management

Contact: Conference Organizing Committee
International Conference on Disaster Management
2952 Wellington Circle
Tallahassee, FL 32308
phone: 850 906 0221
fax: 850 906 9228
email: mail@disastermeeting.com

August 7-10, 2001
Seattle, Washington

International Tsunami Symposium 200 (ITS 2001)

Submit abstracts on-line or by email not later than September 1, 2000
See www.pmel.noaa.gov/its2001 for complete instructions and additional information
or contact: E.N. Bernard
NOAA/PMEL
7600 Sand Point Way N.E.
Seattle, WA 98115-6349
phone: 206 526 6800
fax: 206 526 4576
email: bernard@pmel.noaa.gov

August 9-12, 2001
Erie, Pennsylvania

Critical Incident Stress Management Suite of Workshops

Offered by: International Critical Incident Stress Foundation (ICISF)
Contact: ICISF
10176 Baltimore National Pike
Unit 201
Ellicott City, MD 21042
phone: 410 750 9600
fax: 410 750 9601
www.icisf.org

August 13-15, 2001
Charleston, South Carolina

Workshop on Vulnerability Assessment Techniques (VAT) II

Host: Organization of American States (OAS) and the NOAA Coastal Services Center
Contact: Lacy Johnson
NOAA Coastal Services Center
2234 South Hobson Avenue
Charleston, SC 29405-2413
phone: 843 740 1213
fax: 843 740 1313
email: lacy.johnson@noaa.gov

August 15-18, 2001
Shanghai, P.R. China

International Exhibition for Disaster Control and Emergency Treatment Services

Various activities including a disaster control and emergency treatment forum, technical seminars, business talks, and new product appraisals will take place during the event.
Supported and sponsored by Shanghai Foreign Economic Trade and Relations Commission of Shanghai Municipal Government, Shanghai Anti-fire Security Council, Shanghai Disaster Control Association, Shanghai municipal Civil Defense Office, Education Network & Exhibition Services Ltd. OIC Advertising & Exhibition Co.,

Ltd. The Disaster Preparedness and Emergency Response Association
Contact: Kwan Chu,
Education Network & Exhibition Services Limited
Unit E, 14/F Cindic Tower
128 Gloucester Road
Wanchai
Hong Kong
phone: 852 2598 7556
fax: 852 2598 0302
email: enesjonathan@ctimail3.com
www.orientexh.com

August 18-21, 2001
Anaheim, California

96th Annual Meeting of the American Sociological Association (ASA). Topics include disasters and social aspects of risk.

For more information, see:
http://www.asanet.org/convention/2001
or Contact: ASA Meeting Services
1307 New York Avenue, N.W.
Suite 700
Washington, DC 20005-4701
phone: 202 383 9005, ext. 305
fax: 202 638 0882
TDD: 202 638 0981
email: meetings@asanet.org

August 19-22, 2001
Raleigh, North Carolina

Sustaining Communities: Creating Markets for Mitigation

Presented by: Blue Sky Foundation
Contact: Charles Dugger
Project Coordinator
Blue Sky Foundation
920 Main Campus Drive
Suite 100
Raleigh, NC 27606
phone: 919 424 4558
email: cedugger@unity.ncsu.edu

August 19-24, 2001
Washington, D.C.

First World Congress on Disaster Reduction

Sponsors: American Society of Civil Engineers (ASCE) and others
Contact: Walter Hays
ASCE
1801 Alexander Bell Drive
Reston, VA 20191
phone: 703 295 6054
email: whays@asce.org
or Michael Cassaro, ASCE
email: macass@aye.net

August 23-25, 2001
Kuopio, Finland

'E-Health'—The Use of Information Technology and Telematics in Emergency Management and Education

Sponsored by: Department of Health Policy and Management, University of Kuopio, Finland, and others.
Contact: Conference Secretariat

Disaster Events Calendar

University of Kuopio,
Department of Health Policy and Management
P.O. Box 1627
FIN-70211 Kuopio
Finland
phone: +358 17 163 631
fax: +358 17 162 999
email: aapo.immonen@uku.fi

August 24-27, 2001
New Orleans, Louisiana

Fire-Rescue International

Host: International Association of Fire Chiefs
Contact: International Association of Fire Chiefs
1995-2001
4025 Fair Ridge Drive
Suite 300
Fairfax, VA 22033-2868
phone: 703 273 0911
fax: 703 273 9363
www.ichiefs.org

August 27-31, 2001
Faringdon, Oxfordshire

Second International Course on Training of Trainers (ToT) for Disaster Management

Offered by: Disaster Management Centre
Cranfield University, U.K.
Closing date for applications: August 1, 2001
Contact: Disaster Management Centre
Cranfield University
RMCS, Shrivenham
Swindon, Wiltshire SN6 8LA, U.K.
phone: +44 0 1793 785287
fax: +44 0 1793 785883
email: disprep@rmcs.cranfield.ac.uk
www.rmcs.cranfield.ac.uk/dmc

August 28-September 1, 2001
Helsinki, Finland

Fifth European Sociological Association Conference

This meeting will incorporate several proposed sessions of the 'Disaster and Social Crisis Research Network', including:

1. *Disasters and Social Crises: Visions and Divisions in American and European Approaches.*

Coordinators: Wolf Dombrowski, Disaster Research Unit, University of Kiel, Germany
email: wdombro@soziologie.uni-kiel.de
Robert A. Stallings, School of Policy, Planning, and Development, University of Southern California, USA, email: rstallin@usc.edu

2. *Deconstructing Disaster Management: Beyond the Command and Control Model.*

Coordinator: Maureen Fordham, Anglia Polytechnic University, United Kingdom
email: m.h.fordham@anglia.ac.uk

3. *The Contributions of Sociology to Disaster Research and Vice Versa.*

Coordinators: E.L. (Henry) Quarantelli, Disaster Research Center, University of Delaware, USA
email: elqdr@udel.edu

Bruna de Marchi, ISIG Institute of International Sociology of Gorizia
email: bruna.de-marchi@libero.it

4. *Global Accumulation of Capital as a Factor in Social Crises and Complex Disasters.*

Coordinator: Vera Vratusa, Faculty of Philosophy,
University of Belgrade, Yugoslavia
email: vvratasa@f.bg.ac.yu

5. *Disaster and Sociocultural Changes: Changes Other Than Those in the Organization of Civil Protection*

Coordinator: Nicholas Petropoulos, Emergencies Research Center, Athens, Greece
email: erc@otenet.gr.

Sociologists and other social scientists who are interested in making a presentation in one of these sessions should submit an abstract of not more than 250 words, no later than January 31, 2001, to the respective session coordinators.

September 4-6, 2001
Malaga, Spain

Third International Symposium on Earthquake Resistant Engineering Structures (ERES 2001)

Contact: Susan Hanley
Conference Secretariat
Wessex Institute of Technology
Ashurst Lodge
Ashurst, Southampton, SO40 7AA, U.K.
phone: 44 0 238 029 3223
fax: 44 0 238 029 2853
email: shanley@wessex.ac.uk
www.wessex.ac.uk/conferences

September 8-12, 2001
Big Sky Resort, Montana

National Emergency Management Association (NEMA) Annual Conference

Contact: Tina Hembree
NEMA
P.O. Box 11910
Lexington, KY 40578
phone: 606 244 8162
fax: 606 244 8239
email: thembree@csg.org; www.nemaweb.org

September 9-15, 2001
Dresden, Germany

International Commission on Large Dams Annual Meeting

See: www.icold-cigb.org

September 9-12, 2001
Philadelphia, Pennsylvania

International Public Works Congress and Exposition

Includes educational sessions on emergency management issues

Contact: American Public Works Association
2345 Grand Boulevard
Suite 500, Kansas City, MO 64108-2641
phone: 816 472 6100
fax: 816 472 1610

September 10-13, 2001
Washington, D.C. Area

Managing Conflict during Humanitarian Operations: Improving Negotiation and Cross-Cultural Skills—A Professional Development Seminar for NGO Workers in Humanitarian Field Operations

Offered by: U.S. Institute of Peace
Applications due July 15

Contact: Barbara Wien
Program Officer, Training Department
U.S. Institute of Peace
1200 17th Street, N.W.
Washington, DC 20036
phone: 202 429 3823
email: bwien@usip.org

September 10-14, 2001
Brno, Czechia

Fourth Moravian Geographical Conference on Nature and Society in Regional Context

Organizers: Institute of Geonics, Czech Academy of Sciences

'Disasters and Their Natural and Social Consequences' is one of the conference topics.

See: www.geonika.cz, password CONGEO Conference

or contact:
Antonin Vaishar
Institute of Geonics
P.O. Box 23, 613 00 Brno, Czechia
fax: 4205 578031
email: vaishar@geonika.cz

September 27-29, 2001
Singapore

International Exhibition and Conference on Asian Emergency Care and Defence Medicine - AEDM 2001

Organised by: PSA Exhibitions Pty Ltd
Contact: PSA Exhibitions Ltd
Singapore Expo
1 Expo Drive
Singapore 486150
Republic of Singapore
phone: 65 580 8308
fax: (65) 580 8300
email: htpark@hq.psa.com.sg; www.psa.com.sg

September 30-October 3, 2001
Throggs Neck, New York

Disaster and Crisis Management: Prepare, Prevent, Prevail

Contact: State University of New York Maritime College

Center for Disaster and Crisis Management
6 Pennyfield Avenue
Fort Schuyler, New York 10465
phone: 718 409 7459
www.sunymaritime.edu/ACADEMICS/undergraduate/cdcm.asp

September 30-October 4, 2001
Fredericton, New Brunswick, Canada

Canadian Dam Association Annual Conference: 'Dams: Balancing Social, Environmental and Economic Impacts'

Contact: CDA 2001 Annual Conference
c/o Fred Harriman
Hydro Region, NB Power Corporation
P.O. Box 2000
Station B, Fredericton, New Brunswick
Canada E3B 4X1
phone: 506 462 3813
fax: 506 462 3830
email: cda2001@engineering.ca
www.cda.ca/cda2001/index.html

