

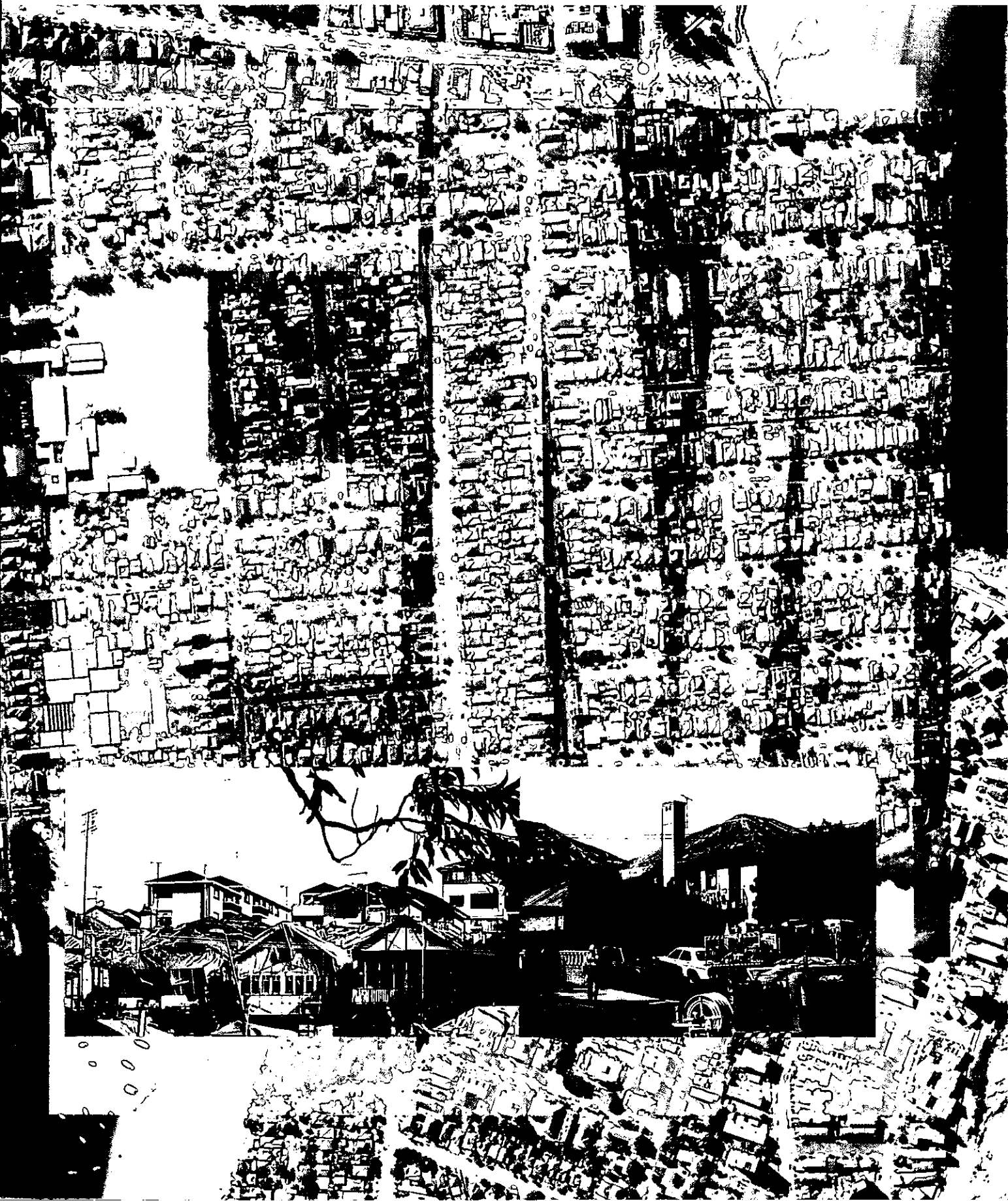


# The Australian Journal of **Emergency Management**













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# Beyond the International Decade

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 – October 15th; Autumn – January 15th; Winter – April 15th; Spring – July 15th. The editorial committee reserves the right to determine the suitability of all material submitted and where necessary to edit submissions.

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December 1999 marked the end of the International Decade for Natural Disaster Reduction (IDNDR). The Decade had the challenging aim of 'reducing loss of life, property damage and social and economic disruption caused by disasters, especially in developing countries, through concerted international action in the 1990s and beyond'.

Throughout the Decade, Australia has been an active participant. Our IDNDR program has been supported and developed through a widely-representative national coordination committee and a full-time secretariat within EMA. The program provided funds for over 150 natural disaster reduction projects in Australia, the Pacific Region and internationally under the IDNDR umbrella.

Last September Kofi Annan, Secretary General of the United Nations, in his annual message to member states focussed on the need for a culture of prevention—a major IDNDR theme. He noted that poverty rather than choice can drive people to live in disaster-prone areas and, in order for disaster-prevention strategies to be truly effective, they needed to be integrated into overall development policies. He also drew on the IDNDR experience to conclude that successful longer-term prevention strategies required broad-based, cross-sectoral and interdisciplinary cooperation.

In July last year a major international forum was held in Geneva to review IDNDR achievements over the last 10 years and to identify a path forward. There was widespread agreement that the key to limiting the economic and social costs of disasters is to put even greater efforts into prevention activities. The conference endorsed a strategy for action entitled 'A Safer World for the 21st Century: Disaster and Risk Reduction'. It contains four goals:

- Increase public awareness of the risks that natural, technological and environmental hazards pose to modern societies.
- Obtain commitment by public authorities to reduce risks to people, their

livelihoods, social and economic infrastructure, and environmental resources.

- Engage public participation at all levels of implementation to create disaster-resistant communities through increased partnership and expanded risk reduction networks at all levels.
- Reduce the economic and social losses of disasters as measured, for example, by Gross National Product.

These broad goals are supported by 12 more specific objectives which provide a road map for further national action. To continue the impetus of IDNDR, the United Nations is to establish an Inter Agency Task Force and an Inter Agency Secretariat. This is good news as it will provide a continuing focus on disaster reduction at the highest levels of the United Nations.

Within Australia, the National Emergency Management Committee (NEMC) at its meeting last November commended the Safer World Strategy for implementation nationally. The NEMC also agreed that it would review progress annually on action taken in pursuing the Safer World Strategy.

The International Decade has passed, but its legacy lives on. During the last 10 years there has been a significant action in Australia to prevent disasters and mitigate their effects. However, there continues to be a need for further concerted efforts in these areas.

In so doing, we need to take account of the Secretary-General's plea to integrate disaster prevention strategies with development policies and to involve the widest range of communities, disciplines and all levels of government in achieving the collective aim of disaster reduction.

We have increasingly recognised the importance of disaster reduction in the last decade. The next 10 years will be the real test of our resolve to truly adopt a culture of prevention within Australia.

**Alan Hodges**  
 Director General  
 Emergency Management Australia

# Demographics and emergency management: knowing your stakeholders

**T**wo of the primary objectives of emergency management are the continuation of government and the delivery of vital services to the residents of an area affected by natural or technological disaster. Just as every individual is different, every community, whether large or small, is also different. In order to effectively meet the needs of a community during a disaster, it is necessary for the emergency manager to understand the composition of that community. This work will discuss the impacts of demographic changes on society, and the use of demographics in emergency management. It will also outline some basic techniques for use by emergency managers, and will identify some resources, which may be consulted when applying demographics to an emergency management system.

## Introduction

Demographics is the study of human populations. The applied science of demographics is an extremely useful resource that is held in high esteem by conventional government planners, health care providers and the advertising industry, among others. The use of demographics revolves around several key assumptions, however, the assumption central to effective emergency management is that individuals have very different needs and engage in different activities at varying points in their lives. The typical seventy-five-year-old is far more likely to require evacuation transportation than the typical twenty-year-old. It therefore follows logically that, if one wished to predict the number of buses needed for evacuation at some point in the future, knowing the relative growth of that segment of the population which normally uses emergency shelters would be valuable as a predictor. From the perspective of risk management, the emergency manager needs to understand who his stakeholders are, and what is important to them. (Boughton, 1998)

The noted Canadian economist, Professor David Foot, says that 'demographics can be used to explain two thirds of all social phenomena' (1996). The two key factors that must be considered are

By Norman Ferrier, Emergency Planner  
Toronto E.M.S. Toronto, Canada

the number of people in each age group, and the likelihood of a given individual experiencing a particular need. In general terms, twenty-year-olds don't have heart attacks, and seventy-year-olds don't go hang-gliding. The ability to perform this type of general trend prediction has the potential to become an extremely useful tool in the hands of emergency managers. Before viewing the implications for emergency management in detail, it is appropriate to briefly visit the major demographic trend that makes the use of demographics both interesting and useful.

Following the close of the Second World War, western industrialized societies experienced a period of elevated birth rate, which was unprecedented in history. This post-war 'Baby Boom' is one of the most studied social phenomena of the twentieth century. Generally regarded as that group of people born between 1946 and 1966, the Baby Boom generation is the largest generation ever born. It is also the generation with the lowest reproductive rate in recorded history. This has created an age group 'bulge' in the population. Communities typically experience sharp increases in the demand for certain age-dependant services, such as education, followed by a rapid decline in demand for those services, and a corresponding sharp increase in demands for the next type of age-dependant services, such as employment. For this reason, the Baby Boom generation is also one of the most difficult phenomena to accommodate for planning purposes, particularly with respect to publicly operated services, including emergency management.

Within North America, and presumably elsewhere in the developed world, a look at the education system will show the myriad of classrooms, built for the Baby Boomers but now empty, and even entire school buildings made surplus by sharply declining school enrollment. During the 1950s, '60s and '70s, everyone thought that the growth would just continue. When viewed from the approach to the millen-

nium, however, it has become obvious that the population growth bubble has burst. It is increasingly clear that, barring unforeseen social phenomena, any element of societal infrastructure built to accommodate the Baby Boom generation is transient; yet this generation must still be accommodated for planning purposes. While many disasters cannot be predicted with any reliability, the social trends that impact on our ability to respond to disasters effectively can.

## Impacts on emergency management

Population age is a major demographic factor that affects emergency management planning. Members of the public who are twenty years of age do not have the same abilities, capabilities or needs as a seventy-five year old, or a four year old. The twenty-year-old who can drive, bicycle or even walk to an emergency shelter may require transportation when he ages. A prudent emergency manager would be well advised to know whether there are enough buses or ambulances in the area to transport the elderly to safety? (Hanna, 1996). A community with a larger proportion of elderly requires more evacuation transportation than a younger community. However, until the emergency manager knows precisely how many senior citizens are being planned for, there is no real means of identifying whether such plans are adequate. Evacuation plans which assume that the majority of people would simply get into their cars and leave become increasingly unreliable as the Baby Boom generation ages.

The elderly are also more likely to experience medical emergencies, as part of an ongoing community emergency. These medical emergencies will also be more serious in nature, as well as demanding more in the way of medical resources. There is a clear correlation between age and the severity of medical emergencies. Research conducted at Toronto E.M.S. in Canada identified the fact that, of those calls identified by algorithm as life threatening, such as cardiac arrests, seventy five percent of patients were over forty years of age (Ferrier, 1998). By way of contrast, the

same research indicated that among those with relatively minor injuries, such as limb fractures, only about fifty one percent were over age forty. While plans for a simple first aid station might be adequate in the emergency shelter of a younger community, more elaborate medical support may be required for a shelter in a community of retirees.

Similarly, small infants and children have special needs in an emergency (EMA, 1996). These needs may be medical, dietary, or simply occupational. A community with large numbers of children or infants may wish to stockpile or develop emergency purchase arrangements for items such as diapers or infant formula, or they may wish to ask those who have agreed to operate emergency shelters to develop a children's activity program. Children also need to be counseled by specialists, if they are available, following a disaster. A prudent emergency manager is aware of these issues, and should be able to identify the need for such services and whether or not they have pressing relevance within the local emergency plan.

The needs of those with disabilities must also be addressed. The emergency manager must know how many blind or deaf people live in the local community. These individuals may very well miss local emergency notification messages, and may require special efforts to reach safety. Similarly, those with mental and physical challenges may require special evacuation assistance, shelter arrangements, or special medical support. But before the emergency manager can undertake any of these worthwhile projects, the size and nature of the group must be properly identified. Does the community need to spend a large portion of its disaster preparedness budget making an emergency shelter fully accessible, or does the size of this subset indicate that simple, basic accommodations for the disabled are adequate, freeing precious money to be spent on a more needed aspect of preparedness?

Length of residence in a community is also a determining factor. It has been demonstrated repeatedly that, in the case of recurring phenomena such as tropical cyclones, long time residents are far less likely to evacuate than 'first timers; are (Beaulieu, 1996). This generally holds true until the community is struck by a truly catastrophic event, and then resumes as time and distance permit the community to place the event behind them. This is highly significant for the emergency manager, since a community with large numbers of new residents, or with a recent

catastrophic event, is likely to experience far more demand for shelter space than a community with a relatively stable population.

Additionally, the world's population has become increasingly mobile in the latter half of the twentieth century, and this also has impacts on emergency management. As people continue to emigrate to more developed countries in search of a better life, the ethnic composition of once homogenous societies is forever changed. It may no longer be enough to disseminate emergency instructions in English, and emergency managers become challenged by 'getting the word out,' despite substantial language barriers. Has the ethnic composition of the community changed, requiring expensive translations of emergency preparedness information, or has it remained the same?

Clearly, if the emergency manager is to disseminate information and to plan for and provide emergency services effectively, the composition of the target audience must be known and understood. Demographics can greatly aid in the acquisition of that knowledge. While not yet in wide use in emergency management circles, the applied science of demographics can be a valuable tool for the planning and provision of emergency services during a disaster.

### **Tools of the trade**

In most developed societies, a Census is conducted by the government on a regular basis, usually at five or ten year intervals. Information is collected community by community, and the result is a relatively accurate picture of the composition of each community, in terms of age, gender, total population, language and ethnicity, education and socio-economic status. For larger cities, these are referred to as Census Metropolitan Areas (CMAs) in Canada, and in the United States they are referred to as Metropolitan Statistical Areas (MSAs). In smaller communities, the data is usually collected within predetermined boundaries called tracts, which include adjacent rural areas. This data can be used to provide the emergency manager with a relatively accurate portrait of the community served. While most governments normally provide this information for a fee, such as publishing and selling the national census, many will also make this information available free of charge for other government agencies. The information is also generally available in the reference section of most university libraries.

Most governments also develop demo-

graphic projections of population for planning purposes. In these projections, population is usually identified in five-year age groups, or cohorts, and may include gender data. The increase or decrease in population is projected by cohort for each year of a twenty-five year period. These projections are based on census data, and on certain key assumptions, such as birth rate, mortality rate, and migration patterns. This information is used by the government to identify future revenue sources, and to identify increases and decreases in the need for various types of government services. While the federal government conducts the Census, the provincial or state department responsible for finance usually creates demographic population projections. Once again, while these are generally for sale to the private sector, they are normally provided free of charge to other government agencies.

Another useful source of data, particularly for those agencies with limited resources, includes municipal planning departments, which generally need to generate these projections for their own purposes. Emergency managers should also consider a strategic alliance with a local university, particularly with the Social Sciences or Geography departments. The development of this information can be provided free of charge to emergency managers, while second or third year students receive the opportunity to apply some of their skills and training to a project with real-life implications. By incorporating this process into the university program, the emergency manager is provided with regularly updated data. In this manner, both the emergency manager and the university derive benefits.

There may be those cases in which resources for the production of case-specific projections, such as a local university, are not available. In these cases, the process of demographic projection can be conducted directly by the emergency manager. The process is relatively uncomplicated, and involves specific steps. These include the collection and analysis of historical data, the identification of target groups of stakeholders, calculation of relative growth rates for the population in these subsets of stakeholders, and a calculation of future requirements for the service in question which are based upon the growth rates previously mentioned.

The first stage in this process is to gather and analyse historical data. In the case of determining future emergency shelter requirements, one should examine shelter registration records. While some communities still do not register shelter

occupants, they are losing a potentially valuable source of information for future planning. Armed with these records, however, it is possible to identify which groups, such as elderly or families with small children, have actually used the shelter in the past. By arming oneself with this basic information, it becomes possible to determine how large that particular subset of people was within the community, and the need for service provision, relative to group size.

To illustrate, the local emergency manager knows that at the time of the last tropical cyclone there were 5,000 people over age sixty-five in the community. According to shelter records, 3,500 of those 5,000 required shelter. One can then create a basic assumption to the effect that, with respect to the provision of community shelter, one needs to be able to accommodate seventy percent of the over sixty-five age group. This function must be performed for each group for which data is available, and it is simplest to determine the subsets using the same five-year age cohorts included in the census and population projection data. By then looking at projections of future population, if the emergency manager notes that in ten years the over sixty-five population of the area will have doubled, it is a fair assumption that shelter demand will double as well.

The emergency manager now knows that within ten years the emergency plan will need to provide shelter resources for approximately 7,000 people over 65 years of age. By repeating this process for each of the age cohorts, the emergency manager will be able to arrive at an understanding of the normal needs of the stakeholders for emergency shelter, both now and ten years into the future. This provides the emergency manager with a window of time in which to develop the availability of the shelter space which will be needed, and provides the opportunity to become proactive instead of reactive. In most cases, the application of these projections to resource requirements is a matter of simple arithmetic.

In a similar scenario, an emergency manager knows that there are currently sufficient buses to evacuate the 600 school children in the service area. If the emergency manager also knows that the number of people in that age group will decrease by 20 percent over the next five years, then it logically follows that the emergency manager will need to have access to 20 percent less buses for school children within the next five years, if the evacuation plan is to be effective. This

may permit the reallocation of some buses to another emergency task, such as providing evacuation for seniors. Similar exercises can be developed regarding shelter space, emergency food stocks, and a host of other emergency commodities.

The Census data provides the emergency manager with a valuable insight into the composition of the community being served as well as what the current needs of that community are likely to be. This information is valuable for the purpose of developing the current emergency plan. The demographic projections provide an insight into what future needs are likely to be, and permit the emergency manager to become pro-active by identifying future needs and matching resources to those needs before the disaster occurs.

### Conclusion

While the incidence of disasters cannot generally be predicted, their impacts on a given community often can. The key to achieving this is an understanding of the composition of a given community in terms of key factors, such as age, gender, ethnicity, and religious beliefs. Certain groups within a larger community often have special requirements that must be considered when preparing an emergency plan.

For many years, most emergency managers have attempted to mitigate physical threats to the community; identification of needs has largely remained an exercise in hindsight. The use of demographics can provide a means to change this. Until emergency managers clearly understand who their stakeholders are, both now and in the future, advance planning will never be fully effective, and unpleasant surprises will frequently occur during disaster responses.

Other sectors of government routinely use demographics to identify populations, and to plan for future specific needs. The science of demographics is also utilised by health care providers throughout the world for planning purposes. The techniques used are every bit as valid for those who determine the steps which need to be taken to prepare for an emergency. The twenty-year-old who simply rides his bicycle or drives his car away from danger may require a bus or even an ambulance to do the same when he is eighty.

The key to success is a strategy of identification and mitigation. Once the needs of a given community are more completely understood it becomes possible to identify whether the community's resources are adequate to meet those needs in an emergency. Armed with

this understanding, it is possible to begin a process to mitigate any shortfalls in resources, so that when and if the time ever comes when those resources are needed, the impacts of the disaster on the population are minimised. The community becomes truly prepared.

The essential point is that the use of demographics permits us a window through which to view our communities, in order to identify those variables affecting community needs. The consideration of these variables within communities is as critical to the process as hazard identification or risk assessment, when formulating an emergency plan. In particular, we need to use these variables to identify those in the population who are likely to have special needs, and to ensure that the resources within our communities are adequate to meet those needs, both now and in the future.

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### About the author

Norman Ferrier joined the staff of Toronto E.M.S. in 1974. He worked initially as a paramedic, and became a District Supervisor in 1981. His involvement in emergency management began in 1983, when he wrote, choreographed and staged his first full scale exercise for a Toronto area hospital as part of its accreditation process. Norm is a graduate of the Canadian College of Emergency Preparedness and a certified exercise designer. He still works for Toronto E.M.S. as an emergency planner, and does emergency planning consulting with other public sector agencies on behalf of that organization.

# Awards to recognise disaster heroes



## The EMA Safer Communities Awards

If you work for a local government, volunteer or community organisation that has been actively involved in emergency management—before or after a disaster—then Emergency Management Australia (EMA) wants to hear about it.

Organisations or people who have helped to keep Australians and their property safe from disasters or assisted with the response to and the rebuilding after disasters will be recognised under a new annual Award Scheme.

The inaugural EMA Safer Communities Awards is searching for excellence in emergency management—the best practice that has built safer communities across Australia.

EMA's Director General, Alan Hodges, says the Safer Communities Awards will recognise the 'unsung heroes' who work often behind the scenes to make communities safe.

'The Awards could recognise the work of local councils in flood mitigation, bushfire brigades in both fighting and preventing fires through hazard awareness campaigns, and schools and community groups for innovative information and education programs on natural hazards,' Mr Hodges said.

In each State and Territory there will be eight Awards—this will ensure that every organisation, regardless of its size or where it might be located, will have a chance of winning. The winners from across the country will then face the national judges who will be searching to identify the best of the best.

The fact is that disasters can and do strike in every part of Australia. Cyclones hit randomly right across Northern Australia, severe storms strike major cities and remote areas, floods have no boundaries, and earthquakes and landslides hit without warning.

Over the past two years Exmouth in Western Australia was extensively damaged by Cyclone Vance, Sydney was battered by hail stones, Katherine in the Northern Territory was flooded out as were other populated areas in the Eastern States, and bushfires burnt out of control and threatened many communities and the environment.

*'Every disaster involves community organisations, local councils and emergency authorities—both in the preparedness and the response phases. So we want to recognise the good work done by all these people,'*

*... EMA Director General,  
Alan Hodges*

The nomination form and full details on the Safer Community Awards will be available from February 10, 2000 on EMA's internet site [www.ema.gov.au](http://www.ema.gov.au).

*Alternatively, you can register your interest in the Awards by contacting EMA:*

Phone: 02 6266 5402

Fax: 02 6257 7665, or

Email: [awards@ema.gov.au](mailto:awards@ema.gov.au)

Postal address:

EMA Safer Communities Awards  
PO Box 1020 DICKSON ACT 2602

*Entries for the inaugural awards covering the period January 1998 to December 1999 will close on March 31 with the National winners being announced in mid-2000.*

The Awards cover all areas of emergency management: Prevention, Preparedness, Response and Recovery. There are two categories:

**Pre-Disaster:** This award will cover activities aimed at preventing or mitigating disasters or their effects. It will also cover preparedness activities.

**Post-Disaster:** Two areas will be covered by the Post-Disaster category: response and recovery.

The awards will be available in four streams:

- Federal and State Government agencies
- Local Government
- Voluntary organizations, including community organisations; and
- Private sector organisations.

A judging panel at State and Territory level will assess each category. These panels will be organised by the peak Emergency Management Committee and will consist of judges representing each of the four streams.

The State and Territory winning entries in each category and stream will be forwarded to EMA for consideration in the National Awards, again in the same categories and streams.

The judges will assess each entry's contribution to community safety with consideration being given to:

- How the project improved community safety and what future benefits are expected.
- The degree to which the approach represents best practice—that is, how it is leading the field in national or international approaches.
- How the project was innovative. For instance, how the new approach, process or technique was implemented.
- Project implementation—that is, the effectiveness of implementation and the consultative processes.
- Potential use by others. The scope for other organisations to implement a similar approach.



# Managing change within the emergency services to ensure the long-term viability of volunteerism

## Context

Securing a long-term future in the current climate of social and economic change is one of the most significant challenges confronting volunteer-based emergency service and support agencies in Australia and around the world.

Factors such as population growth, rural and urban mobility, and increasing cultural diversity present challenges to service providers. These factors increase the demands for, and the complexities of, service delivery by volunteers, and create complex management issues.

The significance of these challenges, and the need for strategies to assist emergency services across Australia in managing them effectively, has been widely recognised in recent years, both in terms of the critical role played by volunteers, and in terms of the extent to which the volunteer culture is under threat.

There is now general acceptance that best management practices, standards and guidelines need to be developed, to assist emergency services across Australia in their effort to support the current and future generation of volunteers. Thus, the pursuit of best management practices has become a key agenda item both for specific agencies and the emergency services sector as a whole.

## The CFA Volunteer Research and Development Project

In May 1996, CFA commenced a project to investigate a range of key questions concerning the current status of volunteering and ways of enhancing the viability of the volunteer culture within the organisation and the broader community.

Following its establishment, a component of CFA's research and development project took on a national focus with the assistance of a \$10,000 grant from EMA.

The broad aims of the CFA's project were to:

- enhance the existing volunteer culture within the emergency services
- develop methods of planning and

By Samantha Reinholdt  
Coordinator Social Research, CFA

management that will minimise the risks created by issues and changes that affect volunteers and maximise volunteer participation and satisfaction over the long term.

In a broad sense, the project comprised four key components:

- an analysis of socio-economic trends and demographic data on CFA Areas in order to develop a better understanding of the external environment in which the CFA operates
- a review of local and international literature on volunteering to see the extent to which there is recognition of these issues and trends and what adaptive responses are evident
- the conduct of a broad-based internal assessment of issues affecting volunteers in the CFA in an attempt to develop a better understanding of volunteers' opinions about volunteering and how it impacts on their lives, work, family, etc.
- an Australia-wide review of volunteer development and coordination initiatives and practices in other volunteer-based emergency services, as a basis for developing generic guidelines for best practice volunteer management and support in the emergency services.

## The challenges posed by socio-economic and demographic change

A number of key socio-economic trends have been identified as likely to have an impact on Australian volunteer-based emergency service organisations in the future.

### Key population trends

- Mobile and volatile population distribution
- Rapid population growth in suburban areas, tourist centres and coastal areas
- Many rural areas are experiencing

periods of population decline

## Implications of population trends for the emergency services

There is little doubt that, in the years ahead, fluctuating population distribution and high levels of mobility and volatility will increasingly challenge traditional modes of service delivery.

The number and complexity of risks is generally greater in areas where the population density is higher, so that, in areas where the population is increasing rapidly, so too is the risk of an emergency, and the challenge of providing emergency services.

In such areas it is likely that there will be an increasing demand for an efficient and effective service. However, ensuring that the volunteer base expands at a rate corresponding with population growth may be difficult in areas where new residents have a limited understanding of their local community or of the volunteer culture within the emergency services.

On the other hand it is possible that these groups may view volunteering as a positive way in which to become involved in activities of the local community.

High population mobility will also undoubtedly pose a number of challenges for the emergency services. It is likely that the ability of organisations to maintain the traditional nature of geographically fixed volunteer membership may become more difficult. It may also result in a decline in the number of people who are able to make a long-term commitment to volunteering.

It is possible that in the future, high population mobility and volatility will also challenge the notion of the volunteer base as a permanent fixture, or the point from which services are delivered.

## Key economic and industry trends

- Pressure on rural communities from regional restructuring and rationalisation of services
- Economic change as a result of government policy on deregulation and competition.



## Implications of economic changes for the emergency services

Volunteer-based organisations need to recognise that many of the factors contributing to the hardship of current conditions are not temporary aberrations but represent fundamental changes. Thus, strategic thinking which takes into account current conditions and prospects is integral to ensuring long-term organisational viability.

In the current climate of economic rationalisation it is likely that maintaining standards of service in areas experiencing rapid population decline will become scrutinised more heavily. Fundamentally, organisations will need to consider how they might continue to provide an efficient volunteer-based emergency service to people who remain in areas where the population is declining and where there is little infrastructure remaining to support familiar community networks.

The pressures of a competitive economic climate will also undoubtedly become more widespread within the community over time. These will continue to increase competition within and between industries and consequently limit both employees' and employers' ability to participate in voluntary work (i.e. because of the costs associated with reduced productivity).

Advances in technology are likely to have significant implications for volunteer-based emergency services as equipment becomes more sophisticated and is up-dated at more regular intervals. It is likely that formal training programs will need to be expanded to ensure volunteers keep abreast of rapid technological innovation. Organisations may also need to carefully monitor whether volunteers leave the organisation in response to such change.

Regional restructuring, and subsequent localised population decline, will increasingly reduce the number of people available to participate in voluntary activities in remote rural areas. In addition, many of those who remain will be forced to travel to regional centres for employment and educational opportunities, so that the number of volunteers with the ability to respond rapidly to emergencies, especially during the day, will also be considerably fewer.

In the past, emergency service volunteers were predominantly employed in the 'blue collar' rather than the 'white collar' sectors. However, as Australia's economic reliance on the primary-based industry sectors continues to decline, the

emergency services may need to explore options for encouraging the involvement of more people from non-traditional sources in their voluntary activities.

## Key labour market participation trends

- More post-secondary qualifications are being attained
- Increasing numbers of women participating in the paid labour force
- People in full-time employment working longer hours
- Rising unemployment levels

## Implications of labour market changes for the emergency services

In recent years, there have been a number of changes in the nature and structure of paid work. Among the most prominent of these changes are rising unemployment levels and the re-distribution of employment opportunities.

With high unemployment levels particularly prevalent amongst low-skill groups, some commentators have suggested that these people may find meaningful activity and acquire skills through voluntary work (Curtis & Noble 1990; Rogers 1992). However, it is also recognised that volunteer work cannot fully meet the need and desire for full-time work that the unemployed seek. As such, the unemployed are likely to be a group which could view volunteering as a means of gaining skills and experience and, in doing so, improve their job prospects. Thus, unemployed people may well represent a resource base from which volunteers with a short-term, rather than long-term, commitment can be drawn.

In contrast, as the hours worked by those people who are highly skilled increase, it is likely that their availability to participate in extra-curricular activities and volunteering will decrease. Furthermore, this group of people may also be more geographically mobile which could limit their degree of involvement in, and commitment to, any one community and their voluntary activities.

## Key social trends

- Growing numbers of single parent families
- An ageing population
- Increased ethnic diversity

## Implications of social trends for the emergency services

It is widely recognised that the social fabric of the Australian community is rapidly changing. In many instances this is coupled with, or is the result of, a range of other global conditions. It is displayed most prominently in the make-up of

family units, the age structure of the population, and the representation of an increasing diversity of ethnic populations. So that, communities are becoming much more complex and volunteers are now serving a greater range of customers.

The increasing number of single-parent family units is likely to have ramifications for the emergency services. Clearly, organisations will need to address and demonstrate how volunteering in the emergency services could become a more viable activity and more attractive for these people.

The changing age structure and composition of the community is also likely to alter the delivery of volunteer-based emergency services. The impact of a large group reaching retirement age (and, increasingly, taking early retirement) is important as it may form a large pool of people seeking new opportunities for community involvement.

On the other hand, it is likely that there will also be fewer young people available for recruitment than in the past. In addition, those younger people who are available will probably encounter a range of economic challenges that will reduce their tendency to become volunteers. It is likely that those who are highly educated and skilled will be in increasing demand and working longer hours in the paid labour force, whereas those with limited skills may join a large, and growing, group of unemployed people within the community (McKenzie 1997a).

Increasing immigration rates will also pose a number of challenges for the emergency services, particularly those operating in the urban growth corridors. Among a range of other issues, people immigrating from other countries are not likely to have an understanding of the Australian environment and the conditions which are likely to expose communities to the risks of an emergency, or the volunteer culture, role and nature of Australian emergency services.

Thus, without careful consideration, the challenge of providing an effective volunteer-based emergency service to an increasingly diverse community may manifest itself in a variety of ways in the years ahead.

## State of volunteerism

Critical examination of the literature, review of current external trends and issues, and survey of volunteering in the emergency services, has revealed a number of features that characterise the current state of volunteerism within the emergency services.

- Delivery of emergency services in Australia is heavily reliant on the commitment of volunteers. Despite widespread recognition of this dependence, there is a lack of information on volunteers and the issues that impact on the volunteer culture.
- There is a poor understanding of the nature of change taking place in the external environment and volunteer membership does not reflect the diversity of the broader community.
- The internal reactive nature of organisational activities means that the emergency services are focusing on specific agency initiatives when greater integration and co-operation is required.

### Best Management Practice Framework

The information collected for the purpose of this research program was analysed and synthesised as a basis to identifying the strengths and weaknesses of volunteer-based emergency services. The current landscape of the sector is characterised by three distinct areas of emergency service activity: support, management and strategic activity.

**Support activity:** The provision of specific information, entitlements and role, support programs and services, internal and external advocacy.

**Management activity:** Resource management, organisational maintenance activities that are ongoing and maintain existing capacity, communication processes and representation in decision making.

**Strategic activity:** Research and development activities which monitor internal and external issues and trends that effect the organisation and the culture, and the relationship and recognition of volunteers and the organisation by key stakeholders.

Each have their own set of issues and can be described and contrasted on the basis of a set of relevant theoretical criteria. The activity groups can be contrasted on the basis of their function by examining the types of activities that constitute them. That is, they differ according to the nature of the contribution each makes to the state of the volunteer culture, and to the broader functioning and viability of the organisation.

### Implementation and impact

By contrasting their temporal and spatial dimensions, the activity groups can be contrasted on the basis of the implementation and impact of the issues with which they are concerned. That is, they differ according to the time and space

factors relating to their implementation, and the extent and nature of their impact.

### Complexity and risk control

Within each of the broad activity groups, three major levels of task are evident and each of these levels can be identified and contrasted on the basis of the complexity of the task and the associated level of risk (low, medium, high). This tends to be a product of the level of interaction involved in the task, the number of stakeholders involved, and the number of transactions between individuals and stakeholders.

These broad themes, and the issues within them, are presented in summary form in table 1 below. Under the three general activity headings, the three levels of task complexity (high, medium, and low) can be identified.

### National Profile of Volunteerism

The analytical framework developed during the course of this research provides a basis for assessing and discussing specific aspects of current organisational practice in Australian volunteer-based emergency services. It also helps to understand the extent and nature of organisational activity in relation to a wide range of issues that concern the health of volunteering, and thus organisational viability.

### Support

The current profile of volunteer support and management activities is characterised by an emphasis on programs that are specific in their formulation and delivery, and not part of an overall integrated management strategy.

The emergency services practice in the area of volunteer support is clearly not a priority.

### Management

There is a great deal of evidence to suggest that, in the past, the emergency services have been able to manage the daily activities of volunteers in a manner which has maintained reliable volunteer capacity and capability. However, some areas of concern are evident.

The emergency services do not appear to be carefully considering how capacity and capability can be maintained, despite their desire for more volunteers. Very few organisations know where their volunteers are recruited from, and what motivates them to join or to resign; and, more than likely, understand why people do not volunteer at all.

### Strategy

Despite widespread recognition that Australian emergency services rely heavily on the commitment of volunteers, there is a significant lack of strategic activity within the sector. This is evidenced both by the paucity of information on this subject in the literature, and by the research findings. While organisations around the world are coming to grips with maintaining an effective capacity and capability to deliver emergency services, there is limited information available to assist them to develop strategic responses to the environment in which they operate.

Thus, volunteer-based emergency services need to move beyond the current short-term focus on operational planning and decision making and pay more attention to longer-term considerations and the management of strategic activities in order to remain viable.

### Agenda for improvement

The best management practice framework provides a basis for assessing

Complexity	Support	Management	Strategy
Low	Information	Maintaining capacity	Internal assessments
Medium	Services	Maintaining capability	External assessments
High	Extension and advocacy	Communication and representation	Community links and recognition
Space	Individual volunteers	Groups of volunteers	Whole of organisation
Time	< 12 Months	12 Months-2 years	2-20 years

Table 1: Best management practice framework

current organisational and industry practice and a means of targeting future improvement strategies.

An assessment of current practice may include the following steps:

- Establish the current context and profile of organisational activity. This may require that a register of existing projects, programs, services, and products be developed. Current practice can be grouped according to the broad structure of the framework.
- Analyse the relative emphasis currently given to each activity group and its associated task areas, and the contribution each makes to the viability of the organisation and the volunteer culture. Emphasis can be determined at the basic level by the mere presence or absence of an activity, as well as by measuring inputs such as budget, resources and management commitment, and outputs in terms of numbers of volunteers trained and serviced by current programs.
- Assess the current profile against a best management practice framework. This 'audit' process will help to define gaps in current practice.
- Assess current activities and practices. This process will assist organisations to make more informed choices about how deficiencies in current organisational practice can be addressed. The broad guidelines below may be used to address identified gaps.

The activities and strategies that could be applied by volunteer-based emergency services to enhance volunteer management and support are perhaps more easily identifiable and justifiable when considered in planning and budgeting terms.

### **Volunteer Strategic Resource Management plan**

The platform for improvement to current practice should be a Volunteer Strategic Resource Management plan that defines program objectives, projects and practices and an implementation framework with immediate and long-term horizons.

Such a plan should seek to integrate all existing programs within the framework and document the desired profile of organisational activity. This should include objectives implemented through the planning and budget process. It should address each specific area of organisational activity, and document both existing and planned activities.

Strategies should also be established to monitor and review progress in each of these areas at timely intervals. A comprehensive evaluation process will ensure

programs continue to meet objectives through time. It should also allow for programs to be adjusted to reflect changing internal and external needs and operating environments.

### **Conclusion**

Clearly, the success and long-term viability of the emergency services will continue to depend upon the strength and commitment of volunteers. In the years ahead, the emergency services will need to ensure their volunteer base reflects the communities they serve. To achieve this, volunteer units must change, and therefore the organisations that support them must change. Those organisations that do not change risk their own survival and disconnection from the community.

It is intended that the information presented within this paper will assist volunteer-based emergency service organisations to implement appropriate strategies to manage change and ensure long-term organisational viability. However, it merely represents the initial step in what should be viewed as a much broader and longer-term agenda.

The greatest challenge now facing volunteer-based emergency services is a need to embrace prevailing change and establish priorities for action. The key to long-term viability will be dependent upon the emergency services ability to foster an environment of co-operation and develop a mechanism to facilitate inter-agency co-ordination.

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A comprehensive bibliography is available in 'Directions in Volunteer Development in Australian Emergency Services'. Copies can be obtained free of charge from Emergency Management Australia.

### **Disclaimer**

The information presented within this paper is a compilation of research findings sourced from 'Directions in Volunteer Development in Australian Emergency Services' (CFA, 1998). The views expressed are solely those of the

author and do not necessarily reflect CFA opinion or policy.

This paper was also presented at the 4th Annual Emergency Services Forum 'Volunteers in Emergency Services' July 21 & 22 1999, Sydney.

## **Revised drug donations guidelines (1999)**

**... now online**

The Drug Donations website has just made available the revised inter-agency guidelines for drug donations published by the WHO. The old document (version 1996) on the site has been replaced by the revised document and can be found at [www.drugdonations.org](http://www.drugdonations.org). You can also directly access these guidelines by going to: [www.drugdonations.org/eng/richtlijnen/eng\\_geneesmiddelen\\_donatiesrichtlijnen.html](http://www.drugdonations.org/eng/richtlijnen/eng_geneesmiddelen_donatiesrichtlijnen.html) (no frames).

### **About the Drug Donations Site...**

The drugdonations.org site was recently developed to raise awareness of the need to improve the quality of drug donations. The site was created by a consortium of European NGOs led by Wemos, a Dutch NGO. Besides guidelines on drug donations and medical services, you will find a checklist for good drug donation practices, provided as a practical tool for organisations that want to professionalise their donation practices. Information provided under the heading awareness raising and advocacy will assist organisations and persons that want to initiate education activities in their communities.

# The response to the 'mother of all storms': a combat agency view

## Introduction

Early in the evening of Wednesday 14 April 1999, a massive hailstorm struck the southern, eastern and inner suburbs of Sydney. It produced colossal damage and over the ensuing weeks turned out to be, in insured damage terms, the most costly natural disaster ever to have occurred in Australia's history. A massive emergency response was mounted, lasting several weeks and giving temporary protection to many thousands of hail-damaged dwellings. Six months later the permanent repair work was still being carried out and, while most roofs had been fixed, the repairs to a minority of difficult cases were not expected to be finalised until well into the year 2000.

## The storm and its impact

This storm was an unusually intense and long-lasting supercell thunderstorm (Commonwealth Bureau of Meteorology, 1999). It was first noted on radar at about 4.25pm at Berry, on the New South Wales south coast, and it tracked northwards through the Kiama, Albion Park and Shellharbour areas where it deposited hail in large quantities shortly after 5pm. Thereafter the storm moved out to sea, before travelling north and re-crossing the coast near Bundeena on the southern shores of Port Hacking, just before 7.30pm. From there it moved northwards

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across the Sutherland Shire, Botany Bay, Kingsford Smith Airport and Sydney's eastern and near-CBD suburbs, before crossing Sydney Harbour and the northern beachside suburbs. The centre of the storm moved out to sea in the vicinity of Broken Bay shortly after 9pm and had collapsed by 10pm, more than five hours after formation. The storm's path is shown on Figure 1.

The storm was principally a hail event although wind gusts of up to about 80 kilometres per hour were recorded at some locations. Individual hailstones 9 centimetres in diameter—the equal of the largest known to have fallen in NSW—were confirmed by the Bureau, and there were anecdotal reports of stones up to 13 centimetres in diameter (Yeo et al. 1999).

In temperate Australia, hailstorms have tended to be the most damaging types of storms experienced (Blong 1999). In this case, with giant hail falling over a sizeable and densely built-up urban area, the damage was particularly severe. The most serious damage occurred between Lilli Pilli (on the northern shore of Port Hacking) and Darling Point (on Sydney Harbour) in a band about 25 kilometres

and commercial premises, to public buildings (including many schools) and to facilities and aircraft at the airport. As far as is known only one death was directly attributable to the storm, although in the hours after the storm's impact, there was a sharp increase in the number of people presenting themselves at hospital casualty wards with injuries.

Most of the building damage was to residential property. Because of the impact of the hail on slate, fibro and tile roofs, many ceilings were damaged, with the result that wall cavities and household effects became waterlogged. Many houses were rendered temporarily uninhabitable although, as no trees were brought down, few were completely destroyed.

The most outstanding feature of the storm's impact was its scale. However measured, whether in terms of the number of calls for help received from the public, the number of houses damaged or the total dollar value of the damage sustained, this was not only the biggest storm ever experienced in the state's history but by far the biggest. The historical record is sketchy, but with the total cost likely to be in the order of \$2,200,000,000 (Emergency Management Australia, 1999, 9), the damage will probably be of the order of three to four times that sustained in previously worst known storms. These were the storms, that struck western Sydney in March 1990, and the northern suburbs in January 1991 and caused total costs of \$550,000,000 and \$670,000,000 respectively in 1997-dollar terms (see Table 1). The April 1999 storm damaged roughly ten times the number of dwellings that were hit in the 1990 event and three times those affected in January 1991. It really was 'the mother of all storms'.

## The response

The emergency services in the area of impact responded quickly. On the first evening there were 270 State Emergency Service personnel in the field, along with more than a hundred Rural Fire Service volunteers and New South Wales Fire Brigades employees. By the second day of the operation there were more than 850 personnel involved, most of them by this stage from outside the impact area,

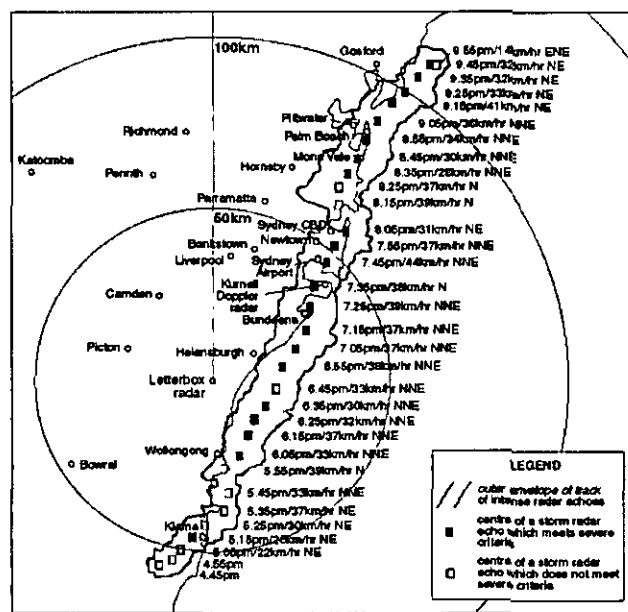


Figure 1: the storm's path

and the number was well over 1400 on the third and fourth days (the weekend after the storm). The SES alone had approximately 90 teams in the field by the second day – 30 more than were involved in the whole of the first two weeks of the response to the northern suburbs storm of 1991 – and this number was exceeded the following day. By then, personnel from 16 of the state's 18 divisions (regions) had been deployed, with nearly 600 SES people in the field at a time.

From the fifth day (the Monday after the storm) all SES divisions had despatched personnel and the rotation which was necessary to sustain what was to become a very long-lasting commitment was well established.

The New South Wales SES contingent was bolstered from that first Monday by SES volunteers from outside the state, beginning with a contingent from the

Australian Capital Territory. Later, SES volunteers from Victoria, Queensland and South Australia joined the effort.

Meanwhile the two New South Wales fire services maintained a strong presence throughout the first week and indeed throughout the three and a half weeks of the so-called 'emergency phase' of the response. There were also contributions, either during the early days or later, from the National Parks and Wildlife Service, the Volunteer Rescue Association, the ACT Fire Service and the Australian Army, not to mention the 'off-roof' contributions of the Police, the Ambulance Service, the Department of Community Services, the Wireless Institute Civil Emergency Network and the Royal Volunteer Coastal Patrol to name but a few. At times there were more than 3,000 people in the field, not counting the many individual volunteers, not connected to particular

agencies, who worked on sandbag filling and other tasks.

### The escalation of the task

This large-scale commitment, complemented by considerable operations centre and logistic support behind the scenes, was a response to what was known from the start to be a very large requirement. Within the first two days there were some 7,000 calls for assistance from members of the public, and this figure continued to escalate—not just for a few days but in fact for weeks. On the third day it passed 9,000, by day five it was approaching 12,000 and by the end of the first week of the operation it had exceeded 15,700. Eventually, the number of calls for assistance was to grow to more than 40,000.

The degree and longevity of this escalation in the scale of the task was

Date	Locations of major impacts	Principal contents	Economic cost (\$1997)	Main types of damage caused
Mar 18 1990	Western Sydney (Auburn, Bankstown and vicinity). Track was from Ingleburn to Narrabeen	Giant hail up to 8cm diameter, very strong winds, flash flooding	\$550 m	More than 2000 houses sustained window and roof damage; a wet and windy autumn exacerbated damage further over later weeks. Very severe damage to car yards, private vehicles and schools
Jan 21 1991	Northern Sydney (Turramurra, Pymble and vicinity). Storm tracked from Camden to Barrenjoey	Giant hail up to 7cm diameter, winds to 230kph, rainfall recorded of 35mm in 6 minutes and more than 60mm in 30 minutes causing flash flooding	\$670 M	More than 7000 houses damaged; 20 demolished; 200 public buildings damaged; severe access problems because of downed trees and wires
Feb 12 1992	Sydney (western and north-western suburbs)	Rain, wind; giant hail up to 7.5cm diameter, flash flooding	\$335 M	Approximately 500 houses damaged, most sustaining damage to roofs
Sept 28 1996	Armidale, Tamworth and large areas of north-west NSW (many separate storms)	Giant hail up to 8cm diameter, very strong winds, three tornadoes	\$340 M	Damage to cars, roofs of houses, CBD premises and institutions; significant crop damage
Nov 23 1996	Coffs Harbour	Up to 300mm rain in 2 hours, flash flooding, strong winds	\$ 20 M *	Over-floor inundation of residences and CBD shops; many vehicles and caravans destroyed
Dec 11 1996	Singleton and vicinity	Giant hail up to 7cm diameter, very strong winds, flash flooding	\$ 49 M *	More than 600 houses damaged in town; others in vicinity. Many cars and crops damaged
Dec 19 1997	Sydney (western and northern suburbs)	Wind, hail	\$ 40 M *	Trees and power lines downed; damage to houses and industrial premises
Aug 17 1998	Wollongong	Rain (200mm in 3 hours), flash flooding	\$125 M *	Heavy residential, commercial and institutional losses, many cars written off
April 14 1999	Sydney (inner, eastern, southern suburbs). Storm tracked from Bundeena through southern and eastern suburbs to Gosford	Giant hail up to 9cm diameter confirmed, reports of larger stones, some strong winds	\$ 2.2 B	More than 20,000 houses damaged mainly with roofs holed; more than 100 houses made temporarily uninhabitable; 40,000 cars damaged; numerous factories and public buildings damaged. Building damage exacerbated by windy and wet weather over following months

Table 1: severe storm events in recent NSW history

\* Insured losses only. Total economic costs would be much higher – possibly 3-10 times higher if ratios of insured loss to total loss as estimated by Joy (1991) for different hazards are used. Sources: Emergency Management Australia (1999); unpublished records of the Commonwealth Bureau of Meteorology, State Emergency Service and Insurance Council of Australia.

unprecedented. In past storm events in New South Wales the size of the job was basically known within two or three days. The 1991 northern suburbs storm was slightly unusual in that damaged houses and their occupants were still being 'discovered' a week later, but in that instance many roads had been blocked and telephone lines brought down by fallen trees. In 1999 neither access nor telephone communication was a serious problem except for some congestion of telephone lines in the first few days, but the size of the task continued to grow relentlessly and for a very long period.

Several factors contributed to this. Among them were the demographics of the impact area, where a high proportion of the population is elderly and/or does not speak English and where many people had little awareness of the help available from the emergency services. The fact that many people put off calling the SES because they thought their problem was not sufficiently severe (or reported their difficulties only when they encountered response crews in the street), was also influential, as was the fact that there were two episodes of quite severe wet and windy weather in the fortnight after the initial storm. This last factor may be particularly important: it had the effect of 'flushing out' people who had not realised they had a problem, usually of cracked tiles rather than actual holes in the roofs, until the rains began. It also created a number of completely new tasks which were unrelated to the original storm but which inevitably became lumped in with the general response.

The continued escalation in the number of tasks under these circumstances calls into question the notion that people calling in to report their needs should be treated as the primary means of determining the nature and scale of the job to be done. That said, it is also clear that reconnaissance would equally not have given an accurate picture of the whole requirement immediately after the event. Road and air reconnaissance were carried out from the beginning but many tasks involving cracked roofing tiles could never have been picked up by these means and only became obvious with later rain. Such cracks could only have been found by people inspecting roofs up close, which is only possible at the level of the individual householder. Some of the jobs that were eventually dealt with by the emergency services were in fact only discovered well after the storm when large areas were 'swept' by doorknock teams staffed principally by the Rural Fire Service and

covering much of the impact area.

The real size of the task to be managed could not have been known within the first day or two. This event was not like an aeroplane crash or a landslide in the sense that the scale of the task in such events is usually easily visible and cannot grow significantly after first impact. The problem in April 1999 was quite different. Nevertheless the fact that the impact had been huge was quickly appreciated and it was known within the first few hours that a very large response would be required. A media release issued by the SES on the afternoon after the storm noted that the job could be as big as in the 1990 and 1991 cases, and at a press conference the next day the Director General of the organisation suggested that it would in fact be larger. Just how much larger it would eventually be could not at that stage have been foretold by anyone: three weeks later, new tasks were still being notified.

#### **Media reactions and the question of army assistance**

The question of the adequacy of the early appreciation of the scale of the task is important because it bears upon the reaction of some sections of the media and the public to the nature of the response operation. Within the first two days the potential role of the army was being actively canvassed on radio and in the press, and before long an insistent call for the army to be brought in had developed. At the beginning this was resisted on several grounds, among them the fact that the state's resources were far from exhausted or proved inadequate (a condition of Commonwealth assistance in emergencies), the knowledge that the army was a relatively small resource by comparison to that which the front-line services (the SES and the two fire brigades) could call upon, and the fact that few army personnel were trained for the sorts of work required in this operation. By contrast SES volunteers routinely train for storm damage control work, and most have considerable experience of it given the frequency of storm activity in the state. Nearly half of the work done by the SES relates to severe storm activity, in fact, and includes as a central element the placing of tarpaulins on roofs.

New South Wales Fire Brigades personnel also have considerable relevant training, as do many of the members of the Rural Fire Service. Both these agencies regularly support the SES in storm damage operations and have done so for years. Moreover, the equipment their crews

carry is suited to the task and they require less equipment support from the SES than do other agencies.

Clearly, the army could not have been brought in during the initial stages of the operation. It could not have been demonstrated within the first two or three days that the state's resources were exhausted or inadequate, and in any case the army is unable to deploy as quickly as the front-line services regularly do. Before the first week was over, however, with the escalation in the number of jobs clearly far from tapering off, the front-line services being bolstered by out-of-state assistance and the weather being forecast to turn against the operation, the decision to request the deployment of army personnel was justified and was made.

By this time, however, the perception had been created in the minds of many that the failure to call in the army at the very beginning indicated that the response was insufficient. There appeared to be a belief in some media circles that the army represented 'professional' support which would be able to do what the volunteer resources of two of the three front-line agencies could not, and a conclusion was drawn by many that the problem could not be solved quickly **unless** the army was brought in. The reality was quite different, of course. The entire army strength in New South Wales is of the order of 4,000 personnel, which means that it is smaller by far than the State Emergency Service, the New South Wales Fire Brigades and the Rural Fire Service **individually**. Indeed the entire armed services of Australia, including the air force and the navy, would be able to call upon fewer people than these three agencies taken together can claim in New South Wales alone. During the operation more than 12,000 people were involved, of which fewer than 700 came from the army.

The army's contribution was most welcome and was very valuable. It could never have been the critical element in the response, however—it is not the large-scale resource, always available to help the civil community, that sections of the media portrayed it to be. It must also be noted that what was supplied was a disciplined workforce rather than a workforce which came already skilled in the particular areas required by this operation. The majority of the personnel deployed were artillerymen and infantrymen who had to be given basic training in roof-covering methods and on-roof safety by SES officers before they began to work. This training had to be repeated

on most days as new army personnel were brought in to the operation, and most of the necessary equipment had to be supplied to them.

Part of the pressure to involve the army in the early stages of the response reflected an understandable concern that all possible resources should be applied immediately. To finish the task speedily is a commendable goal, of course, but it cannot be accomplished merely by throwing resources willy-nilly at the problem: doing that risks a loss of co-ordination with regard to equipment and tasking, the development of supply glitches in relation to materials, and the potential for the response to exhaust itself before the job is completed. There were, in the first few days for example, some difficulties with regard to the supply of tarpaulins. Under the principle of 'just-in-time' management, large stocks are no longer routinely held, and had there been more responders in the field during the first two or three days they would certainly have run out of tarpaulins to place over damaged roofs. Other stocks would also have been threatened with exhaustion.

From the start, the response that was organised was the largest one possible. The limiting factors were not those relating to numbers of personnel in the field but to their effective resourcing and co-ordination. The response could not have been larger even if the full size of the task had been known with precision on the first day.

In truth there was some naivete in parts of the media about what could be achieved by the emergency services and about the army's capabilities. Many unrealistic expectations were created in the public mind, among them the notion that the task would be completed quickly **only** if the army was called in. The emotion that was generated by this demand was further fuelled by journalists' discoveries of a number of elderly people in the impact area who had apparently 'fallen through the cracks' and whose houses had not been seen to as quickly as would be desired. Sadly, it is impossible when dealing with a massive response task to guarantee that such cases will never arise. When disasters occur the environment is in a sense turned upside down and problems develop in trying to right it: when the storm is the worst ever experienced it is to be expected that the fix will be an unusually difficult and time-consuming one to accomplish.

Not all of the comments in the media were critical of the response effort and

its management, of course. There was widespread recognition of the great scale and complexity of the task, most newspaper and radio comment was supportive, and the SES received a good deal of favourable publicity. About 80 per cent of the news items generated, in fact, were assessed as being favourable to the SES, but some of the remainder were hostile and damaging.

The first week of the operation was successful notwithstanding the fact that many people's needs could not be serviced immediately. Before the weather broke on day seven, the vast bulk of the emergency task appeared to have been done. In fact, 12,500 dwellings of the 15,700 known to be in need of treatment by the end of the first week of the operation had been attended to by that time despite the insistence of some sections of the media that the operation was going far too slowly. Then strong winds ripped tarpaulins and loosened ropes, necessitating hundreds of call-backs to jobs completed earlier, and heavy rain caused renewed water damage and compounded the misery of those whose houses had not been given protection.

The deterioration in the weather ensured that the 80 per cent clean-up rate which had been achieved at the end of the first week would not be reached again for a further two weeks. As it happened, the completion rate of the first week represented a far higher level of 'productivity' than was achieved in earlier responses to severe storms in Sydney.

The media clamour had several consequences towards the end of the first week. One was the introduction of a new control arrangement—the Commissioner of the Rural Fire Service being brought in to effect forward control at the tactical level and to establish and lead the multi-agency daily briefings which had not been held during the first few days. These changes caused some confusion as regards who was actually controlling the event, which itself led to uncertainties about the management of information flow and to some loss of morale on the part of SES volunteers in the field. The change in management and the deterioration in the weather made for a difficult few days in the second week—including the management of the now large-scale need to revisit work which had previously been done and the renewed growth in the number of tasks coming in. The SES, incidentally, retained strategic operational control and continued to supply the materials for roof-covering work to all the agencies working in the field.

The emergency response continued at a very high level of commitment of personnel for a further two and a half weeks after the introduction of the Commissioner of the Rural Fire Service. By the end of that time the vast bulk of the task of covering roofs had been completed although in the inner city some difficult cases of steeply pitched and high roofs remained unfinished. From this point the focus switched to a recovery effort co-ordinated in the first instance by the State Recovery Committee which had been established within the first few days of the operation and which had the task of managing the permanent repairs.

Patrols of the storm-hit areas continued for most of the winter, however, the inevitable bouts of windy weather periodically loosened and ripped the tarpaulins, allowing further water entry when rain fell. Unfortunately, the late autumn and winter months were both windier and wetter than usual in Sydney. SES teams from various parts of the state, including Sydney, kept up with the tasks of patrolling the damaged areas and attending to the re-fixing of tarpaulins as the need arose.

### **Lessons learned**

All large and complex operations create difficulties which are not fully foreseen or which are not managed perfectly, and there are inevitably opportunities to learn from the mistakes or organisational deficiencies which are exposed. The debrief process after the emergency response phase of this event generated several recommendations applicable to the SES as the relevant combat agency, and to the state's emergency management structure. Space does not allow these to be dealt with exhaustively here, but some comment can be made on the key issues as they relate to the combat agency.

One of these issues relates to dealings with the media. Today the media spotlight is harsher than it has ever been, weaknesses or alleged weaknesses are quickly discovered and misunderstandings of complex matters are broadcast as fact. These things being so, the management of the media must be given a high priority. If this is not done effectively the core business of the operation, in this case the fixing of tarpaulins to roofs, can be derailed to the detriment of the victims of the disaster.

The SES in New South Wales was not well placed here. It has no specialist media staff, much less a media cell, and as a result it was unable to effectively counter the line that by failing to bring in the army it



was ignoring appropriate professional help and under-responding to the severity of the situation. In some sections of the media this appraisal became an axiom and, because it was not countered, it took root in the public mind. There was no clear public explanation of the reasons why the army could not have been introduced at an early stage, and garbled media explanations of matters relating to command and control (as outlined in legislation and in the State Disaster Plan) went uncorrected.

Criticisms of the SES's Director General on radio and in the print media and of some volunteers on talkback radio became a distraction and had a negative effect on the morale of volunteers in the field. Having a properly trained and staffed media unit would have allowed the organisation to service media enquiries more effectively and perhaps to dispel some of the criticisms that were levelled. There is a real risk, if media misunderstandings (as distinct from fair criticisms) are not corrected, that emergency service organisations will be forced to run to a media-created agenda with regard to operational decision making. If this is allowed to happen there are likely to be serious problems in relation to appropriate resourcing and deployment decisions.

Along with the media staff there will need to be a clear media policy which sets out how information is to be provided to media organisations and the community. There will also need to be appropriate training and support for those who can speak for the SES at different levels—state, regional and local.

Gaining a clear understanding, early in the event, of the scale of the task to be managed was a problem which raises questions about the means by which assessments are made. The number of calls for assistance in this instance failed to give a complete picture at an early stage, and improvements can be expected if the SES is made easier to contact. A single call number, linked to a commercial call-taking facility, would be appropriate and is being established. This number will need to be advertised, and the promotion of it will help establish the SES in the public mind as the relevant agency to call if storm damage has been sustained. At present, many people appear to be unaware of how to seek help.

Other means of determining where and how serious the needs are will also be necessary, however, and the SES is re-examining its procedures with regard to the carrying out of reconnaissance.

Emphasis needs to be increased, in SES training, on the importance of reconnaissance during storm operations, and in addition the organisation will have to look at obtaining external assistance with the reconnaissance task.

It may be that more aerial reconnaissance at an early stage would have been useful in this instance, but it must be said that this is most valuable when there are many trees down and roads are impassable, or when the damage to structures is obvious enough to be visible from a distance. While many of the roofs holed in this storm were visible from the air, others were damaged in ways that could not have been seen except by up-close inspections by people standing upon them.

These problems notwithstanding, increased use of aerial reconnaissance will be necessary. There will be difficulties, however, if it proves impractical to train SES personnel to become proficient aerial observers able to provide accurate assessments of impacts. External helicopter operators, including the Police Air Wing, may constitute alternatives.

The recruitment of neighbourhood-based wardens has also been suggested. Such people would be useful in reconnaissance and reporting as well as in providing advice to response teams and assisting with task allocation. Warden systems are, however, difficult to maintain and if they are to be organised effectively they will need to be linked with existing community-based initiatives such as Neighbourhood Watch or the Safety House Program. Sponsorship will be necessary to establish the credibility of any such system and to publicise its existence.

One of the shortcomings of the SES has always been the quality of its operational facilities in the Unit Headquarters that operate at a local level. In some of the more densely populated areas of Sydney, including the area that was hit by the hailstorm, this problem is especially acute. Some of the present headquarters are simply old houses located on noisy, congested city streets with no on-site parking and inappropriate internal spaces for the management of operations. A much-improved building subsidy scheme is needed here, along with improved provision for operations centre equipment including computers and appropriate operational software to allow for a more efficient and standardised collation of incoming information.

Better accommodated and better equipped SES units will not only be able

to operate more effectively, of course; they will also be better placed to recruit new members than will units with overcrowded and badly equipped facilities.

The storm also proved the importance of having high-quality and standardised operational procedures. In big events, where out-of-area assistance is vital, it is important that people operating in an unfamiliar environment are able to function effectively. Training resources which have been prepared by the SES on themes such as working in an operations centre will help in establishing standard procedures. Standardised operations centre equipment and fitouts will also be helpful in this regard.

Standardisation issues arose in various contexts: another was the difficulty that was experienced at an inter-agency level in managing the vast amounts of data coming in from the field. The three front-line agencies had non-compatible data transfer and data representation technologies and had to decide quickly on a standard system to permit integration. Since the storm, a whole-of-government approach to the spatial display of information has been adopted and protocols are being developed for a more coherent integration of operational information in the future.

## Conclusion

By the standards of previous storm responses, the response to Sydney's most damaging storm event ever was an effective one. It started quickly and was sustained for a long period of time under difficult circumstances involving strong media criticism and weather that made operating on roofs unpleasant and sometimes dangerous.

There were, of course, mistakes made, but the SES volunteers and the personnel of the many other agencies involved can be confident that they performed with great credit to themselves and their organisations. The response was a real test of training, of management procedures and of personnel: quite possibly it was the biggest test the SES has ever had in New South Wales.

If, in the aftermath, the SES is made more easily contactable, can manage the media more effectively, is more able to determine the scale of the task at an early stage and can overcome operational shortcomings produced by deficiencies of accommodation and equipment, the result will be an improvement in the organisation's ability to respond effectively when future storms strike.

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# The On-Line Graduate Program in Community Development (Emergency Management/Human Services) at Southern Cross University

The School of Human Services at Southern Cross University, New South Wales, Australia, is currently developing the following courses for delivery:

- **Graduate Diploma in Community Development** (*Emergency Management/ Human Services*)
- **Masters of Community Development** (*Emergency Management/ Human Services*)
- **Graduate Certificate in Community Development** (*Emergency Management/ Human Services*). This course will be available as an exit point from the Diploma program if required.

The courses offered through this program are unique in that they emphasise community development principles in both the human services generally and in emergency management particularly. The emergency management strand's community development approach is aligned with the United Nations' current focus on disaster mitigation through community development rather than on merely logistics-based response. Traditionally both undergraduate and postgraduate courses within Australia and beyond have considered emergency management primarily from an immediate 'response after the event' approach.

This program offers students the opportunity to look beyond that 'how to' approach and to consider the community itself as fundamental not only to appropriate response to disasters but as integral to planning for emergency management and for human services generally.

The design of this program is also unique. It is tailored

specifically to on-line delivery. This means that each unit will include the most recent information through Web materials that are constantly updated. Students will be able to interact both with this exciting material and with their fellow students and lecturers. Because students will be located around the world, individual students will have a unique opportunity to network and 'chat' with others currently working on the front lines of emergency management and community development on a global level. Because of this design, participants must have access to a computer with a CD drive and to the Internet.

## For more information

More information, a list of core curriculum courses, and a list of courses available in the first trimester 2000, are available from the program's Web site at: [www.scu.edu.au/emonline](http://www.scu.edu.au/emonline).

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# The Sydney hailstorm: the insurance perspective

## The hailstorm

During the early evening of April 14, 1999 a severe hailstorm swept north across the eastern edge of Sydney causing extensive damage to homes, businesses and vehicles. Hailstones up to 9cm in diameter were reported. The hailstorm occurred within a thunderstorm that formed to the South of Sydney and effected almost the entire eastern seaboard suburbs of Sydney.

The maximum hailstone size, the resultant damage, the season and timing of the storm occurrence, as well as other circumstances associated with the storm development made this event exceptional.

Much of the hail was similar in size to tennis balls. One report suggested that the amount of hail that fell on Sydney during the storm was of the order of 500,000 tonnes. The thunderstorm was accompanied by strong winds and rain. The latter being a major cause of loss due to water damage to internal linings and contents of dwellings.

Following its development about 150 km south of Sydney, the initial storm cell moved northward parallel to the coastline and mostly over the sea, only to change its track slightly inland south of the metropolitan area and to strike the coastal suburbs of Sydney at about 8pm. The major storm cell located over the south-eastern suburbs of Sydney was followed by a second storm, which passed over the city two hours later.

The April hailstorm occurred at a time of year characterised by low hailstorm activity. Most hailstorms in the Sydney area can be expected during the months of late Spring and summer, while the maximum monthly hailstorm frequency is usually reached during the month of November.

Moreover the storm developed very late in a season that was marked by a substantially below normal number of hailstorms, and occurred very late in a day that was not marked by any extremely unstable atmospheric conditions.

## The damage

While it is still too early to report on the final outcome of the insured loss, our current estimates have revealed that some 43,900 residential claims for building and

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contents have been submitted for an estimated payout of \$422 million. Motor vehicle damage has been substantial with some 61,700 claims being reported for an estimated payout of \$409 million. In addition, commercial claims for retail and industrial property damage and business interruption claims total 5,810 claims for an estimated payout of \$413 million. There are claims for damage to

The maximum hailstone size, the resultant damage, the season and timing of the storm occurrence, as well as other circumstances associated with the storm development made this event exceptional.

aircraft which are in the order of \$100 million and some 60 marine craft were damaged which will produce claims totalling around \$300,000.

Overall this event has produced insured claims in excess of \$111,500 and we are confident that the overall insured loss will exceed \$1.5 billion.

The total damage to public buildings is estimated at \$45 million with the principal damage being:

- Department of Housing: \$15 million
  - Department of Education: \$9 million
  - Department of Health: \$5 million
  - State Rail Authority: \$10 million
- (48 government schools suffered damage in the storm)

While there is no question that the Sydney hailstorm of April 14, 1999 now figures as the largest insured event in our industry's history in terms of the total number of claims produced and the

expected payout of in excess of \$1.5 billion, it must be remembered that if all of the damage caused by Cyclone Tracy in Darwin in 1974 had been insured with the insurance industry, that event would continue to hold its place as the most significant natural disaster. Some 10,000 homes were totally destroyed in Darwin as well as some 10,000 motor vehicles. While our industry paid out a loss of about \$900 million in today's values, the loss to Commonwealth Government property including government houses was many times that figure.

## Hailstorm disaster response and recovery

The New South Wales Government declared the event a disaster and established a State Disaster Recovery Coordination Committee to bring together the key agencies and non-government organisations. These included:

- Premier's Department
- Treasury
- Departments of Community Services, Housing, Public Works, Fair Trading, Office of Emergency Services
- Effected local Councils, principally Botany, Marrickville, Randwick and Woollahra
- Insurance Council of Australia
- Members of other non-government organisations such as the Master Builders Association, Housing Industry Association and small business.

The Government opened a Disaster Recovery Co-ordination Centre as a 'one stop shop' at Randwick Racecourse to assist residents effected by the storm particularly elderly residents and those from a non-English speaking background.

The emergency response effort immediately following the hailstorm resulted in the deployment of over 200,000 tarpaulins at a value of some \$10 million, over 280,000 sandbags and 9,600 km of rope, safety equipment, hardware tools and equipment hire worth over \$2 million.

In the initial response period over 44,000 calls for assistance were attended to involving around 20,000 premises. In the first four days alone over 4,000 houses were covered with tarpaulins (tarpred).

The government agencies and chari-

table organisations that participate in the NSW Disaster Plan have already expended some \$50 million in responding to this event, that figure is most likely to grow.

The hailstorm called for the largest deployment of aerial appliances (cherry pickers) for a single event in the world. There were 17 aerial appliances supplied by NSW Fire Brigades complemented by a further 25 provided from private commercial firms.

Some interesting issues developed in the response phase. For example many of the Rural Fire Service volunteers had never been to Sydney before and were working in an environment ie. densely populated suburbs, with which they were completely unfamiliar.

The number of people engaged in the response was huge:

- NSW Rural Fire Service Volunteers: 5,006
- NSW State Emergency Services: 2,500
- NSW Fire Brigades: 2,850
- NSW Parks and Wildlife: 750
- NSW Ambulance Service: 699
- Australian Army: 650

*(These numbers include those from country NSW and interstate.)*

These emergency response personnel although extremely highly trained in storm damage response, had to operate under extreme climatic conditions. During the actual thunderstorm and in the weeks following the high impact area of southern Sydney experienced driving rain and very high winds averaging 40 knots but gusting up to 100 knots.

### The recovery

On April 23, 1999, the Minister for Emergency Services established the Southern Sydney Recovery Task Force to undertake the recovery phase of the relief effort. The overall objective of the task force is to facilitate and coordinate recovery works for all properties damaged by the hailstorm as quickly and efficiently as possible.

This involved:

- prioritising households according to the degree of damage and household status and directing resources to deal with the most needy cases first;
- providing weatherproofing and essential power to uninsured properties;
- facilitating and coordinating recovery works of insured properties according to priority; and
- working with industry to improve the supply of critical materials and resources.

The Task Force has substantially completed a thorough process of visiting all known effected properties and veri-

fying data supplied by State Emergency Services. As a result of this process the Task Force has currently identified 20,831 residential properties effected by the storm. Detailed information on each property is held and maintained in an electronic database. Recently, to complete the verification of the database, a comprehensive aerial survey was undertaken and aerial photographs have been reviewed to monitor progress and identify properties not kept in the database through the household visit process.

Roof repairs have now been completed to more than 81% of the effected properties. The vast majority of these repairs have been repairs to insured properties where the Task Force has carried out a facilitating and coordinating role.

Urgent electrical repairs have been addressed using the resources of Energy Australia and the National Electrical Contractors Association (NECA). To date, 1715 properties with unsafe electrical problems have been made safe.

**The hailstorm called for the largest deployment of aerial appliances (cherry pickers) for a single event in the world. There were 17 aerial appliances supplied by NSW Fire Brigades complemented by a further 25 provided from private commercial firms.**

### Roofing materials and labour

The high impact areas, which comprise the suburbs of Botany, Marrickville, Randwick, Southern Sydney, Sutherland, Waverley and Woollahra, are older, relatively affluent, medium density suburbs. Houses in these areas, most of which pre-date the 1930s with some being turn of the century and older, are predominantly roofed with terracotta tiles, while many of the older industrial buildings have asbestos fibre-cement roofs. Both of these materials are very brittle and perform poorly under the impact of large hail. As a result most buildings in the severe hail effected areas suffered significant roof damage with consequent water damage to contents.

The amount of roofing material needed to weatherproof the damaged properties is staggering. For example about 12 million

terracotta tiles are required equal to about 1 million square metres. Terracotta tiles are the predominant roofing material being of the order of 72%. Concrete tiles make up 13%, metal roofs 11% and slate tiles about 4%.

The duration of the recovery works will be principally governed by the capacity of industry to supply terracotta tiles, slate, roof tilers and slate fixers. The Task Force has continued regular discussions with the main roof tile manufacturers (CSR and Boral) the Master Roof Tilers Association, Slate Importers and Slate Fixers to improve the supply of resources.

Terracotta roofing work was initially completed using tiles supplied from the stockpiles maintained by the major suppliers, which were very quickly depleted, and more recently from accelerated production at plants located in both NSW and Victoria.

Recent supply has not satisfied demand, lead times for tiles has increased to 8 weeks, and some suppliers have taken steps to import tiles from elsewhere. For instance CSR made arrangements to import 2 million tiles from Western Australia and a similar number came from Victoria.

Although comprising only 4% of the damaged roofs, the need for an abnormally large quantity of slate to be sourced and then imported from overseas, mainly from Wales, threatens to prolong the recovery effort well into 2000.

The Task Force has identified 23 slate roofing companies that are currently working in the hail-effected area with a workforce of some 100 slate fixers including tradesman from Queensland, Victoria and the United Kingdom. About 95,000 square metres of slate roofing needs to be repaired.

Many of the monumental buildings such as government building, churches and schools in the area have high angle slate roofs and there are some 700 houses with slate roofs that have been hail damaged.

### Damage to motor vehicles

Because of their older nature, many of the dwellings have limited or no space for garaging cars undercover, resulting in a high proportion of vehicles being parked on streets. In the affluent suburbs many of these vehicles were of relatively high value. Most of the uncovered vehicles in the severe hail effected area were damaged with broken rear windows (toughened glass), cracked or broken front windscreens (laminated glass), and denting of the metal bodywork.

The main motor vehicle insurers established storm damage assessing centres to enable motorists to obtain drive-through assessments. These special centres were very effective in removing the storm claims from the normal workflow and speeding up the assessment process.

Assessing and claims staff came from as far afield as country New South Wales and all other mainland states to contribute to the task of managing the volume of claims that followed rapidly on the heels of the storm. In one case assessors saw a car roof where the steel had actually been split by the force of the hailstones.

Written-off vehicles, which accounted for some 25% of the assessments, were disposed of through auction centres and although the incidence of suspected fraud cases of manufactured hail damage was as high as 10% in the first week following the hailstorm, this figure dropped to 1% three weeks later following public warnings, media coverage and a high level of detection. Notwithstanding that, fraudulent claims have amounted to many millions of dollars, the most serious of which have been referred to the NSW Police Commercial Crime Agency.

### **Insurance Council of Australia's role**

ICA implemented its normal disaster response role the morning after the hailstorm and attended to a large number of media inquiries, and assisted State Government Departments and Agencies as a member of the NSW Disaster Plan.

ICA advised the Premier and the Minister for Emergency Services on the response they could expect from insurance companies, and was invited to, and joined, the Government's Hailstorm Recovery Co-ordination Committee and the Southern Sydney Recovery Task Force.

Industry meetings of claims managers and loss adjusters were held on a regular basis and several special meetings were conducted to enable the CEO and his senior officers of the Southern Sydney Recovery Task Force to brief the industry on project management issues being facilitated and coordinated by the task force.

ICA's role will continue well into the year 2000 because there is a determined effort to have all but the most serious or difficult residential cases finalised before the start of the Olympic Games. However, some of the major insurance companies have indicated that their time lines extend out to between 3 and 5 years. It must be remembered that there is a continual

inflow of new claims and this event has a substantial IBNR<sup>1</sup> (Incurred But Not Reported claims) factor involved.

### **Insurance Enquiries & Complaints' role**

The Insurance Enquiries and Complaints Ltd (IEC)<sup>2</sup> became involved in the very early stages and supplied a representative to attend on a daily basis at the NSW Department of Community Services 'one stop shop' located at the Randwick Racecourse. This assisted people who were making inquiries about their insurance even to the point of simply finding out with whom they were insured.

### **A big undertaking for the insurance companies**

The Sydney hailstorm came at a time when insurance companies were still attending to claims arising from the series of severe storms and floods that had occurred around Australia, notably Townsville, Katherine and Wollongong. It can be fairly said that the hailstorm has taxed insurance companies' resources as well as those of loss adjusting firms.

In spite of the obvious strain, insurance companies moved quickly to establish their response under their own internal disaster plans. Typically these disaster plans saw the deployment of staff and resources to special operation rooms, the development of special public relations response, purpose designed communication strategies to assist their customers, intermediaries and their own staff, the briefing of strategic partners such as loss adjusters, builders and consultants etc., the establishment of special IT resources (a very critical element in any disaster plan) and the establishment of liaison lines with ICA and the rest of the insurance industry.

Some of the issues that insurance companies had to immediately find solutions to were:

- repair versus replacement
- materials matching
- alternate repair methods
- resource issues
- fraud: insurance companies had to contend with compliance issues. For example:
  - very few of those insured who brought in their own contractors verified the credentials of the contractors;
  - very few contracts were in place for damage above the compliance minimum of \$200
  - there were numerous breaches of

the 'Home Owners Warranty Scheme' for work above \$5,000;

- there was non-compliance of the prescribed payments system;
- there were many cases of local governments not being approached for development consent.

Insurance companies were concerned with the capacity of contractors. It seems that contractors were driven by the need to maximise work and simplify repairs. This meant that contractors were endeavouring to replace rather than repair; in other words quoting to repair but costing on replacement. There were many cases of inadequate description of work to be undertaken and numerous examples of work being included in a quote that was unrelated to the damage.

Repair quality was impacted by three elements:

- non recurring work
- short term opportunities
- owner's inexperience

In the latter respect a lot of homeowners are exposed to quality issues if under duress and inexperience.

One of the causes of complaints from owners was the fact that some repairers were causing further damage, for example to landscaping, which may have been undamaged and or not insured.

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### **Notes:**

1. IBNR stands for 'Incurred But Not Reported claims'. It is an essential element in an insurance company's estimation of its future liability for a claim or series of claims. For example, a house roof may have suffered damage in a storm but the householder did not know about the damage until the roof started to leak some time later. A claim is then submitted. Based on experience, most insurance companies would allow for an IBNR of 20% or more depending on the class of business. Liability insurance has a much higher IBNR factor because of the so-called long tail to the claims.

2. The IEC is the Insurance Enquiries and Complaints Ltd a company established by ICA and the industry to provide consumers with access to alternative dispute resolution at no cost and also to deal with general enquiries about insurance.

# New Books

## Living with Drought. Drought Mitigation for Sustainable Livelihoods (1998)

When Central Queensland University and Charles Sturt University commenced an RIRDC funded project 'Farm Families Experience of the Drought of the 1990s' (RIRDC 99/14) in 1995 - there was little or no literature, either Australian or international, about drought and its impact on communities. The decade long drought in eastern Australia changed that—there is now a body of work associated with the impacts of that drought on the environment; on primary production; on families and on communities. While we tend to think of drought as an Australian phenomenon, other continents experience it too—and in the southern portion of Africa their own drought experience particularly close to our own.

This package—produced as part of an educational strategy by the Southern African Development Community—includes a video-cassette with three short films and a text book which supports the visual material and offers background information and work shop opportunities.

The book identifies that 'recurrent drought is a normal part of life and living in southern Africa', and the video shows graphically how various communities within southern Africa attempt to manage the impact of this challenging phenomenon. However rather than just focussing on the impact - the package attempts to teach what are called 'mitigation strategies', that is, identifying opportunities to plan ahead, rather than just accept each drought as it comes and then forget it when the rains bring relief.

The package 'aims at complementing other disaster management training materials and is therefore directly aimed at a broad cross section of the community. Its purpose is not simply to teach but also to develop participatory learning models among all stakeholders in order to support sustainable development, and to allow those communities impacted to maintain their relationship with the land they own and farm. There are some tensions obvious among these stakeholders—as indeed in any discussion about environment/production—but the video attempts to present the views of all the people and focuses particularly on one drought mitigation success story—the Banga Dam project. Here it shows 'how the partnership between a community and different extension services can strengthen livelihood security by incorporating local knowledge and sound natural resource management'.

It is always useful to learn how similar challenges are being met by other cultures, and in this example, extension personnel, policy makers, field staff, farmers, graziers and Landcare personnel (indeed any one who is or has been touched by drought) would find the package both informative and useful.

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The book and video are available from Intermediate Technology Publications, 103-105 Southhampton Row, London WC1B 4HH, UK.

Email orders from: orders@itpubs.org.uk or in the US from Stylus Publishing LLC, 22883 Quicksilver Drive, Sterling, VA 20166-2012. Email: Styluspub@aol.com. The price is US\$35.00 or £19.95.

## Disaster-induced Employee Evacuation

by Thomas E. Drabek

Published by the Natural Hazards Research and Applications Information Centre, Institute of Behavioural Science, University of Colorado.

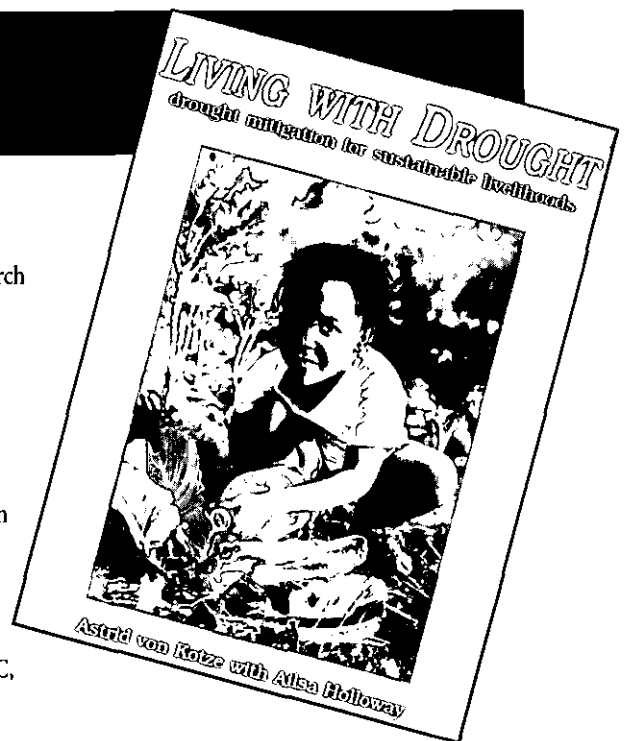
Thomas Drabek has produced for us another advance in researching disasters. Building upon his previous work titled *Human Systems Response to Disaster*, Drabek continues to focus upon understanding human behaviour within organisations when confronted with a potential or real disaster event. The results of his research follow on from interviews conducted with 23 Federal, State and local emergency management managers, interviews with business executives and employees, and an extensive questionnaire. As outlined in this study, Drabek uses seven disaster events, which have occurred across 12 communities. He focuses on the affect these events had on the employees of some 118 businesses.

Drabek establishes excellent comparative criteria for these events. This provides him with good data on which he bases his conclusions.

Using terms like 'Uncertainty of Forewarning', the 'Magnitude of Impact' and the 'Accessibility of Escape Routes' Drabek is able to provide good comparisons related to 'similarities' and 'differences' that arise from the seven disasters studied. Students and practitioners of Emergency Management in Australia, who need to understand more the employees behaviour when faced with the need to evacuate, will find this publication an excellent source of data.

For example, I found it of interest that of the 406 employees involved in this current study, 92% had some prior disaster experience which had triggered a workplace evacuation. 40% of the interviewees had also evacuated from their home because of a prior disaster.

However, according to Drabek's research, only



27% of the 406 employees claimed that they had received some form of disaster training at their place of work. Drabek provides an analysis of workplace training and its effectiveness.

What can we learn from this publication? That will depend on your understanding of both the 'theoretical' and 'behavioural' concepts used by the author.

Thomas Drabek provides us with good discussion on the results of his research. He uses responses from his interviews and the questionnaire to predict employee behaviour and document their concerns.

While based upon disaster events that have occurred within America, his work none-the-less proves a rich source of data for those involved in emergency management. His work will be of particular interest to those who are seeking organisational change that will provide for educative programs and support for the employee whenever a disaster event occurs.

To my knowledge, no comparative research has been published that deals with our employees' behaviour during evacuations that have been initiated in response to a disaster.

Neville J. Betts, BA., Grad Dip OHM, CFSIA

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# The Sydney hailstorm: the Victorian experience

## The organisation and personnel involved

The Victorian SES is an organisation with both emergency operations and emergency management planning responsibilities. It has a small staff of seventy people and a trained volunteer force of approximately 5,000. These volunteers, based in 145 'Units', are the operational arm of the Service and respond to storms, floods and road accident rescue. They also perform operational tasks in support of other agencies including land and marine search and rescue on behalf of the police.

The management of the Victorian response to the Sydney hailstorm was shared between many people, both staff and volunteers. In the initial stages of activation, when systems had to be developed and proper responses organised, virtually all Victorian SES staff were involved. The task of determining volunteer availability and then organising pick up and travel was monumental, and one the Service had never faced before. It is a credit to the staff and volunteers that a response force was mustered and despatched in such a short time.

As already mentioned most Victorian SES staff were involved, but coordination was mainly borne by Gary Thwaites, Manager State Operations. Task Force One was lead by Paul Jerome and Task Force Two by Bob Cowling.

## The response

On April 14 1999, Sydney experienced a severe hailstorm that caused significant damage to properties in the southeastern suburbs. The various agencies were stretched to their limits in responding to the damage and on the April 21, a request was received by the Victorian State Emergency Service (Vic SES) from the New South Wales State Emergency Service (NSWSES) for personnel to assist in Sydney. Organisational and government approval was granted very quickly and the process to identify types of tasks to be done, resources required and availability was begun.

The initial request was to provide assistance for the period to April 25, but deteriorating weather conditions resulted in two further requests to extend

By Gareth Davis, Deputy Director of the  
Victoria State Emergency Service

assistance until May 2, 1999.

At 8:30am on the April 22, a party of Vic SES staff flew out from Tullamarine airport, and at approximately the same time a convoy of 24 vehicles and volunteers departed the outskirts of Melbourne. A second convoy also left from north Victoria and both convoys travelled via the Hume Highway to Wodonga where they met. At approximately the same time a third convoy left from Gippsland and travelled via the Princes Highway to Sydney.

A party of volunteers also flew out of Tullamarine on the afternoon of the same day and these, with the staff and volunteers who had travelled before, made up what became known as 'Task Force One'. This consisted of 16 staff, 244 volunteers and 24 vehicles.

By April 29, due to normal work commitments of the volunteers and general exhaustion, it was decided to change the personnel in Sydney and flights of volunteers and staff resulted in 'Task Force Two'. Most of the vehicles that had travelled to Sydney with Task Force One remained for the use of the second task force and one specialist vehicle was added. Task Force Two then involved 11 staff and 178 volunteers.

All personnel and vehicles had returned to Victoria by May 2, and during the next 3 weeks de-briefs were carried out in regional centres. From these de-briefs has come the 'Victorian Experience' which will form the basis of procedures and protocols for Vic SES task force response in the future. It must be emphasised that although the operation in question was the first Vic SES experience of travelling in numbers interstate, the lessons learnt will be applied to any large movement of personnel from one location to another, including within Victoria.

## Organising personnel

As with any operation, and the determination of 'how many and who?' is crucial. There are a few questions that

need to be asked such as:

- What are the tasks, and what are the skills and attributes required?
- What is the anticipated duration of the operation?
- How urgent is it?
- What resources, other than people, are required?

Due to the remote (from Vic SES's point of view) location of the scene it was more difficult than usual to answer some of the questions posed above. In particular, there was considerable debate as to 'urgency versus when to leave'. Although there were a considerable number of people ready to respond that evening a decision was made to delay response until the next day with, hopefully, more organisation. In retrospect, it may have been better to delay departure even further and allow volunteers discussion time with their employers during normal business hours. This could have afforded those managing the operation the opportunity to include the ongoing availability of the various volunteers into their planning.

The initial request for assistance anticipated a duration of a few days and many decisions were made based on this perception. Subsequently, some of these decisions were proven to be inappropriate when the operation was extended and it probably shows that despite the 'difference of the operation', basic premises should be maintained. For many years the Vic SES has determined that when making decisions on operations, such as rosters, catering, resources etc., one should assume the duration of the operation is infinite. In this way, if the planning is based around continual provision of the functional areas, one cannot be caught short when the operation extends past pre-conceived limits.

Although knowledge of the various skills of volunteer members is held in a variety of ways at Unit level, that information has never been comprehensively collated. It is also a fact that the Service has never succinctly defined the criteria for performing many operational tasks and relies on the regional/Unit knowledge to match people to requirements. In the case of this operation, where a large number of people were required without



much warning, and there was a distinct possibility that the normal Unit 'supervising group' would not be there supporting, it is obvious that some people who responded were not appropriate. It is hoped that the development of national competencies, the inclusion of operational experience in the system of maintaining competency, and the recording of skills on databases provided by the Vic SES Extranet system will assist in tackling this problem in the future.

It was essential, particularly with relation to specialised vehicles, that the operational 'home base' was not denuded of resources to the detriment of the operational response in that area. It was a credit to the people involved, particularly those in Unit management, that despite the widespread response to Sydney the operational viability of the state was not compromised.

### **The convoy**

Although Vic SES had in the last few years moved reasonable numbers of staff and volunteers around the state for operational purposes, the Sydney operation was the first time that such a number of vehicles had travelled together. With some staff and volunteers having experience in the Army, there was scattered knowledge of the protocols required for travelling in convoy. There was a hurried attempt, particularly for the convoy that left from Melbourne, to issue convoy instructions but the reality was that the Service was less than prepared and untrained for travelling this way. Despite this, all vehicles arrived safely in the Sydney area although locating their final destination was difficult due to heavy rain and lack of local knowledge.

Some of the areas identified for improved procedures in the future include:

- Provide staff travelling with the convoy with the means to pay all expenses
- Ensure communications intra-convoy and between the convoy and nominated headquarters.
- Plan protocols as regards to rest breaks, travelling speeds etc.

### **Operational management**

In the last few years Vic SES has spent considerable effort in developing an Operational Management System (OMS) and training people to use it. It is based on the premise that no matter the size of the operation, or how many people involved, there are certain functional areas to be managed.

As OMS training has enhanced the operational management skills of staff and volunteers there has been an obvious

improvement in the ability of people to operate away from their home base. It is now possible for a significant proportion of Vic SES personnel to walk into another regional or Unit operational headquarters and be productive almost immediately.

In Sydney, however, personnel were faced with a different system. Victorian staff had been briefed before they left and in that briefing it was emphasised that they were going to assist NSWSES and should fall in with whatever system was present. This did cause some difficulties, and with tasking still remaining with NSWSES and uncertainty about systems within the operations centre, operational management amongst the Victorians was less than perfect. Initial staff also worked shifts that were too long, although in the circumstances it was understandable. Their NSW colleagues were exhausted and it was imperative to provide real assistance as soon as possible.

As it became obvious that the visitors were basically dealing with their own area of operation, staff decided to implement OMS as far as they were concerned. They had carried with them electronic versions of the OMS stationery and within a short time were operating as they did at home. This had immediate benefits for staff and volunteers and, hopefully, for the people of Sydney who were receiving the fruits of their efforts.

What are the lessons from this? When possible, within the context of the particular operation, it is preferable for visiting groups to operate as autonomously as possible with systems that are familiar. This means that they must carry with them the resources to operate those systems. In the future, any Vic SES team moving interstate will carry with it resources, including notebook computers, that can facilitate the implementation of operational management systems. If it is not possible to use them in the circumstances, so be it, but they will be there just in case.

Of course, there is always the possibility of all SES organisations around the country actually using the same operational management systems!

### **Teams and their leaders**

As mentioned before, the individual skills of volunteer members are not as well documented outside the Units as they could be. This includes the ability of those individuals to lead teams in various types of operations, and there was a problem in Sydney with the formation of teams and selection of leaders. Where particular volunteers were recognised leaders within

their own Unit and staff from the member's home region were in Sydney, they could apply that knowledge to the selection process. In the main, however, staff were flying blind and it took some days before all teams were of optimum construction.

The national competencies referred to above include 'team leadership', and this will contribute in some way to alleviating this problem in the future. Another way to address this problem, and it was raised a number of times at de-briefs, is that future groups operating remotely from home consist of pre-organised teams. In other words, whether the teams are from single Units or a combination of Units, the team construction has been planned and its leadership, skills and other attributes are pre-defined and documented.

### **Communications, equipment and clothing**

When Vic SES members travel far from home; what do you take with you? This was the dilemma facing the members and those assisting and briefing them. The uncertainty of duration of the operation was a contributing factor to the decisions made in this area and it was obvious that some people travelled without even the basic essentials for being 'away from home'.

With the Vic SES teams that operate in a land search role, particularly in the alpine areas, there is an unwritten rule as far as self-sufficiency is concerned. Members do not leave their bases unless they are '24 hour self-sufficient', and it is probably appropriate to extend this philosophy to other areas. The basic philosophy that must be applied to providing assistance to others is not to become a burden on those you are trying to assist. Self-sufficiency has to be an important element of this.

NSWSES radios were provided to the Victorian teams but training on how to operate them was extremely limited. There was also a problem with channel allocation for the (trunked) NSW system, and the Vic SES UHF frequencies were not approved for operation in the Sydney area because they conflicted with local users. This meant that teams operated for some time without adequate communication. Are we once again facing the dilemma of a 'national emergency frequency' for interstate use? Easy to propose but hard to solve!

### **The wash up**

The Victorian Experience has made indelible marks on the systems of Vic SES and the way it will operate in the future.

As with all de-briefs, the process often involved discussing what went wrong but did not emphasise the things that went well. There is no doubt that many of the problems had not been faced before, but more importantly, temporary solutions were found and permanent solutions were placed on the agenda.

It is probably appropriate to record the general comments by Vic SES members after they comprehensively dissected the areas mentioned above, and their thoughts about the whole operation. They ranged

from 'magnificent' to 'best experience we have ever had' and were incredibly positive. Of particular note was the report from Vic SES staff and volunteers of the marvellous hospitality and reception by their NSW colleagues and the general public. As one person commented:

'I have always been proud to wear the Vic SES uniform but I did not expect to get a standing ovation from members of the public when going for a meal in the evening.'

About the author:

Gareth Davis is Deputy Director of the Victoria State Emergency Service (Vic SES) and has been with that organisation for more than twenty years. Amongst other things his duties encompass the operational aspects of Vic SES and he has overall responsibilities for the regions. Gareth travelled around Victoria to de-brief the staff and volunteers after the Sydney operation.

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# The April 1999 Sydney hailstorm

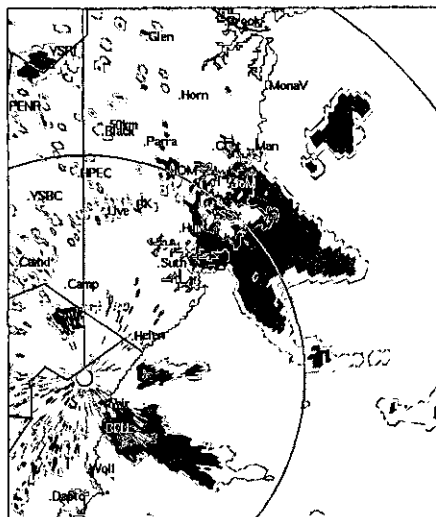
Insured losses from the hailstorm that struck Sydney on Wednesday 14 April 1999 are projected to reach A\$1.5 billion, making it the most damaging event in Australian insurance history. On Saturday 17 April, the Natural Hazards Research Centre (NHRC) placed a carefully prepared advertisement in *The Sydney Morning Herald*, encouraging readers to share their hailstorm experiences. A letterbox-drop was undertaken in suburbs where the response to the newspaper advertisement was low, and surveys were sent to three secondary schools. Including information derived from actual house inspections, over 350 responses were received—detailing hailstone sizes and the nature of any damage. Preliminary results from the survey are presented in this article. The context in which the event is placed is the product of several years' research on the hail hazard in Sydney.

## The event

The 14 April 1999 Sydney hailstorm was, in every respect, a rather unusual phenomenon. The maximum hailstone size, the resultant damage, the season and timing of the storm occurrence, as well as other circumstances associated with the storm development made this event exceptional. Following its development about 150 kilometres south of Sydney, the initial storm cell moved northward parallel to the coastline (and mostly over the sea), only to change its track slightly inland south of the metropolitan area and to strike the coastal suburbs of Sydney at about 8pm. The major storm cell located over the southeastern suburbs of Sydney, followed by a second storm, which passed over the city two hours later (but produced only 2cm hail) can be seen in the radar imagery shown in *Figure 1*.

The Bureau of Meteorology reported the largest hailstones on 14 April 1999 to be 9cm in diameter. The NHRC survey invited respondents to nominate the largest size from a qualitative list (including \$1 coin, golf ball, tennis ball, and larger than tennis ball), which were converted into quantitative data. The most commonly reported largest stone (37%) was of 'tennis ball' size (6.3cm), but many respondents (19%)

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*Figure 1: Radar image showing the hailstorm cell over the southeastern suburbs of Sydney and a second storm developing about 80km further south. (Source: Bureau of Meteorology)*

reported 'larger' sizes. These included several 'cricket ball' (7cm) or 'orange' (8cm) sized hailstones, six reports of hail as large as 'grapefruits' (10cm), four reports of 'half-bricks' (about 11.5cm) and two reports of 'rockmelons' (about 13 cm).

Occurrences of 9cm hailstones, or even larger sizes reported by some residents in the affected areas, are rare but not unprecedented events in the Sydney area. The latest two hailstorms producing such hailstones hit Sydney in March 1990 and in January 1947. However, as shown in *Figure 2*, these are extreme events. The majority (or about 90%) of all hailstorms are marked by maximum hailstone sizes smaller than 5cm, while 2cm is most common.

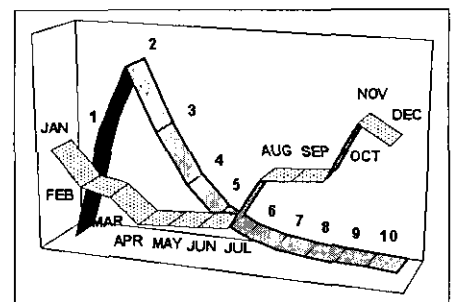
The April storm occurred at a time of year characterised by low hailstorm activity. As shown in *Figure 2*, most hailstorms in the Sydney area can be expected during the late spring and

summer months, while the maximum monthly hailstorm frequency is usually reached during the month of November. Moreover, the storm developed very late in a season which was marked by a substantially below-normal number of hailstorms (though west of the Dividing Range the hailstorm activity was normal or above-normal) and very late during a day that was not marked by any extremely unstable atmospheric conditions. Normally, the area of greater Sydney can expect about 8 hail-days per year and the majority of storms tend to develop in the afternoon between 2pm and 6pm.

## Hailstones

Hailstones begin life as frozen raindrops or particles of ice. They grow mainly by accreting supercooled (substantially cooler than 0°C) liquid from the surrounding cloud as they are held aloft by strong updraughts generated by severe thunderstorms. In their end form they can have different shapes ranging from spheroid to cones or irregular shapes. Depending on the environment they were created in, hailstones can also have different densities and come as soft and wet hail or graupel, or as harder and drier ice pieces. Most hailstones retrieved after the Sydney hailstorm were hard and had density comparable to that of gum tree wood.

The hailstone shown in *Figures 3 and 4*, which was collected at Newtown, was roughly spherical with a maximum diameter of 8.4cm and weighed 132 grams. This hailstone would have been travelling at between 140 and 200 kilometres per hour when it hit the ground. The growth time for a hailstone this size is likely to be



*Figure 2: mean monthly hailstorm frequency (dotted pattern) and maximum hailstone size (cm) distributions (dark pattern) for hailstorms occurring in the Sydney area during the last sixty years.*

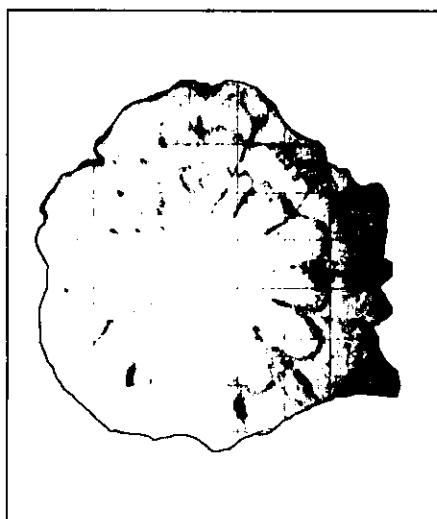


Figure 3: Photograph of a 2mm thin section of a hailstone that fell in Newtown illuminated by plain light (1cm background grid).

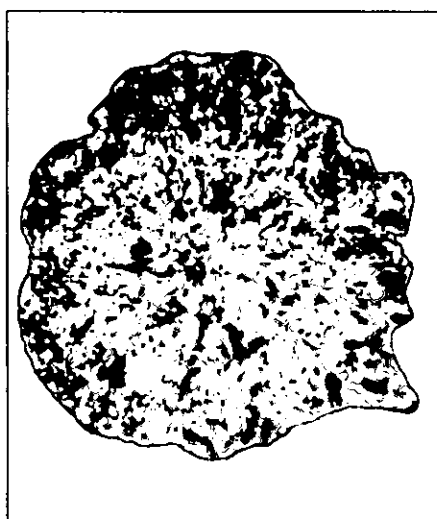


Figure 4: Photograph of a 0.7mm thin section of the same hailstone illuminated by cross-polarised light.

between 40 and 60 minutes. It would have grown at heights ranging from about 3 to 10 kilometres at temperatures varying from about 0°C to -35°C. The concentric opaque and transparent rings evident in Figure 3 indicate the different growth modes the hailstone has undergone and thus, the different water concentration in the cloud. Opaque layers contain many small air bubbles and generally indicate 'dry growth' (low water content) at low temperatures. Clear layers contain fewer air bubbles and indicate 'wet growth' (high water content) at higher temperatures. Growth mode may change as the hailstone moves to different altitudes in the cloud or as the local temperature and water content of the cloud changes.

The knobby surface of large hailstones is a consequence of a lobe structure. The lobe structure of the inner layers of the sectioned hailstone is clear in Figure 3. The lobes increase the surface area and

cause the airflow around the hailstone to become more turbulent. These factors enhance the rate of heat transfer from the hailstones, allowing them to grow large but remain hard and dry rather than soft and wet.

The crystalline structure of hailstones also provides clues to their growth history (Figure 4). In general, long radially oriented crystals indicate growth at relatively high ambient temperatures (not far below zero) while smaller, more uniformly shaped crystals indicate growth at lower temperatures (less than -20°C for dimensions less than 0.5mm).

Low ambient temperatures occur high in the cloud, while higher temperatures occur nearer the ground. The crystalline structure shown in Figure 4 (large crystals in the centre, medium sized crystals near the circumference, small crystals between) suggests the hailstone underwent periods of growth at a minimum of three different altitudes.

### Distribution of hail falls

Figure 5 shows the spatial distribution of the largest reported hailstone sizes. Reports of hail were received from as far south as Kiama (about 100km from central Sydney) and as far north as McMasters Beach (about 50km from central Sydney). Large hailstones (greater than 5cm) fell in a SSW-NNE swathe from the Royal National Park to Sydney Harbour, with the exception of an area in the far north where the storm regained intensity. The map also shows a distinctive gradation in size across the swathe—from less than 3cm at South Coogee to greater than 7cm at Kensington to less than 3cm at Annandale.

### Roof damage

Some form of damage to roofs was reported by 62% of respondents. Figure 6 shows the distribution of three classes of roof damage—none, few broken tiles, and many broken tiles—according to the size of the largest hailstone. No tiles were broken by hailstones smaller than 3cm. No houses were without roof damage for hail sizes of 7cm or more.

The most common type of roof damage for hailstone sizes less than 5cm was a few broken tiles. Hailstones larger than 5cm often caused substantial damage. Inspections of damaged houses suggested that terracotta tiles were probably more susceptible to hail damage than concrete tiles, though all tiles were seen to have sustained severe damage.

### Window damage

Window damage was reported by 34% of

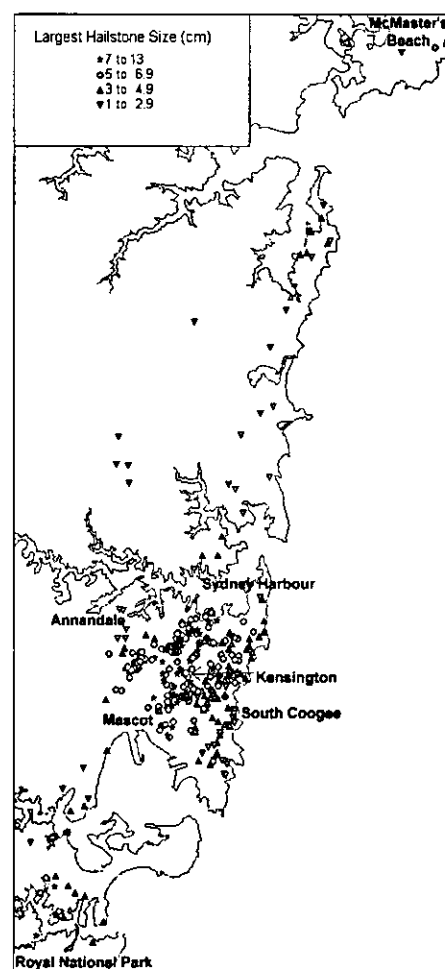


Figure 5: Largest reported hailstones, 14 April, 1999

respondents—notably less than roof damage.

Figure 7 shows that even for the largest hail size category, 40% of residents indicated no damage. This is probably a reflection of the vulnerability of different dwelling types. Many terrace houses, for example, do not have side windows. An interesting feature of the hail damage to roofs and windows and water damage to house interiors is a tendency for the most severe damage to be situated on the southern side of buildings. This corresponds to the predominant direction of the wind.

### Vehicle damage

Damage to cars was reported by 53% of respondents. A significant proportion of the cars that did not sustain damage, even for hailstone sizes greater than 7cm, would have been garaged. Some respondents reduced the degree of damage by putting their cars under-cover at the outset of the storm, or by covering their cars with doonas. Figure 8 shows that hailstones smaller than 3cm caused little damage. Damage was more common for hailstones between 3 and 5cm in diameter, but most damage was slight. Severe damage was common for hailstones larger than 5cm.

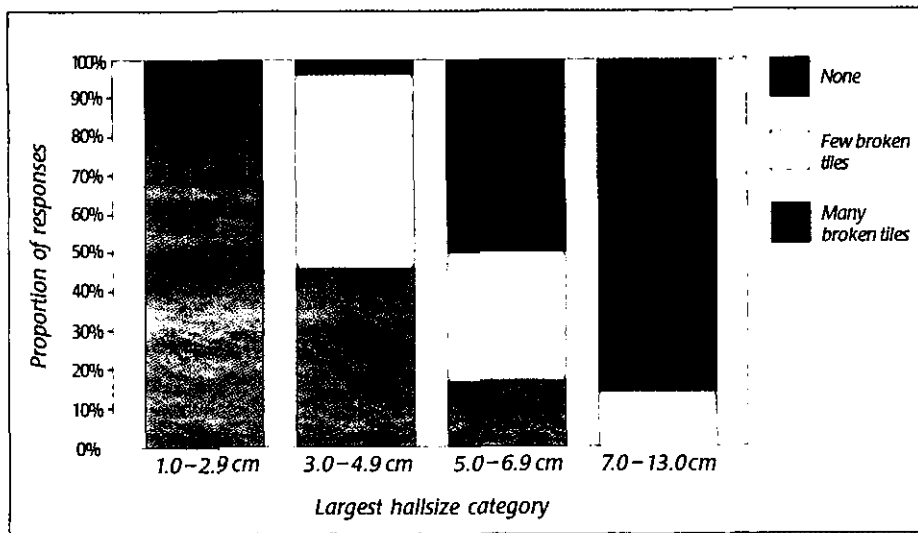


Figure 6: Largest hail size and roof damage

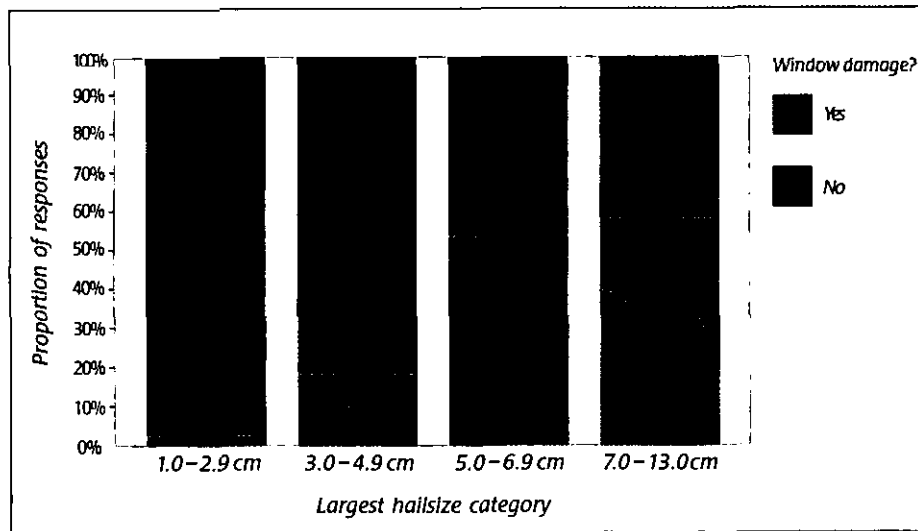


Figure 7: Largest hail size and window damage

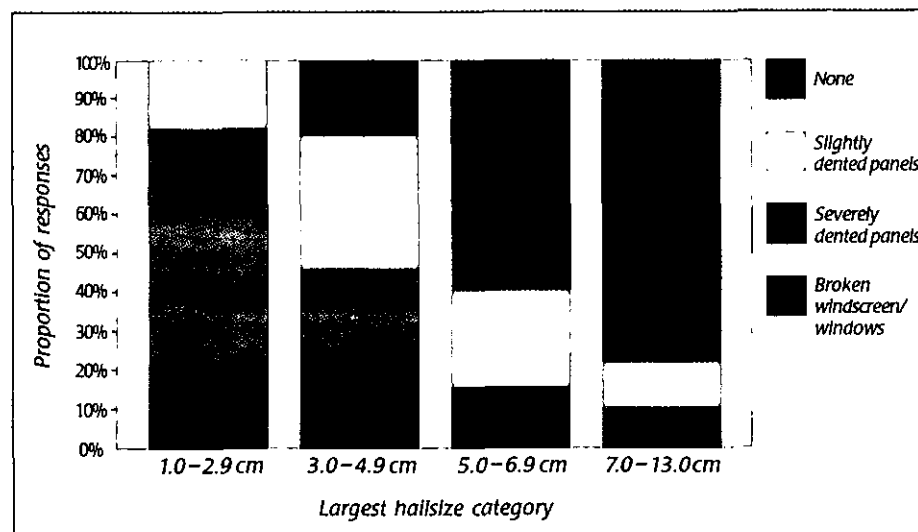


Figure 8: Largest hail size and car damage

### Other damage

Rain entered over half of the respondents' houses, often through damaged roofs or skylights. Ceilings and walls needed repainting, and in the most severe cases, ceilings collapsed under the weight of broken tiles and saturated insulation bats.

Water was often reported to have flowed down light fittings. Carpets were damaged in several houses. There were a few reports of dented external walls. Garages and sheds often sustained roof and gutter damage. Solar panels and television antennas were badly affected. Air-conditioners were

dented. Pergolas and outdoors plastic furniture were holed. Other damaged items include fencing, hose fittings, letterboxes and pool covers. Very many people reported damaged, if not shredded, gardens. Terracotta and plastic pots were often broken. One or two people were bruised or cut when they tried to protect their cars. A number of respondents covered their distress.

### Conclusion

The April 1999 Sydney hailstorm will not quickly be forgotten by the thousands of residents whose homes and cars were damaged. The survey initiated by the Natural Hazards Research Centre increases our understanding of the characteristics of Sydney storms and the patterns of damage they cause. Better understanding of the hailstorm hazard should lead to improved risk management, disaster mitigation and response strategies. The knowledge gained should provide impetus for the development of measures to reduce losses from hailstorms in the future; they are, after all, not unusual events in Sydney.

The NHRC is currently developing a hail risk model for Sydney with the support of Benfield Greig Australia, Partner Re, Hannover Re and Royal Sun Alliance. The numerical simulation model incorporates climatological data and exposure and vulnerability information for houses and cars. It is designed to estimate the magnitude of potential hail losses in Sydney. Improved understanding of the association between hailstone size and degrees of damage to roofs, windows and cars derived from the recent storm will be vital for the fine-tuning of the model.

### Acknowledgments

Stephen Yeo, Roy Leigh and Ivan Kuhnel wrote this article. We are very grateful to those respondents who collected and donated their hailstones. Dick Flood and Noel Tait (Macquarie University) provided a great deal of advice, and Hadi Sim (University of Melbourne) cut and photographed the thin sections of hailstones. Special thanks go to all respondents for sharing their hailstorm experiences.

We particularly wish to acknowledge the efforts of Kevin Burg and students from Brigidine College, Sydney Girls' High School and Newington College.

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# Stop propagating disaster myths

The international response to the recent tragic earthquakes in Turkey, Greece and Taiwan reinforces the need to reassess the myths and realities surrounding disasters, and to find ways to stop these destructive tales. Most of those myths cover the fear of epidemics and the place of external assistance in the rescue effort.

The myth that 'dead bodies cause a major risk of disease', as reiterated in all large natural disasters from the earthquake in Managua, Nicaragua (1972) to Hurricane Mitch and now the earthquakes in Europe and Asia, is just that, a myth. The bodies of victims from earthquakes, other natural disasters and conflicts do not present a public health risk of cholera, typhoid fever or other plagues mentioned by misinformed medical doctors or humanitarian players. In fact, the few occasional carriers of those communicable diseases who were unfortunate victims of the disaster are far less of a threat to the public than they were while alive. In those countries where these diseases were, for all practical purposes, not present prior to the disaster, they cannot appear and spread.

Often overlooked is the unintended but dramatic social consequence of the precipitous and unceremonious disposal of corpses. It is just one more severe blow to the affected population, depriving them of their human right to honor the dead with a proper identification and burial. The legal and financial consequences of the lack of a death certificate will add to

By Dr. Claude de Ville de Goyet, Chief of the Emergency Preparedness and Disaster Relief Coordination Program at the Pan American Health Organization, regional office for the Americas of the World Health Organization

the suffering of the survivors for years to come. Moreover, focusing on unnecessary and, in any case, ineffective measures such as the superficial 'disinfection' with lime or the often partial cremation of corpses requires important human and material resources that should instead be allocated to those who survived and remain in critical condition.

Our experience in the aftermath of the earthquake in Mexico City (1985) showed that health authorities and the media can work together. They have informed the public and made possible the identification of the deceased and the return of the bodies to the families in a climate free of unfounded fears of epidemics.

The unreasonable fear of epidemics is not only manifested with regard to cadavers. For a long time WHO has discouraged the post-disaster improvisation of mass immunization campaigns recommending instead that countries take advantage of the temporary gathering of normally scattered populations to improve the coverage of *normal* immunization policies. Following natural disasters,

external or foreign medical teams rush to administer any available vaccine (generally donated) with the excuse: 'It can't do any harm,' or more candidly, 'we have nothing else to do'. Wrong! Unplanned, improvised, and poorly supervised mass campaigns are not without medical risks.

However, as with the disposal of bodies, the primary negative result is the false feeling of security we misleadingly impart. The result is the population is distracted from the only effective measures: improving sanitation, controlling food and water quality.

External assistance has its own myths that we conveniently maintain. Reports that local populations affected by natural disasters are helplessly waiting for the external world to save them are also false, especially in countries with a large -but unevenly distributed- medical population. In fact, only a handful of survivors owe their lives to external (from other regions of the affected country) or foreign teams. Most survivors in earthquakes, cyclones and floods owe their lives to neighbors and local authorities. When foreign medical teams arrive, most of the physically accessible injured have received some medical attention.

Western medical teams are not necessarily most appropriate to the local conditions prevailing in many developing countries. How many lives might foreign search and rescue teams (SAR) in Turkey (1999) have saved? The most sophisticated



WHO recommends that the temporary gathering of normally scattered populations be used to improve the coverage of *normal* immunization policies.



In a disaster it is not unusual for volunteers to join with rescue teams to search for victims.



above left and right: Unsolicited material competes for space and takes time to identify for usefulness

and costly teams coming from far away only saved a couple of lives. SAR is an acute example of quickly diminishing returns where time is everything! What has been the cost? Certainly, foreign investment in building the local capacity would have been more effective but less mediatic.

As a professional disaster manager for the last twenty-five years, the press coverage of the recent earthquakes in Europe (especially in Turkey) leaves me with a sense of déjà vu. International rescue teams rushing in are made to look as though they are saving victims neglected by incompetent or corrupt local authorities. We saw the same thing after major earthquakes and hurricanes in the countries served by the Pan American Health Organization (PAHO) in the Americas.

Disaster-stricken countries appreciate external assistance, and it can do a lot of good when directed to real problems. Unfortunately, too much of the assistance is directed to non-issues or myths.

For example, a common myth is that 'any kind of international assistance is

needed', and it's needed now, while our experience shows that a hasty response that is not based on familiarity with local conditions and meant to complement the national efforts only contributes to the chaos. It is often better to wait until genuine needs have been assessed. Many also believe that disasters bring out the worst in human behavior, but the truth is that while isolated cases of antisocial behavior exist, the majority of people respond spontaneously and generously.

The myth that 'the affected population is too shocked and helpless to take responsibility for its own survival' is superseded by the reality that on the contrary, many find new strength during an emergency. This is evidenced by the thousands of volunteers who spontaneously united to sift through the rubble in search of victims after the 1985 Mexico City earthquake or the one in Turkey. Perhaps this cross-cultural dedication to the common good of so many local volunteers and institutions, without red tape or petty institutional turf fights, keeps alive our faith in humankind and society.

This generous response far outweighs opportunistic behavior.

One myth trespasses on all types of disasters: natural, or complex, or those resulting from armed conflicts: 'Send any type of donation—it is needed immediately!' There is not one seasoned relief worker without his or her bag full of anecdotes on inappropriate donations. As an inter-governmental agency serving national institutions we have seen, in

each international disaster, the management problems caused by the flood of unsolicited, inappropriate or useless supplies that clog the distribution channels, competing for space and transportation with the critically needed items. The medical field is particularly prone to these errors: Expired medicines, partially used household prescriptions, and samples or inappropriately labeled products may represent a substantial portion of the health donations.

At the request of the affected countries, the WHO regional office for the Americas developed 'SUMA' a computer program, a training package and an operational capability at national and international levels to sort, classify and inventory all supplies for humanitarian assistance. This skill imparted to all countries in the Americas (over 1,500 trained national personnel) has now found a new application in the East Timor crisis. As in past disasters, supplies of any kind, good and bad, are stockpiled in two warehouses in Darwin and are trickling down to Dili, East Timor. The humanitarian sector has no spare logistical capacity to waste on unneeded supplies. To compound the humanitarian coordinators' problems, no comprehensive information was available on what actually was in the warehouses or in the pipeline, since the supplies belong to a large array of agencies and non-governmental organizations. SUMA provided the tool to collectively manage large amounts of miscellaneous supplies, regardless of their ownership and share information among all parties.

It is an interesting contribution from WHO to the overall management of donated supplies, but only a palliative solution. The still unaddressed cause lies in the misinformation the public receives on what is needed and, more important, what is NOT needed. The myth of a



Disaster victims need time to identify and grieve over relatives and friends.



population thankful for any kind of supplies is not sustainable in even the most acute famines in Africa. Starving children cannot adjust to most food items. Likewise, it is not sustainable in even the most dramatic earthquakes.

The myth that 'things go back to normal within a few weeks' is especially pernicious. The truth is that the effects of a disaster last a long time, definitely longer than the attention span of the public. Disaster-affected countries deplete many of their financial and material resources in the immediate post-impact phase. The greatest need for external assistance is to restore normal primary health care services, water systems, housing, and income-producing work. Social and mental health problems will appear when the acute crisis has subsided and the victims feel (and often are) abandoned to their own means.

Proper resumption of public health

services, such as immunization and sanitation measures, control and disposal of waste, and special attention to water quality and food safety, will ensure the safety of the population and of relief workers.

It is essential that the press and the donor community are aware of what is good practice and what is malpractice in public health emergency management. Past natural and complex disasters in the Americas and elsewhere have shown the need for international contributions in cash and not in kind.

There should be built in flexibility to use these for rehabilitation, if the need arises. Do not rush humanitarian organization in a high visibility job at the cost of the welfare of the victims. This ensures that allocation of resources is field-driven by evidence of what is needed on-site.

The civilian population in many disas-

ters does not need used clothing, household or prescription medicines, blood and blood derivatives, medical or paramedical personnel or teams, trauma field hospitals and airlifted modular medical units. They want, as do any victims of disasters, to rebuild safer houses, have their 'normal' health problems attended at the health center, put their kids in school and get on with their lives. Unilateral contributions of un-requested goods are inappropriate, burdensome, and divert resources from what is needed most.

There are lessons to be learned. While it is true that local authorities are generally insufficiently prepared, who is ever ready for a disaster of this magnitude? The United Nations, the World Health Organization and NGO's should have done more to strengthen the local capacity, but with what resources?

Donor countries have spent millions of dollars to dispatch search and rescue teams—who arrived after the most critical first hours or days—to countries where thousands of local medical doctors volunteered their services. A small part of this money could have been more effectively applied to preparedness and prevention activities.

We need to educate donors just as we need to educate potential victims of disasters. A little preparedness can go a long way toward alleviating the 'secondary' disasters caused by international assistance that are often visited on countries. Increased international funding for disaster preparedness and prevention in the third world could help matters.

If donors would commit now to strengthen the local capacity to respond to future natural disasters in vulnerable countries, and learn what is important and what is futile when helping countries, the world would be better off.



above and top: SUMA organised and classified material

above: SUMA training session

# Responding to mass casualty incidents in the rural setting: a case study

## Introduction

While buses are a relatively safe form of transport, when accidents do happen, they have the potential to generate large numbers of casualties. In Australia, most significant bus accidents over recent years have occurred in rural areas, necessitating responses by rural health facilities. One such event occurred near Albury in August 1998, involving the presentation of twenty-five Chinese patients to Albury Base Hospital. The hospital's disaster plan was activated, and all casualties were effectively managed over a three-hour period. This event demonstrated that all hospitals in rural environments should be prepared for such events, and that in fact rural hospitals have some advantages over metropolitan hospitals in responding to such incidents.

## The accident

Shortly after 6pm on Thursday August 13th, 1998, a tourist coach and a semitrailer collided on the Hume Highway near Mullengandra, a small village approximately 30 km northeast of Albury. The coach and the truck clipped each other on a single-lane section of highway, resulting in the ripping out of the front right hand corner of the bus, and leaving a large tear almost the full length of the bus.

The semitrailer veered off the road, and ended up in a ditch on the side of the road. The truck driver was thrown out of his cabin, and died at the scene. The tourist coach contained 25 passengers, the majority of whom were non-English speaking, and belonged to a Chinese Government Delegation from Hebei province. Following the accident, several passengers were trapped in the wreckage of the bus, but were soon freed by rescue/SES/Fire Service personnel from Holbrook (a nearby small town) and Albury.

The first ambulance on the scene arrived from Holbrook, with two ambulances (including the site controller) arriving from Albury shortly after. Triage was undertaken, with walking patients directed to a tarpaulin on the ground, as well as utilisation of triage tags. Patients were then transported by ambulance vehicles and another bus, as these became available.

By Dr Jon Hodge, MBBS, MHA, FRACMA,  
Clinical Superintendent, Albury Base  
Hospital and Dr Malcolm Robertson, MBBS,  
FACEM, Staff Specialist, Emergency  
Department, Albury Base Hospital

## The hospital response

At approximately 6.20pm, Albury Base Hospital received notification that a significant incident had occurred, and that there were at least ten seriously injured, 'with multiple amputated limbs'. At that time, the Emergency Department was quiet, and it was relatively easy to clear and prepare the Department.

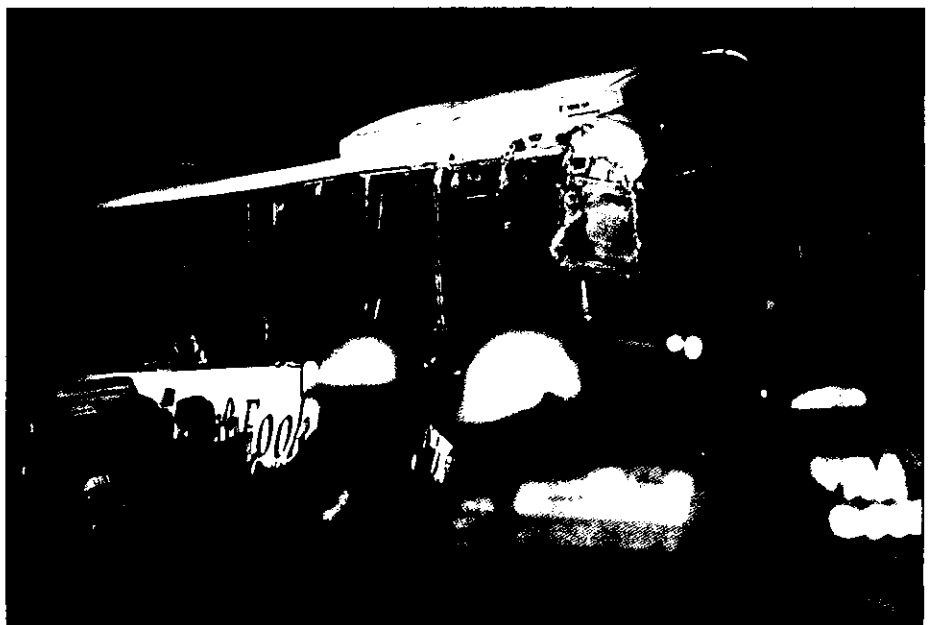
The hospital disaster plan was activated, including the following components:

- call-in of necessary staff
- preparation of the Emergency Department to receive the more seriously injured
- preparation of the Day Oncology Unit to receive green category patients (the Walking Wounded)
- preparation of a casualty reception ward
- discharge or transfer of patients from other wards in the hospital
- establishment of a hospital control centre in the admission offices adjacent to the Emergency Department

Once the hospital control centre was established (and notified to the Ambulance Coordination Centre), further information as to nature and number of injuries was communicated. The first patients arrived from the scene by ambulance at 19.15. Triage was performed in the Ambulance bay by the Emergency Department Staff Specialist on duty (MR) and the Emergency Department Nurse Unit Manager, although green category patients arriving by bus were taken directly to the Day Oncology Unit, where they were separately triaged.

Table 1 (next page) outlines the casualties received (Baskett and Weller 1988).

The last casualty was received at 22.00, with the hospital being stood down at 23.00 (although arrangements for increased staffing were put in place overnight). Because of the particular characteristics of the group (foreign nationals, non-English speaking), it was necessary to access several interpreters (including local Chinese restaurant owners), as well as involve the Department of Community Services, who arranged for transport and accommodation of those Chinese patients who were discharged (as part of the local welfare recovery plan). The following day, an operational debrief was held involving all hospital departments as well as the Ambulance Service and Department of



The bus accident at Mullengandra resulted in the presentation of 25 patients to the Albury Base Hospital

Ser.	Age	Sex	Time of arrival	Injuries
1	49	F	1915	Fractured pelvis, fractured femur, fracture upper humerus
2	43	M	1915	Compound lower leg fractures (leading to amputation), facial lacerations
3	47	M	1950	Bilat. corneal/conjunctival abrasions, hyphaema, lacerations both elbows, contusions to chest, calf
4	31	M	1950	FB eye, hyphaema, facial grazes, contusions abdomen and thigh
5	33	M	1950	Multiple rib fractures, haemothorax, minor lacerations to chest
6	52	M	2008	Multiple facial lacerations, fracture / dislocation @ foot, hyphaema
7	39	F	2010	Contusion @ elbow, large scalp lacerations
8	42	F	2015	Multiple facial lacerations, FB eye and ear, fracture scapula
9	38	M	2019	Facial / scalp lacerations, chest contusion
10	44	M	2100	Upper leg laceration
11	44	M	2110	Scalp / feet lacerations
12	59	M	2110	Facial lacerations / bruising
13	45	M	2115	Lip contusion / facial lacerations
14	49	M	2115	Facial lacerations / corneal abrasion
15	44	M	2115	Lacerations face, knee
16	57	M	2115	Facial lacerations
17	59	M	2115	Facial lacerations
18	48	M	2120	FB eye, facial lacerations
19	52	M	2125	Contusions only
20	53	M	2130	Fractured fibula, phalanges. Lacerations
21	79	M	2135	Contusions only
22	31	M	2150	Minor injuries only
23	56	M	2200	Lacerations to forehead, ankle sprain, contusion chest wall

Table 1: Casualties received at the Albury Base Hospital

Community Services. This debrief was to review the performance of the hospital (and its disaster plan), to recognise the efforts of the staff, and to provide the necessary information with regard to critical incident stress management.

## Discussion

Bus travel is both a comfortable and relatively safe way to travel. Table 2 provides estimates of the risk per hour from all forms of commuting (Baskett P. and Weller R 1988).

Despite this, when something does go wrong, the capacity of modern buses is such that large numbers of casualties can be generated over short time frames, overwhelming available medical facilities. Recent examples are included in Table 3.

Of these recent examples, it is interesting to note that the majority have occurred in rural areas, with the exception of Brisbane and Mt Tambourine (while Mt Tambourine could be regarded as rural, the medical response was directed from and supplied by metropolitan hospitals) (Green 1990, Gaul 1992).

A number of papers suggest that com-

munities and/or health facilities in rural and remote areas are impacted by, and respond to disasters in different ways to their urban counterparts. (EMA 1995, Somers 1997, BDS Idaho 1994, Quarantelli 1983, Johnson 1991, Thompson 1997, Arnold 1993, CES Seminar Committee 1990). The Australian Emergency Manual on Disaster Medicine (EMA 1995), identifies a number of difficulties in response, including limited communications, lack of alternative emergency resources, generally limited response capability, harsh environmental conditions, and the deleterious effects of prolonged evacuation times. Somers (1997) identifies that in such a setting, the general practitioner has a key role to play as the first medical responder. The Idaho Bureau of Disaster Services (1994) also identified that rural communities may not have the same expectations of emergency services as city dwellers, and, because of disproportionate media coverage, may believe that they are not as badly affected as the urban population.

Other factors that may also negatively impact on the medical response may include limited numbers of appropriately

trained staff, incomplete range of services (especially in areas such as neurosurgery and burns), limited pre-hospital resources, and the limited capability of hospitals to dispatch site teams, given that casualties will inevitably be brought back to the same hospital.

Despite these factors, there may be some positive aspects to the rural response. Responders are used to working well in small groups, and cooperate well on a multi-agency level. Management structures are generally smaller, such that good communication exists on both a daily operational as well as major incident/disaster basis. Indeed, Quarantelli (1983), in his study of a large series of mass casualty incidents in the United States of America, suggested that coordinated medical responses were far more likely to occur in small towns/cities than they were in large metropolitan areas. While this is probably more relevant in the North American context, where there may be multiple competing pre-hospital providers, these issues may also be relevant in some parts of rural Australia.

In addition, because medical resources are scarce, it is far more likely that arrangements will be in place with regard to cooperation between health facilities to cope with such events. In the case of the Albury bus crash, inpatients were transferred to a nearby Catholic hospital to free up beds, and non-disaster emergencies were directed to a nearby Victorian hospital. Regular meetings and the development of a cross-border mutual aid agreement had enhanced cooperation between the facilities.

It is also important to bear in mind that rural communities are not homogenous. The Australian Health Ministers Advisory Committee (1996) considers rural Australia to equate with non-metropolitan areas, and as such incorporate major provincial centres, country towns, mining and isolated communities. Existing as a subset of this is remote Australia, which consists of communities that are more than a few hundred kilometres from a capital city, or are separated from other major centres by a significant physical barrier. Significant differences may therefore exist between the medical response in Albury or Tamworth, and the medical response in remote centres like Bourke or Longreach.

With regard to the specific hospital response, the principles of an effective response have been recognised by a number of authors (Richardson 1991, Savage 1979, Waeckerle 1991, Doyle 1990, Noji 1994, Auf der Heide 1995). Richardson

(1991) notes that effective hospital disaster planning must include care of existing inpatients and outpatients, co-ordination of staff, clearance of wards, medical record creation, new triage procedures in the Emergency Department, and dealing with media and relatives. Savage (1979) defines hospital disaster planning as falling into three major components; medical management of casualties; staff alert, recall and deployment; and, information, control and communication. Waeckerle notes that the survival of victims once they reach the hospital may be dependent on the organisation, training and experience of the hospital staff. Doyle (1990) cites familiarity with the facility disaster plan as being essential to a smooth response. Noji (1994) identifies shortcomings of hospital disaster plans as including delayed or improper notification, poor delineation of command structure, overloaded or broken communications networks, improper or incomplete identification, lack of supplies and lack of public relations.

### Lessons

With regard to the hospital response in the rural setting, we felt that the following lessons were particularly bought home in this incident:

- It is absolutely vital that a separate area be designated for the management of the walking wounded (green category). While this makes one triage point difficult, it ensures that the Emergency Department can be effectively utilised for the more seriously injured. In this case, the hospital's Oncology care centre was utilised. While the staffing in the area was bolstered by staff from more acute areas, it was also essential to have staff in the area who knew where things were.
- Exercising the hospital disaster plan is probably even more important than having the plan! The hospital had an exercise 1 month before the event, and there was therefore a good understanding of what was required. On the evening, relatively few staff even had to look at their action cards or disaster plans.
- With incidents involving large numbers of non-English speaking people, it is vital to obtain the services of local interpreters in sufficient numbers to minimise delays in management. A telephone interpreter service is not practical in a mass casualty situation.
- Invariably the area exercised the least by hospitals is the hospital control

### Relative safety of different forms of travel

Bus	0.03 deaths per million hours
Rail	0.05 deaths per million hours
Car	0.6 deaths per million hours
Airline Flying	1.0 deaths per million hours
Motor Cycling	9.0 deaths per million hours
Private Flying	27.0 deaths per million hours
Mountaineering	27.0 deaths per million hours
Motor Cycle Racing	35.0 deaths per million hours
Rock Climbing	40.0 deaths per million hours

Table 2: Relative safety of different forms of travel

### Recent Australian bus crashes

Oct 20 1989	Grafton	coach and semitrailer collide on Pacific Highway - 20 dead
Dec 22 1989	Kempsey	two coaches collide head on - 35 dead, 41 injured
Sept 26 1990	Mt Tamborine	bus veers off mountain road - 11 dead, 38 injured
Jan 4 1992	Tamworth	bus veered into bridge - 4 dead, 50 injured
Nov 2 1993	Wangaratta	bus and semitrailer collide on Hume Highway - 10 dead, 35 injured
Oct 24 1994	Brisbane	bus driver loses control across median strip - 12 dead, 39 injured

Table 3: Recent Australian Bus Crashes

centre. For this to work effectively, it is necessary to identify a suitable area, allocate staff and their roles, and maintain the communication flow.

- Responding effectively to a major incident in a rural setting always involves a cooperative approach - with the ambulance service, other hospitals, and recovery agencies, to name but a few.

### Conclusion

While the outcome of this incident certainly could have been much worse, especially in terms of fatalities, it demonstrated the ability of rural hospitals to respond well to mass casualty incidents. The particular Australian situation means that rural hospitals may be exposed to mass casualty events, especially as the result of bus crashes, and this requires that practiced plans be in place to effectively cope with such events. While many of the lessons learnt from this incident are not unique, they do highlight that rural hospitals can, and do, respond to such incidents effectively.

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## Urban Search and Rescue

### The strategy for major structural collapse search and rescue

The development of a multi-agency Urban Search and Rescue (USAR) capability is progressing in Australia with the latest meeting of the USAR National Steering Committee being held in November 1999. The Committee has released a new USAR video which outlines the capabilities required by emergency management organisations for dealing with major structural collapses and focuses on the importance of multi-agency cooperation.

In December 1999, Mr Trevor Haines of EMA and Superintendent Garry Smith of NSW Police Service attended a United Nations debrief of the rescue response to the Turkey and Taiwan earthquakes. Among the many lessons learnt was the enormity of the devastation. In Turkey over 66,000 buildings were totally collapsed and a further 244,000 damaged, while in Taiwan 11,000 buildings collapsed and 8,000 were damaged. Neither country was able to cope sufficiently with the rescue requirement even with more than 30 countries providing specialised search and rescue teams and other aid.

In view of the increasing number of devastating earthquakes in 1999 and Australia's increasing involvement internationally, the work of the USAR National Steering Committee in 2000 will be focused on developing protocols for deployable self-contained teams and for receiving international teams into Australia.

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## Year 2000

As advised in the Spring edition of the AJEM, EMA and the Office for Government Online established a National Coordination Centre in Canberra to manage Commonwealth Government aspect of the Year 2000 Rollover. The Commonwealth Centre complemented similar centres established in capital cities by each of the States and Territories. While the Rollover passed uneventfully, the preparations made for managing the event proved invaluable and ensured that the Commonwealth Government was in a position to deal expeditiously with any likely service failures.

A website developed for providing information on the Rollover proved extremely popular nationally and internationally. The site recorded over 4 million 'hits' between midnight on 31 December 1999 and 6 am on 1 January 2000.

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## Funding for disaster prevention/management projects

EMA has project funding to support disaster prevention and management projects during 2000-01. Proposals aimed at reducing disaster-related loss of life, property damage, and economic and social disruption in Australia are now being sought from individuals, organisations or Federal, State/Territory and Local Government agencies.

EMA is seeking projects that will:

- improve Australia's capabilities for preventing or dealing with natural or technological hazards and disasters;
- improve community awareness of the risks posed by natural and technological hazards;
- focus on prevention, preparedness, response or recovery strategies; or
- reduce the vulnerability of communities or essential services to natural and technological hazards.

Projects could also relate to particular elements in the community, ie. schools or special interest groups.

While project funding is normally limited to cash funding of up to \$40 000, higher amounts may be considered in special circumstances. All proposals, irrespective of the funding amount, will be considered on merit.

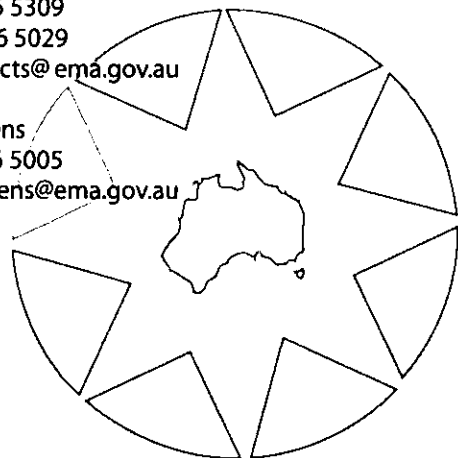
Instructions on how to submit an application for EMA Projects Program funding are available on the EMA web site at [www.ema.gov.au](http://www.ema.gov.au).

Proposals should be addressed to EMA, PO Box 1020, Dickson ACT 2602, and must be received by 29 February 2000.

Please note that the EMA Projects Program replaces the International Decade for Natural Disaster Reduction (IDNDR) and the Australian Emergency Management Projects Programs. It does not, however, replace the Australian Disaster Research Grants which are funded and administered separately.

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## EMA publication news

### Disaster Prevention for the 21st Century

*Proceedings of the Australian Disaster Conference 1999.*  
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A 9-page final report of the conference and papers, which is not printed in the proceedings, is now available free of charge via the EMA homepage.

### Public Information, Media and Disaster Mitigation.

*Papers from the World Disaster Reduction Day Seminar, Sydney 1998* (42-pages).

### CRES Resource and Environmental Studies Number 18.

Topics include:

- accuracy, timeliness and consistency of information - facilitating the flow of public information and preventing public panic
- Joint Media Information Centre
- public education & information to reduce natural disasters: an on-going role for all emergency managers and the media
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### IDNDR Education 2000

*Hazards Happen: Elements of Australian Natural Hazards CD*

Hazards Happen: Elements of Australian Natural Hazards Educational CD is a new resource for schools structured according to earth, wind, air and fire, with interactive sections to help students learn what they can do to prepare for and prevent disasters. It includes hazard information and case studies. It was developed by education specialists at Queensland University of Technology with funding from Australia's IDNDR Program.

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email: [ema@ema.gov.au](mailto:ema@ema.gov.au)

### *Natural Disasters: You are the Manager CD*

A new educational CD investigates types of natural hazards, ways of preventing hazards becoming disasters, response when disasters occur and the recovery process. An interactive scenario allows the user to 'manage' a natural disaster by assessing the risks and then making decisions about appropriate preparedness and response measures based on limited resources.

The CD also allows the user to examine the consequences of their choices. Included in the CD is a high quality video of natural disasters and interviews with experts in the field. Primary and secondary school versions of the video will also be available for separate sale.

This resource was produced by Classroom Video with partial funding through Australia's IDNDR Program.

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# What's on at AEMI

In the new millennium emergency management is rapidly changing and the environment in which the Australian Emergency Management Institute works has also changed. As a result, the Institute has undertaken a review of its courses in consultation with the States/Territories and a new suite of educational activities will be offered.

## Courses

AEMI will continue to conduct Recovery Management and Exercise Management courses. However, we will no longer be offering the Emergency Co-ordination Centre and Evacuation Management courses on-site at Mt Macedon. It is expected that State/Territories will offer these courses within their own state.

Two courses, *Understanding Emergency Risk Management* and *Implementing Emergency Risk Management* based on the emergency risk management competencies from the Public Safety Training Package will be offered. These courses will be delivered through a combination of four-day residential activities and workplace learning projects.

The first of the Understanding Emergency Risk Management courses was conducted in January 2000 and the Implementing Emergency Risk Management course will commence in June 2000.

## New Professional Development Activities

The following activities are being developed by a national committee, with the intention of offering them to full time emergency managers in the financial year 2000/2001:

### Induction course

Contemporary emergency management issues activity.

### National Studies Program

The final activity in the National Studies Program for the financial year 1999/2000 is the workshop titled *The Rural Decline and Emergency Management in Australia*. The aim of this workshop is to identify the effect that the rural decline has on emergency management arrangements and capabilities within rural communities throughout Australia. This activity will be held at Mt Macedon from 10 to 12 May 2000.

The National Emergency Management Committee recommended the conduct of five activities for the financial year 2000/2001. They are:

- Measuring the Performance of Disaster Mitigation Projects and Programs
- Community Safety - Towards a Safer Community
- Economic and Financial Aspects of Disaster Recovery
- Determining the Effectiveness of Emergency Services Volunteer Brigades/Units
- Emergency Management of Australia's Cultural and Linguistic Diversity.

## National Seminar

### The Essential Service Disruption Seminar

*Eden on the Park - Melbourne*

*May 8-9, 2000*

The Essential Service Disruption seminar will be held at Eden On The Park in Melbourne from 8-9 May 2000.

The aim of the seminar is to share the lessons learnt from recent significant essential service disruptions, including the Auckland electric power failure, the Victorian gas shortage and the Sydney water quality incident.

### For registration details

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# An Internet-based emergency management forum for Australians: The Australian Emergency Management Forum

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The use of the Internet as an emergency management tool is increasing around the world at an enormous rate. Here in Australia we already have some very impressive emergency management sites, the EMA site and the Macquarie University's Natural Hazards Research Centre site are prime examples. Most state and territory emergency management agencies have their own Internet sites and these are providing increased access to emergency management plans, procedures, public awareness information and preparedness guides.

In 1998, emergency management teaching staff at Charles Sturt University recognised there was a need for an Australian based online emergency management discussion forum. A similar service has been in operation in the USA for a number of years.

This service, the Emergency Information Infrastructure Partnership ([www.emforum.org](http://www.emforum.org)) focuses on emergency management issues pertinent to the USA. The EIIP has welcomed international participation in its online activities, however time differences have precluded most emergency management professionals in Australia from participating in the live sessions.

Staff at CSU felt that a similar service established in Australia would enhance emergency management within the region and provide a venue for the discussion of Australian and regional emergency management issues. In 1999, Charles Sturt University was successful in obtaining IDNDR funding to develop and implement the Australian Emergency Management Forum (AEMF).

The AEMF will provide a number of online services that revolve around its core features of an online discussion forum and chat facility. It is planned that each month the AEMF will host a one-hour online chat session on a selected emergency management topic. A paper on the selected topic will be posted on the site prior to the scheduled chat session. The author of the discussion paper will be online 'live' during the chat session to answer participants' questions relating to the paper and discussion topic.

In addition to the chat session, a news group styled discussion forum will be available for visitors to post specific or general emergency management questions or issues. The use of this type of discussion facility enables questions and issues to be

raised in an open environment, thereby promoting potentially widespread involvement by the general emergency management community. Charles Sturt University currently utilises such discussion forums to bring together distance education students in specific subject cohorts. The use of these forums facilitates interaction and networking between the forum participants.

The AEMF will also provide links to previous discussion papers, chat session transcripts and Australian and International emergency management agencies, education and training providers, research facilities and Non Government Organisations. Agencies and organisations with a vested interest in emergency management will be invited to become associates of the AEMF, and links to their web sites will be provided from the AEMF site. Associates will also be able to provide specific advice and assistance in their area of expertise.

It is planned that trials and testing of the site will commence in January 2000, with the site being fully online by March 2000. Information regarding forthcoming online activities, emergency management and AEMF updates will be promulgated to associates and other interested organisations, groups and individuals on a regular basis via email.

The success of the site will hinge on the participation of organisations and individuals in the online activities. Therefore, if you are involved in emergency management at whatever level and would like to discuss emergency management issues that concern you, you are strongly encouraged to become a part of the Australian Emergency Management Forum and its activities.

## For more information

If you would like to participate in or receive further information regarding the Australian Emergency Management Forum, please contact the forum administrator:

Ian Manock at CSU  
email: [aemf@csu.edu.au](mailto:aemf@csu.edu.au)  
ph: 02 63384907  
fax: 02 63384993

# A reconsideration of the nature and role of resettlement housing and housing materials in natural disaster recovery in indigenous communities

## Introduction

Shelter, as an integral part of the built environment, impacts dramatically on disaster recovery and adjustment. There are multiple studies documenting how built environments affect behaviour and recovery processes that support this argument. (Ittelson et al 1974, 1976, Bell et al 1996, Taylor 1984; Raphael 1986, Oliver-Smith 1986, 1992; Brown & Perkins, 1992). There is a complex and consequential mutual interaction between people and their built environment (Rapoport 1969, 1977; Tuan 1974). Built environments have the potential of being stress-inducing or stress-reducing (Saegart 1976); they can both facilitate and inhibit human activities (Rapoport 1977). The built environment can play a very supportive role and therapeutic role in helping people adjust to dramatic change, catastrophe, and personal and family loss. This depends in part on the familiarity, meaningfulness, and responsiveness of the setting itself to individual, community and cultural need (Reser 1979, Sommer 1974). The extent to which the built environment can be determining with respect to behaviour and psychological well-being depends on the experiential state of occupants; the more stressed individuals are, the more determining and consequential the impact of the physical setting (Reser 1989).

The real human tragedy that occurs when one loses a home due to a natural disaster is arguably not so much the loss of physical property and one's residence per se, but the loss of that place from which one derives self-identity and meaning (Read 1996, Bunbury 1994). It is through place attachment, identification and meaning that we anchor, situate and locate who we are. In the aftermath of a natural disaster and resettlement, the need for orientation, anchorage and meaning is paramount. Shelters provided in post-disaster relocation and rehousing situations cannot adequately provide for long-term recovery until a victim is able as well to re-establish a

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'sense of place' and achieve some sense of equilibrium.

Recovery, adjustment and the sustainability of communities after natural disasters are all founded on a very deep sense of place attachment and meaning (Altman & Low 1990, Altman & Warner 1985, Marcus 1997). How the physical environment of resettlement settings relates to, reflects, and validates these meanings are crucial to the recovery of disaster victims. Construction materials for disaster relief housing, as well as the nature, design and siting of such housing, can play an important role in creating this supportive environment. The nature and character of differing building materials can reflect and embody different symbolic meanings relating to security, stability, values, and identity, all of which contribute to one's sense of well-being and connectedness to place (Rapoport 1991, Ackerman 1990, Rodaway 1994).

This paper explores the Aetas' perception of their current rehousing and resettlement setting and the role these settings play in facilitating and frustrating recovery, and with respect to on-going individual and family adjustment and social and cultural change. Particular consideration is given to the type of grass huts built for Aetas as 'permanent' resettlement shelters. Though this type of structure has been traditionally used by Aetas for shelters before the eruption, Aetas believe they are no longer appropriate in their current situation. This somewhat surprising situation highlights a more general misunderstanding of the role which shelter can play in the recovery

process. The aim of this paper is to canvas a number of important cultural and psychological issues that resettlement agencies need to consider in designing post-disaster resettlement accommodation for indigenous communities.

## The context: Mount Pinatubo, mitigation, and resettlement

Extensive relocation of more than 5,400 indigenous families, known as Aetas, was undertaken by the Philippine government after Mount Pinatubo erupted in 1991. Mount Pinatubo is one of the highest peaks in the west-central region of the island of Luzon and stood at 1,745 metres above sea level before the eruption. This area is adjacent to two United States military bases; Clark Air Base which lies within 25 kilometres east from the volcano's summit, and Subic Naval Station which is 40 kilometres south-west (Wolfe & Hoblitt 1996). As indigenous dwellers of the region surrounding the volcano for more than 600 years, the Aetas were considered the hardest hit by the eruption and 7,800 families or 35,000 persons lost and were forced to flee their homes (Bautista 1996).

Evacuation and relocation preventive measures were undertaken to protect upland and lowland communities from being buried under tons of volcanic ash. The volcano, which was dormant for about 600 years, released more than seven cubic kilometres of pyroclastic materials (Fernandez & Gordon 1993) affecting an area 850km by 400km and a population of more than a million. The Philippine Atmospheric and Volcanology Department (PhilVocs) estimates that 40-60% of these materials are erodible, and only 50% of these erodible materials have been washed down from the volcano's slopes as of 1992. About 29 'barangays' (settlements) became uninhabitable in 1992 and about 9,829 families (53,435 people) became homeless (Bautista 1996), see *Figure 1*. Several river channels were clogged and hectares of agricultural lands

were damaged (Solidum 1993, Fernandez & Gordon 1993). The remaining deposits, which are estimated to move down for eight to ten years, render the remaining unaffected lowland communities vulnerable, with a very real possibility of further evacuation and relocation. Though megadikes have been built to protect communities, commercial and industrial districts, secondary explosions have blocked natural channels and diverted lahar flows to unprotected zones. Even if these flows cease, the loss of natural drainage paths still leaves communities vulnerable to seasonal floods (Solidum 1993).

The relocation and resettlement experiences of Aeta communities have not been uniformly positive. Many found their resettlement setting incongruent with their traditional lifestyle leaving them feeling inadequately sheltered and protected. Many abandoned their new homes to return to their old hazardous homesites, to seek employment opportunities in the cities, or to beg. As traditional mountain dwellers, isolated from the lowland population for several centuries, and having their own cultural beliefs and lifestyle, the new lifestyle in the resettlement areas, patterned after lowland settlement policy, has imposed its own difficult and often insuperable adjustment and adaptation demands.

While relocation and resettlement programs generally were able to address and reduce the vulnerabilities of communities against volcanic and lahar<sup>1</sup> threats, they have at the same time increased other psychosocial costs and risk factors for the Aetas. The current resettlement settings may have succeeded

as 'emergency shelter' in the short term, but have failed to address the long-term adjustment and accommodation needs of Aeta communities.

### Resettlement communities and consequences

The lifestyle Aetas<sup>2</sup> enjoyed in their traditional homes in Mount Pinatubo<sup>3</sup> before the 1991 eruption was characterised by self-sufficiency and independence from the outside world, despite years of colonisation by Spain, Japan and the Americans. Aetas were able to maintain and enjoy their subsistence-based communities and culture. They enjoyed a healthy and satisfying lifestyle based on hunting, gathering and shifting cultivation, and, while they were fully dependent on the forest environment for food, water, medicine and shelter, they were also independent and autonomous with respect to the larger Philippine society (Shimizu 1989).

In resettlement sites, however, an almost total dependence on outside help and government support now characterises the Aetas' lifestyle. Adjacent lands provided for farming were found to be mostly unsuitable for planting, did not have access to water, and were barren and badly degraded. The lack of food, cash income and forest resources have made the Aetas dependent on relief goods provided by agencies in the initial years of their resettlement. In significant ways, the relief efforts reinforced their feeling of helplessness, loss and degradation. Emergency and relief support had little effect in alleviating poverty and poor living conditions. Six years after their relocation over 60-70% are still earning

less than P3,000 (Aus\$150.00) (MPC, 1996) a month, are unemployed, eat only twice a day or less and suffer diseases related to nutrition, sanitation and hygiene. At this point of almost complete loss of self-respect and self-determination, the Aetas' culture of self-sufficiency and independence is on the brink of extinction (Shimizu 1992).

The Aetas' self-sufficiency and independence is linked to their strong spiritual bond with Mount Pinatubo. Their relationship and bond with the mountain has been likened to that of an umbilical chord in a mother's womb connecting the mother and the child (Shimizu, 1992). They believe it is the home of their ancestors and 'the dwelling place of their God - Apo Namalyari, the One who creates, the One who makes the whole of creation grow and live' (Lakas 1991). They believe He gave them this land and to this land, they belong. They call themselves 'katutubo', meaning, 'the one who comes from this land' or 'the one who comes from this country'—as opposed to the 'dayuhan', meaning, the 'stranger or outsider', or 'one who does not come from here', a name they use to refer to people from the lowlands.

The status of the Aetas' ancestral lands at present has left Aetas with little or no options for relocation. Most of their traditional homelands have been buried in volcanic ash—some that may have been only partially covered are still unsafe for habitation. Other lands that have recovered have either been claimed by rich land-owners or mining companies, or were developed by government corporations as resorts or new economic zones (such as the former Clark Airbase in Pampanga and Subic Airbase in Zambales). The 'ambiguousness' of the Philippine government's law on ancestral domains has made the Aetas' battle against mining, developers and logging companies very difficult. Even the newly passed October 1997 Indigenous People's Rights Acts does not fully recognise Aeta rights to their ancestral land<sup>4</sup>. Land policy before the passing of the 1997 IPRA had considered all undocumented lands in the Philippines as part of the public domain, regardless of how long they have been occupied (Poffenberger 1992). In effect, all inhabitants of the Philippine forests, including indigenous cultural minorities groups, were considered virtual squatters by law. Aetas who did not avail themselves of resettlement accommodation and who chose to remain in Mount Pinatubo's forested lands consequently bear this status.

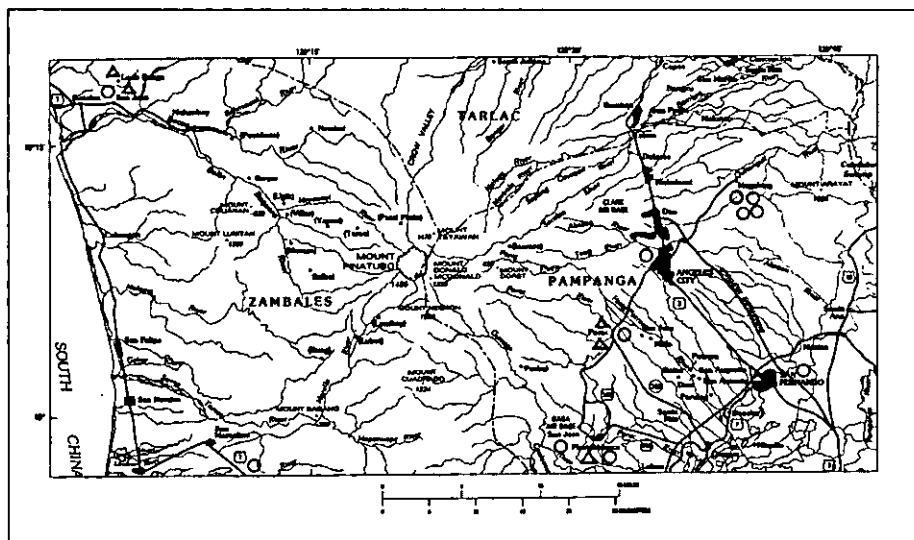


Figure 1: Map showing location of settlements (towns cities and provinces) affected by the 1991 Mount Pinatubo eruption and the location of some government-built resettlement sites. Settlements in brackets were destroyed and buried by the eruption. Settlements in Bacolor and Poonbato were inundated by subsequent lahar flows. (Legend:  $\Delta$  = location of upland Resettlement sites,  $\circ$  = location of Lowland Resettlement Sites.)

The resettlement program in a way provides some emancipation from the Aetas' illegitimate state. As beneficiaries of a legitimate piece of resettlement land provided by the government, they have acquired a legal stake and status in society. Hence, even though some Aetas have been able to return to their ancestral lands, they have not broken their new connections with the resettlement sites. Their legitimacy as residents and landowners has ensured their access to free and desired education for their children and medical and social services support. These constitute rights and benefits that they feel they never enjoyed from the government before the eruption.

### Settings, policies and housing

The Mount Pinatubo Resettlement Program built a total of ten upland resettlements for Aetas, see Figure 2. By the end of 1996, 5,414 families (approx. 32,484 people) had received permanent housing. Each new Aeta settlement had an average population of 300-600 families. Primary and secondary schools, medical centres, community halls and recreation centres were provided, along with some basic facilities such as deep wells, water distributions systems, public toilets, roads, and for some, electricity. Home plots awarded per family unit range from 100-200 square metres and are legitimised by a 'Certificate of Stewardship Contract' and a 'usufruct contract'<sup>5</sup> (MPC 1996). Family and tribal groupings were closely maintained in the resettlement sites. There has been a mixing of several family grouping from other tribes, but differentiation was visibly defined by block areas within the site. Some had large spaces between them. In some cases bamboo fences were built by the tribal communities themselves.

Grass huts were the principal type of housing provided in upland resettlement areas for Aeta shelters. These were built by a 'self-help' or 'bayanihan'<sup>6</sup> system in which shelter construction is undertaken by the whole community (NHA 1992). Lightweight materials such as bamboo,



Figure 2: An aerial photo of a typical Upland Resettlement Site built by the government in 1991 to relocate and accommodate Aeta families displaced by the Mount Pinatubo eruption (Source: Mount Pinatubo Commission as of 1994)

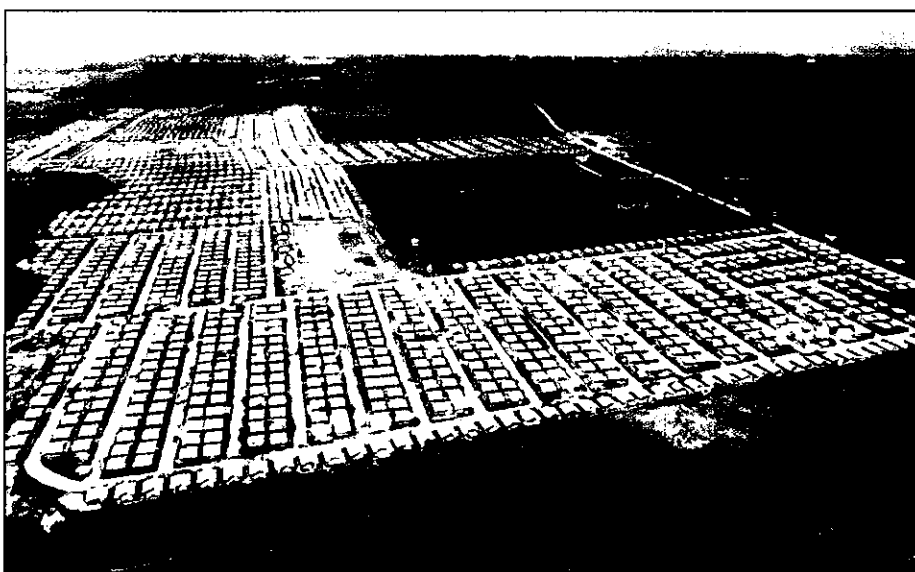


Figure 3: An aerial photo of a typical government-built Lowland Resettlement Site to accommodate and resettle communities of the lowland areas displaced by the Mount Pinatubo eruption (Source: Mount Pinatubo Commission as of 1994)

cogon grasses and nipa thatches were provided by the government and non-government agencies. Each shelter consisted of a core unit of about 2.5 x 4 metres, elevated on stilts at about 0.80-1.2 metres from the ground. Coco lumber was generally used for shelter frames, bamboo poles used for walls and floors,

and nipa palms for thatched roofs. Aetas used the core unit mainly for sleeping and storing valuables. The units did not include a toilet, bath, kitchen, and living area. Public toilets, bathing areas and water points were provided in certain blocks along the streets. Beneficiaries, in their own time and with their own

#### Notes:

1. Pinatubo Lahar is a flowing mixture of loose volcanic sediment and rainwater. Depending on their consistency, they travel at speeds of 2 meters - 8 meters per second. Consistencies of 20-60% sediment by volume erode laterally, while those up to 80% erode vertically, lift large boulders and bridges. (Solidum, 1993).

2. The Aetas is a cultural minority group considered the first immigrants in the Philippines and the inhabitants of the Zambales range where Mount Pinatubo is located.

3. Mount Pinatubo is one of the 21 active volcanoes of the Philippines and lies in the central part of the Zambales range in Central Luzon. It was dormant for 600 years

when it erupted in June 1991 (Fernandez, 1993).

4. An Indigenous People's Rights Act 1997 (Republic Act 8371) has just been signed by the Philippine President Fidel Ramos last October 29, 1997. The law's sincerity to ensure rights of indigenous people has however been criticised by human rights groups because of IPRA's Section 56 that states, Property rights within the ancestral domain already existing and/or vested upon effectivity of this Act, shall be respected and recognised. In principle, no ancestral land, which is part of public domain has been free of encroachment and control from the government (mining and developers) or rich landowners.

5. The beneficiaries' current use of land is legalised by

a Certificate of Stewardship Contract under the Integrated Social Forestry Program of the Department of Environment and Natural Resources. Usufruct contract, which is currently processed, is defined by the Mount Pinatubo Commission, as the right to use public land.

6. Bayanihan is a Filipino traditional way of showing a spirit of community solidarity and concern for the welfare of the other. It forms part of the Filipino culture and is particularly strong in rural areas. It works on the principles of reciprocity. The family whose house is being built prepares food for assisting members until the house is completed. Normally, it takes 2-3 days to a week, depending on the number of people working, to complete a thatch house.

resources, have to undertake extensions and modifications to achieve other functional spaces, if they wish to. Construction of each core house took from two to three weeks. Length of construction depended on the number of people working on the thatch house.

In contrast, concrete housing was provided to the new town centres built by the government for lowland settlers, see *Figure 3*. More than 39,000 displaced families were housed by the end of 1996. Construction of additional concrete housing is still progressively being done to house eight thousand more families by the end of 1997 (MPC 1997).

A few Aetas were able to build houses in concrete at their own expense. Masonry construction using blocks from volcanic ash and cement mix became very feasible and a profitable industry after the eruption.

The tons of volcanic ash that blanketed thousands of hectares of land were readily accessible for everyone to use. Construction costs at that time became cheaper, and the quality of blocks produced performed better than conventional blocks made from river sand (ITDI, DOST 1991 in UAP 1995). Validity tests conducted by the Department of Science and Technology showed they were as much as 5 to 6 times stronger than river sand blocks. The abundant supply of volcanic ash, its proximity to resettlement sites, and its practical use, makes the material most appropriate for rebuilding and reconstruction after the eruption's devastating effects.

One of the two general policies of the Mount Pinatubo Commission (MPC) has been 'to restore the living conditions of the Aetas and other cultural minorities'. MPC is a funding body mandated by the Philippine government to dispense P10 billion for the Mount Pinatubo victims' aid, relief and rehabilitation and infrastructure support (MPC 1997).

Since the Aetas' have long existed in living circumstances that involve the traditional use of lightweight materials for their dwellings, the commission deemed it was appropriate that lightweight materials be provided for the Aetas in their resettlement accommodations. Such materials, they believed, would replicate their traditional living environment and offer them greater flexibility, unlike concrete dwellings. A trade-off was also made by providing each family unit with a 100-200 square-metre house lot, a lot area twice the size of house lots allocated in lowland settlements.



*Figure 4: A typical housing unit constructed in bamboo and grass or nipa, an accommodation provided by the government to Aetas in the Upland Resettlement Site as a permanent post-disaster shelter.*

The Office of the Northern Cultural Communities, a government body in charge of advising the government on cultural minority affairs, also endorsed this concept, based on their consultations with Aeta leaders.

Basically, the resettlement program was seen by the government as a rare opportunity to plan new townships and conglomerate different settlements into one area, thereby economising government services such as schools and medical facilities. It was also an opportunity to weave the resettlement program into central Luzon's Regional Spatial Development Strategy, wherein the region was conceived as a transit lane or a catchment area between the resource-rich provinces of northern Luzon and the densely populated industrialised areas of Metro Manila (Bautista 1996).

Envisioned to 'provide for the requirement of Northern Luzon in goods processing, manufacturing and shipment' (Mount Pinatubo Task Force 1991 in Bautista 1996), the resettlement areas were seen to potentially supplement and reinforce this obligation.

Productivity centres (factory-like structures intended for goods manufacturing and packaging) were built in every lowland settlement. The layout of settlements, in both upland and lowland settlements, was strongly linear, with houses and modern community buildings (schools, medical centres, public halls) arranged around a community 'plaza and in rows along grided street systems'. The development and allocation of housing in each resettlement site was administered by a Resettlement Site Manager, employed by a commissioned body<sup>7</sup> charged with the responsibility for managing the rehabilitation and recovery programs for Mount Pinatubo victims.

### **Satisfaction, symbolism and security**

The Aetas' level of satisfaction with their housing setting and settlement communities is very low. Five out of six resettlement sites visited had a majority of its residents preferring concrete housing to housing made of lightweight materials. Houses built of lightweight materials have badly deteriorated since their construction five to six years ago see *Figure 4*. These structures have endured damages from yearly cyclones and rain, and have undergone repeated major repairs. Many roofs constructed of traditional roofing materials have now been replaced with galvanised iron sheets provided by the government and other non-government agencies. This material lasts longer than cogon grass or nipa thatching. The galvanised iron roofing has also been useful with respect to the storing of rainwater. But the walling, floors, doors and windows remain unrepaired and have become very problematic with respect to keeping out stray animals, insects, flies and unwanted visual access to the home.

Those few Aeta families who were able to renovate their houses using concrete blocks and masonry had better access to employment and other resources. Their living conditions were much better than their fellow Aetas who lived in houses made of bamboo and wood, and they were able to realise appreciable savings which

#### **Notes:**

7. Initially, it was Task Force Pinatubo. In 1992, Mount Pinatubo Commission was created from R.A. 7637. MPC became a special body for policy formulation, planning and administration of the 10-billion peso Mt Pinatubo Assistance, Resettlement and Development Fund, appropriated for the aid, relief, resettlement, rehabilitation and infrastructure support for the victims of the 1991 Mount Pinatubo eruption (MPC, 1996).



*Figure 5: A typical concrete housing unit built in Lowland Resettlement sites by the government. Some Aetas who resettled here availed with this kind of housing.*

did not have to be spent on yearly repair and maintenance. The stability of the concrete structure, according to these residents, has given them more security from natural calamities as well as allowing them to make an investment for the future.

This permanence of residence has also boosted their self-esteem. Some reported that their concrete housing has made them feel more human, 'not anymore like egg-laying fowls' living in grass huts. (Lowland people keep their fowls in grass huts. Aetas normally keep their fowls free or tied to poles.) Aetas in some resettlement site were ridiculed with a visiting politician's comment that their shelters looked like 'pigeons' nest' ('bahay nang pati') in comparison to their concrete block public toilets. Such ridicule helped to 'stigmatise' the image of the 'grass huts' as sub-standard and unfit for human habitation. For many Aetas, living in a 'house' which looked and felt like the chicken coops of their lowland neighbours was a matter of considerable shame and embarrassment. Aetas residing in grass huts identified with the stigma and felt less human in that type of dwelling.

Some Aetas who resettled in lowland settlements, and therefore were able to avail themselves of concrete housing, expressed higher satisfaction with their housing and settlement situation as compared to Aetas who resettled in the upland resettlement sites, see *Figure 5*. Though these lowland residents have very pressing problems with respect to employment and access to old homesites where they get most of their living sources, their housing situation, they said, has given them a secure place to stay and tenure that they can rely on. Since these houses were among the newer houses built by the government, their quality was also better (concrete floors were provided

unlike the earlier houses built).

No official study or assessment survey has been conducted by the government to determine Aeta housing preferences or satisfaction levels. The government sees Aeta housing needs as a lesser priority as compared to their ongoing need for sustainable work and income occupation. The Aetas' need for better housing and resettlement conditions is neither acknowledged nor supported by strong political platforms, though they have been noted in the basic minimum needs report made by the Department of Social Welfare and Development. Their political organisation is weak and there is great disunity among the different Aeta tribes (which has traditionally existed in Aeta history). In addition, confusion and conflict within Aeta communities is worsened by the presence and influence of varying non-government and religious organisations operating in Aeta communities. Many of these organisations are also involved in developmental programs such as housing, medical, and social services aimed at Aeta disaster recovery and rehabilitation. Many of these programs complemented the government's recovery programs, while others were redundant. Some were critical to the government's capacity to deliver services, further eroding the Aetas' confidence in the government's sincerity or ability to assist them with their resettlement needs.

The provision of masonry housing for Aeta communities has never been the intention of the government, even if each unit by direct contract cost the government only about P49,000 (Aus\$2,500). The government's decision not to provide concrete housing to Aetas perhaps reflected the assumption that Aetas did not have the capacity to pay the monthly amortisation required for acquiring

government-provided concrete housing. However, looking at the current condition existing in lowland resettlement sites, none, or at most only a handful of the 40,000 families resettled, have so far started paying, or have been willing to pay, the government since they started collecting in July 1996.

An important and unanticipated aspect of concrete housing is the symbolic meaning which has accrued to such housing in terms of permanence, i.e., a better standard of housing, government commitment, and individual security. These meanings are rather independent of the culture-specific symbolic meanings associated with traditional Aeta housing, but they are nonetheless very important aspects of the symbolic meaning of home and place (e.g., Altman & Low 1992; Marcus 1997). What has been ignored is the role which the built environment plays in relocation and disaster recovery situations, and the powerful symbolic, psychological, and political messages that particular kinds of housing solutions convey. From a psychological perspective, the housing solutions which have been implemented have largely frustrated individual and community coping and adjustment, and they have eroded individual control at the same time that they have increased individual and community dependency (Reser 1979, Spacapan & Thompson 1991). Yet there was a real potential in the case of Mount Pinatubo and the Aeta people for more sympathetic and realistic housing and relocation policies which might have assisted and supported individual and community coping with natural disaster and change generally.

The 'traditional' housing units provided to the Aetas at the time of their resettlement have acquired their own status value and symbolic importance, in this instance very negative, and are viewed as a very unacceptable political and policy statement. Up until the present, many Aetas believed the lightweight materials provided by the government were only meant to build temporary shelters.

They claim that ever since they moved in, concrete housing has been promised by government officials. Demand for concrete housing as opposed to the bamboo and grass materials provided by the government was always high, but is currently increasing. The failure of the government to see and recognise this expressed and salient need for stable, permanent housing has left many Aetas frustrated, demoralised, and greatly dissatisfied.



## Cultural context, meaning and congruence

Continuity with the past is the greatest challenge Aetas are facing today. The threat to their cultural existence as Aetas has much to do with the Aetas' perception of a growing loss of continuity with the past and little control over the future in their current relocation and resettlement situation. Before Mount Pinatubo erupted, the Aetas' sense of continuity had been secured for generations by the protective walls of a place called 'home', a place always tied to land and community. 'Home' was where their ancestors lived, worked, died and were buried. 'Home' was also the family grouping to which where they belonged and identified with, and which made them distinct from other groups, tribes and communities. 'Home' was also where the Aetas' sense of privacy, security, stability and meaning emanated from.

Family groupings of one, two, three or more families characterised the traditional Aeta settlements in Mount Pinatubo (Shimizu 1989). Enclosed structures, often described by researchers as bamboo and wooden huts or sheds, are actually part of an invisible and extended structure of the Aeta home. Enclosed structures are often used only for sleeping at night, and sometimes for keeping valuables. Domestic activities, such as food preparation, eating, washing, laundering, toileting and bathing take place outside these enclosures, or outside the house as observers may mistakenly say.

Privacy from other family groupings, as well as strangers, was possible because of the nature of the area and the way in which space was structured (See Figure 6). Security was also not an issue. Communally owned home lots where Aetas built their dwellings were as big as three hectares, and normally included swidden farms and plots of orchards and vegetable gardens (Shimizu 1989). Bamboo and grass structures and construction sufficed to deter unwanted visual access or social interaction.

Continuity with the past also emanates from the Aetas' great respect and reverence for their ancestors. Burial grounds are kept sacred and protected. Their ancestors' history is passed on from one generation to the other through oral traditions. Things, objects, forests, mountains, hills in their ancestral lands, which they believe they own, are used to tell their stories and are therefore carefully maintained to ensure the continuation of these stories. They constitute a literal and metaphorical text in which people situate their lives and tell their cultural narratives (Howard 1991).

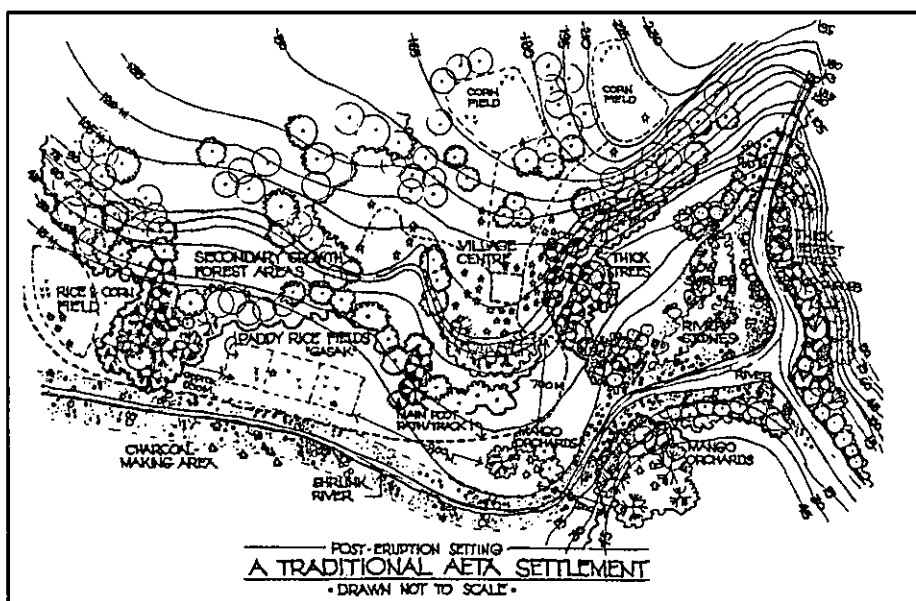


Figure 6: A typical site layout of a traditional Aeta settlement situated near the slopes of Mount Pinatubo after the eruption. Recorded by the researcher as of May 1997. Layout is drawn not to scale. Contours are represented in dummy numbers (highest area is estimated at 250-300 meters from the lowest point of settlement).

The current Aeta resettlement setting, however, though still maintaining family groupings, destroyed the invisible structure of the traditional Aeta 'home', see Figure 7. Privacy, security and sacredness of place have been largely violated. The smaller home plots of 100-150-sq. metre awarded to family units, instead of family groupings, not only disturbed their sense of territorial space and communal ownership, but placed the future of their forthcoming generation in uncertainty. The concept of private ownership, for them, fragmented the cohesiveness of the structure of their family and family groups. Common burial places provided by the government meant they had to share burial grounds with other tribes, many of whom they were at odds with, and some lowland groups, with whom they share a history of considerable antagonism and dislike. Such practices for Aetas would desecrate their ancestors as well as disrupt and distort the continuation of their stories.

The permanence and tangible presence and occupancy of the small land and shelter provided by the government, have become the only heritage Aetas believe they can pass on to future generations. A stable and strong home, like the concrete homes they have seen built by the government for their lowland counterparts, they believe can at least ensure stability in their lives and a modicum of well being. Since they are now in the midst of densely populated communities, with rising crime rates and social conflict, a strong dwelling is seen to ensure security both literally and symbolically. The popular belief is that a concrete house is safer against burglaries, vandalism,

cyclones and fire, than bamboo and grass structures. As each cyclone season passes, cyclone and seasonal rain are also seen to cause minimal or no damage to concrete housing, in contrast to the current structures they are living in which need constant repair and maintenance. Such repairs and maintenance have caused them to regularly cut available trees, frustrating reforestation programs and further degrading eroded lands. Since these materials are not always readily available, the demand for maintenance has further pushed Aetas to a degrading dependence on the government and relief agencies. The lack of cash income has deprived them from buying these materials in the market. Operating small 'sari-sari' stores (local name for variety store), food industries and handicrafts are also seen to be more viable and possible in a strong, stable and secure house.

Aeta resettlement settings are also faced with myriad problems of inappropriate design. A telling and very consequential example of totally inadequate design thinking relates to the provision of toilets. Private toilets and bathing places built in concrete are supposed to ameliorate the sanitation and hygiene problems which plague resettlement sites. Unfortunately, the concrete communal toilets beside main streets, designed and built by the government, were grossly inappropriate. The traditional toileting practices of Aetas, performed in bushes or open fields, are done in private. There was and is no such thing as 'toileting' together. Even if extraordinary circumstances required this among family members, toileting with strangers is unthinkable! The lack

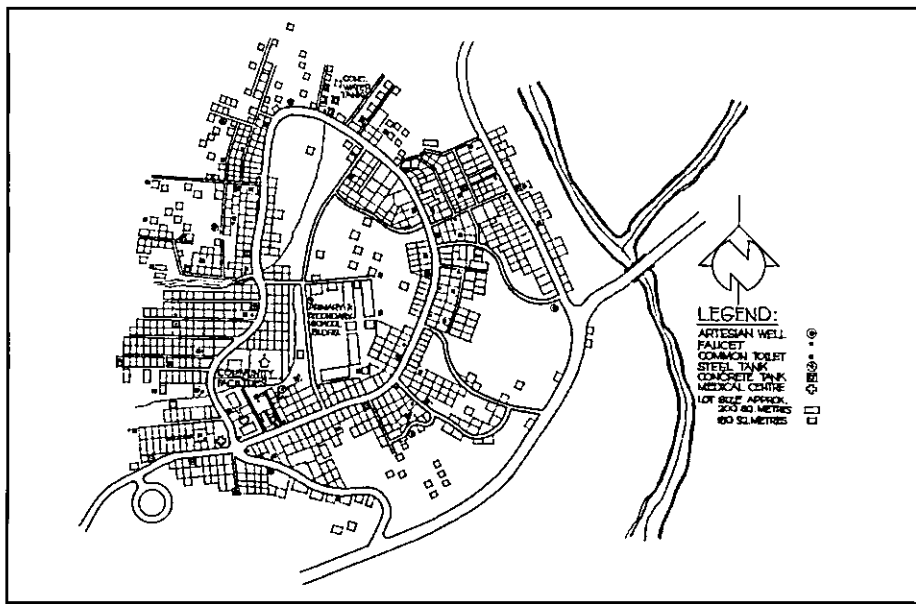


Figure 7: A typical site layout of an Upland Resettlement Site built by the government to relocate and accommodate displaced Aeta families.

of water and the faulty designs of public toilets (some without doors and roofs), makes the maintenance of the toilets very difficult, if not impossible. Even if great efforts were made to clean the cubicles, the dirt/sand floors and the lack of water ultimately clogged waste in the pipes. The absence of roofs and the hot topical environment dried water seals in toilet bowls, releasing the foul smell of the septic tank. Due to poor maintenance, public toilets in resettlement sites have remained unused and abandoned.

At present, efforts through the Department of Health were made by some local governments to provide private toilets to Aetas. Many of these, however, became useless because of faulty construction. In one settlement site only 10 out of 96 toilet bowls installed in 1995 were found to still be functioning in 1996. Faulty construction was blamed, not only on poor construction quality, but also to lack of cement material provided by the agencies responsible. Meanwhile, the majority of the Aetas still uncomfortably seek their private places at night near bushlands for toileting—places which unfortunately lie near riverbeds and drainage lines. The resulting and severe pollution to water and air has caused serious health and sanitary problems to all residents of the site. Aetas also experience guilt and shame for not only trespassing private land and territory (which is not practised in their culture) but also defiling such land (which is considered a great offence, not only in their own culture but also by the lowlands).

### Implications for recovery

The difference in housing materials for

upland and lowland settlements has created a clear disparity of living conditions among the two groups of settlers. Lowland settlers appear to be economically better off than upland settlers who have spiralled down into poverty. Instead of assimilating the Aetas to mainstream society, which is one of the government's objectives, their current housing situation has left them effectively marginalised. Since disaster recovery has always been associated with economic development, priority has always been given to emergency support. Housing has not been seen as of equal importance. However, the failure of emergency and relief programs in improving the Aetas' quality of life and economic condition, suggests that such priorities and policies are not realistic. The critical need for more permanent housing for Aetas as an integral aspect of their resettlement, and the symbolic messages of less permanent shelter, have been largely ignored.

In the Aeta resettlement experience there is much to suggest that their housing conditions have affected their ability to cope with the disaster. Instead of supporting and facilitating recovery and integration, their rehousing has, ironically, frustrated this recovery and adjustment in multiple and cumulatively debilitating ways. These impacts typically relate to a cumulative erosion of individual and community control over everything from food, to income, to repairs, to crime, to self advancement, to legacy and security for one's children. There has also been a more subtle erosion of control due to the absence of a more responsive, congruent and supportive built environment in terms

of design and planning. What has made these interacting design problems and disaster recovery problems more acute is the fact that the very nature and meaning of the houses provided suggested impermanence, marginal status and no control.

There is a serious need for agencies to evaluate their resettlement programs and realign housing strategies with community needs and cultural and psychological realities. It is very clear in the Aeta case that the use of traditional materials is no longer culturally viable. The physical and psychological stability that concrete construction appears to provide in the Aeta housing context must be further explored. The abundance of volcanic ash for concrete block construction offers an economical and practical solution to the provisional low-cost masonry housing for Aetas. It also minimises the cutting of trees and the clearing of bush lands and ensures a more hygienic and sanitary environment.

Concrete block housing, though objectively rigid and cold, gives the impression of permanence, stability and strength. To the Aetas it offers an alternative shelter that can compensate for the protective environment lost due to the Mount Pinatubo disaster. Natural catastrophes are not the only hazards Aetas perceive in their resettlement situation, but also 'cultural hazards'. The eruption of Mount Pinatubo signifies the birth of a new Aeta existence. The new environment brought about by their resettlement process offers a new Aeta reality—requiring and demanding a new cultural existence and the re-establishment of a 'sense of place' in order for them to survive. Until Aetas find this, until the Aetas are able to re-establish a place they can call their own, the Aeta culture may not survive (Shimizu 1992). Once the Aetas' dignity and pride for their ancestry and identity as Aeta is gone, this will be the end of Aeta culture. And that will be the *ultimate* Aeta disaster. Hence, it is not against natural hazards that they want protection, but against the hazards of a 'cultural imposition' brought about by the process of their resettlement and rehabilitation. Such hazards have threatened and have started to erode the very core of their cultural existence, their pride and dignity as Aetas. Unless they find a 'shelter' that makes them feel safe and less vulnerable to the demands of the 'alien' culture, coping will be much more difficult and recovery may never happen.

### Conclusion

The Aetas' demand for stronger and more permanent housing, such as concrete structures, clearly suggests that the

bamboo and grass structures provided by the government, are not the structures that Aetas are seeking to replace lost 'homes'. To the Aeta, 'home' equates with their ancestral land, the mountain, the forests and the rivers. The enclosed structures we see as bamboo huts and sheds (which Aetas use only for sleeping) are just part of the invisible home structure of the Aeta. The large tracks of land, the family groupings of 3-4 families, the abundant supply of housing materials and food provided by the environment are symbolic protective walls that protected the Aetas' privacy and self-sufficient lifestyle. Unfortunately, these do not exist anymore in their current resettlement situation. The bamboo and grass housing provided in resettlement sites, while superficially similar to their traditional housing, has left the Aetas feeling vulnerable, unprotected and unsafe.

There appears to be a strong need on the part of relocated Aeta people for housing and residential community 'solutions' which, symbolically and actually, provide for security (including economic security and security of tenure), experienced control, privacy, and sense of place and home. This place attachment provides not only for psychological and social equilibrium, it provides a 'place' from which the Aeta can come to terms with not only the natural disaster which precipitated their relocation, but their now irreversible loss of their traditional homelands and way of life. The houses in which they now reside have come to express, and symbolically represent, where they are at with respect to all of the events that have taken place, i.e. what they have left and what they have secured for the future. This psychological reality is rather different from the more traditionally-inspired design thinking that characterises indigenous housing literature. Perhaps we, as designers, must be more open to the multiple needs that the built environment serves, and to the reality that the Aeta culture is not encapsulated by the bamboo and grass hut that characterised their Mt Pinatubo existence, but, like all cultures, by an ongoing complementarity of human setting to human need.

### Acknowledgements

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## Disaster Events Calendar

**March 11-17 2000**  
**Melbourne, Australia**

*World Water Congress 2000*

Sponsors: International Water Resources Association (IWRA) and others.

**Contact:**  
IWRA  
4535 Faner Hall, MC 4516  
Southern Illinois University  
Carbondale, IL 62901-4516  
or Secretariat, World Water Conference  
c/- ICMS Pty Ltd  
84 Queensbridge Street  
Southbank, Victoria 3006, Australia  
ph: 61 3 9682 0244  
fax: 61 3 9682 0288  
email: worldwater@icms.com.au  
www.icms.com.au/worldwater

**March 16-19 2000**  
**Melbourne, Victoria, Australia**

*Third World Conference for the International Society for Traumatic Stress Studies: The long-Term Outcomes of Trauma in Individuals and Society*

**Contact:**  
Dr Di Clifton  
Scientific Program Coordinator  
121 Fortescue Ave, Seaford VIC 3198, Australia  
email: dclifton@silas.cc.monash.edu.au  
ph (work): 61 3 9550 1479  
fax: 61 3 95501499  
ph/fax (home): 61 3 9786 1918

**Conference Organiser:**  
PO Box 214  
Brunswick East, 3057, VIC Australia  
Email: conorg@ozemail.com.au  
ph: 61 3 9380 1429  
fax: 61 3 9380 2722

The themes of this conference will include, amongst others, understanding the context of trauma, how people heal with and without therapy, factors that increase or lessen the risk of adverse outcome, and the relationship of basic Research to clinical practice. The conference also aims to look at the longer-term outcomes of

traumatic stress in individuals across generations and in society, as many of the longitudinal studies undertaken in the flourishing period of research of the last two decades are coming into maturity.

**March 27-7 April 2000**  
**Bangkok, Thailand**

*Fourth Regional Course on 'Community Based Approaches to Disaster Management' (CBDM-4)*

**Contact:**  
Zubair Murshed  
Senior Program Associate  
Learning and Professional Development  
ADPC, Asian Institute of Technology  
P.O. Box 4  
Klong Luang, Pathumthani 12120, Thailand  
ph: 66-2 524-5378/5354  
fax: 66-2 524-5360  
email: adpc@ait.ac.th  
www.adpc.ait.ac.th/Default.html  
Fee: US\$2000

**April 3-5 2000**  
**Honolulu, Hawaii**

*Building a Disaster Resistant Asia*

Sponsors: U.S. Trade and Development Agency, Federal Emergency Management Agency, and Department of Commerce.

**Contact:**  
Gisele Lee  
ICF Consulting  
ph: 703 934-3255  
fax: 703 934-3243  
email: asia-tda@icfconsulting.com

'The objective of the conference is to match U.S. technology and know-how with emergency management providers in Asia.' Ten countries will be targeted for the conference: South Korea, Indonesia, Thailand, Philippines, Vietnam, Bangladesh, India, Nepal, Sri Lanka, and Taiwan.

**4-6 April 2000**  
**St. Louis, Missouri**

*Fifteenth International Hazardous Material Spills Conference.*

Sponsors: National Response Team, National Governor's Association, U.S. Environmental Protection Agency, and others.

**For details:**  
email: hazmat2000@nrt.org  
www.nrt.org/hazmat2000

**April 24-28 2000**  
**Rotorua Bay, New Zealand**

*International Coastal Symposium 2000*

Sponsors: Coastal Education and Research Foundation, Commission on Coastal Systems of the IGU, and others.

**Contact:**  
T. Healy  
Coastal Marine Group  
Department of Earth Sciences  
University of Waikato  
Private Bag 3105, Hamilton, NZ  
fax: 64-7-838-4061  
email: ics2000@waikato.ac.nz  
www.erth.waikato.ac.nz/ics2000/ics2000.htm

**25-27 April 2000**  
**Rio de Janeiro, Brazil**

*First International conference on the sustainable city: urban regeneration and sustainability*

**Contact:**  
Susan Hanley  
The Sustainable City  
Wessex Institute of Technology  
Ashurst Lodge  
Ashurst, Southampton, SO40 7AA, UK  
ph: 44 0 238 029 3223  
fax: 44 0 238 029 2853  
email: shanley@wessex.ac.uk

The conference aims to bring together professional and practitioners in a wide range of disciplines to exchange ideas and identify best policies in practice for a viable urban environment for the new millennium. Organised by UniverCidade, Rio de Janeiro, Brazil and Wessex Institute of Technology, UK

... disaster events calendar cont. p.65

# 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

For more than 60,000 years Aborigines (Yolngu) living in the tropical monsoon region of northern Australia have sustained their way of life from generation to generation until the arrival of foreigners (Balanda) two centuries ago. Through meticulous observation, learning and memory, and transmitting within their Law and Culture, comprehensive and intimate knowledge of their specific clan estate lands and environments, they have coped with the severe natural hazards of fire, devastating cyclonic winds and rains, extreme floods and food supply fluctuations, in a uniquely successful manner.

In conducting a recent Emergency Management Australia supported assessment of the contemporary situation regarding the hazards and vulnerabilities associated with living in the remote coastal communities of the Northern Territory of Australia, where 95% of the population are of indigenous descent, the well-honed and robust, traditional counter-disaster capabilities of Australia's first settlers were researched and studied in the field. Some details are reported here.

The assured, direct and simple, renewable and enduring, traditional Aboriginal approaches to natural hazard counter-disaster capabilities, contrast markedly with many present-day lifeline and hazard mitigation features and frailties integral to the complex, interlocking, advanced Western services, resources and infrastructure systems, upon which Information Age High Technology Human Settlements are now so critically dependent for survival.

This article outlines the essential elements of the timeless traditional north Australian Aboriginal approach to sustainable living and coping over the many millennia since the Dreamtime. There are valuable lessons that emerge from this study, which if applied

By Allan Skertchly and Kristen Skertchly,  
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thoughtfully to the planning, design, construction and management of remote contemporary human settlements, could reduce some of their critical vulnerabilities to dysfunctional natural hazards and thus make them safer. At the same time, their current high levels of depen-

dency upon expensive distant agencies, supplies and emergency services could be substantially reduced.

## Background

In examining research and technology relevant to the issue of emergency survival 'lifelines' and cyclone shelter provisions in the tropical coastal communities of the Northern Territory of Australia, we (Skertchly and Skertchly 1999) become aware of several unique features that could affect beneficially key aspects of sustainable contemporary human settle-

### A Recent Hazardous Tropical Monsoon Event or 'Sky Fire'

*This blue fire, he said. This blue. Burn my heart. It jump! Like fish jumpin straight down sky. Marl-gan! Sky-fire! Cum-oo, he said. Water. He yelled, Go-ah go-ah go-ah! Rain! Talking Gungganyji... Talking language after the big wind come. Shacks blew down. All shacks. In the mornin after they creep out from behind the rocks where they shelter all night, the bodies. Mumma, he whimper, mumma, stickin his pink and brown paw into hers. Uncles killed. Tribal cousins. Even the big house scatter along the rain-soaked grass...the rain still comin...no one now to tell us what to do.*

*Did they need anyone to tell?  
Mumma, he ask in language,  
what we do?*

*Find your dadda, Manny.  
That what we do.*

*And later that morning with the steam rising and already the stink starting, there had come his father down from the hills, trailed by Jericho and clutching Billy in a bit of old blanket and yowling fit to bust.*

*Boss dead. Wife too. Crushed under a ten be eight beam, huge beam hold up the house. Must've gone hide downstairs from the big wind, dadda say, they all say, looking at the body of this once boss/ruler. Silly man, dadda say.*

*They know better. You can't hide from the wind. You close doors on the big wind it get angry, shake your bones, your house bones, body bones, little sticks it think, it know people little sticks. Flesh fly away like grass in big wind...*

*So they live traditionally, build up grass humpies, one week, two, dadda fishin, helpin the other men bury the dead. They use the remnants from the boss house. Strongly alive again after many weeks...by their Law and Culture.*

*With smiles now and then! That we-ra, mumma say, that wind. It reborn us!*

*Inspired by The Multiple Effects of Rainshadow, Thea Astley 1996*

ment arrangements (Marion 1996, Ayres 1999), of social, economic and technological functioning (ASTECH 1993), and of future responses to emergencies (Pickup 1978, Pickup and Minor 1980, IDNDR 1998).

*The unpredictable and often severe nature of tropical climates has a major impact on the future development of industrial and residential tropical Australia. Floods and tropical cyclones as well as the pervasive problem of drought occur frequently in one part or another of the vast expanse of tropical Australia. Such events can cause substantial disruption and loss. Particularly vulnerable are biological and agricultural production, water supply and its quality, the rate of degradation and impacts upon buildings and infrastructure (roads, communications, power supplies) and disruption to transportation of goods and people, and to quality of living.* (ASTECH 1993)

'Mother Earth has become a strange and agitated place, with a proliferation of hurricanes, floods, wildfires and droughts. What exactly is happening, and what can be done?' (Ayres 1999).

This article focuses on traditional Aboriginal Law and Culture and associated appropriate behaviours and technologies for coping with severe weather in tropical monsoon environments and their possible lessons for today. 'Our ancestors, sheltering in caves, needed to know what risks and dangers existed in their immediate environments as a matter of simple survival. Human beings may be genetically programmed to seek out dangers' (Hennington 1999). As we will see, Australian Aboriginal people had

refined their survival capabilities to a very high degree before the recent advent of foreign settlers. This discourse assumes that positive Aboriginal advancement is both desirable and possible (Skertchly 1987b, Reynolds 1999, Kelly & Pearson 1999).

Although the direct focus of our work has been on the Northern Territory, our analysis is applicable to any similar monsoon region, and particularly to many island communities of the tropics and Indian and Pacific Oceans.

*Australian Aborigines have been called by world-renowned anthropologist Claude Levi-Strauss, 'intellectual aristocrats' among early peoples. Outstanding features of traditional Aboriginal society include sophisticated religion, art and social organization, an egalitarian system of justice and decision-making, complex far-flung trading networks, and an ability to adapt and survive in some of the world's harshest environments* (Flood 1995, 1999).

The climate of tropical Australia has defined the features of the physical and historical landscape of the region (Pittock et al. 1999). Factors such as rainfall and soils have restricted human settlement activity to small pockets within the region and have affected the success of European settlements since last century. Tropical Australia has the highest proportion of Aboriginal and Torres Strait Islander people in the country and their different inherited social and cultural values must be properly accommodated in any consideration of emergency management. Although there are many features in common across the coastal communities of the monsoon region, their overall

direction and management has often been fragmented as a result of their diverse histories and of artificially enforced constraints and boundaries of the last century and today. Finally, there have been many attempts to develop or assist Aboriginal Australians, often on the basis of political rhetoric rather than on sound economic and social bases (Rowley 1975, CAR 1998, Kelly & Pearson 1999).

Table 1 portrays some (markedly differing) characteristics of Modern and Aboriginal cultures.

The Aboriginal, Yolgnu (Murri), blackfella way was both simple and rich (Elgin 1981) in marked contrast to the complexities and sophistication of contemporary Westernised, Balanda (Migloo), whitefella communities (Rogers 1997, Hesselbein et al. 1998). For the Aboriginals 'the natural world around them supplied all that they needed, so they had a special relationship with that world. They saw themselves as one with nature. The land not only belonged to them but they belonged to the land' (Cole 1982).

Figure 1 shows a typical contemporary small and remote Northern Territory coastal community. It is slightly elevated as is commonplace, and in the cyclone season faces the storm surge hazards of the exposed open sea, with potential for serious inundation by waves up to some 3-4 metres magnitude above high tide levels.

Aboriginals lived predominantly nomadic lives using simple, expendable, shelters, and possessed a detailed knowledge and understanding of their lands, environments and weather cycles. As has been observed, indigenous people have been designated 'caretakers of all life'.

*Prehistoric technology was neither*

Feature	Modern	Aboriginal
'World View'	Fragmented	Comprehensive
Land	Commodity	Living Heartland
'Being' and Living	Individualisation	Communitarian
Culture	Diverse	Cohesive
Natural Environment	Detached/Exploited	Integral/Cherished
Resources	External Dependency	Self Sufficiency
Location	Fixed	Mobile on Clan Land
Natural Hazards	Distant Understanding	Detailed Awareness
Emergency Management	Few Professionals Many Volunteers	Total Preparedness, Mobility and Change
Values/Spirituality	Shifting	Enduring



Figure 1: Waruwi Community, South Goulburn Island, Northern Territory

Table 1: Some Characteristics of Modern and Aboriginal Cultures

simple nor primitive... women were equipped with digging sticks, men with spears and boomerangs. A strong, fire-hardened wooden spear was an efficient weapon that has been used throughout Aboriginal history... The returning boomerangs are even more sophisticated... Aborigines caught (fish) with shell fish hooks and vegetable lines or bone-barbed fishing spears (Flood 1995).

The hunt was the instrument of everyday survival, but the camp, the home-base, was the instrument for preserving and continuing the species. The camp in the daytime was the place for the women, the children and the old men. There was work to do—collecting fruit and roots and water, bringing up the children, some rudimentary attention to hygiene and comfort—but it did not have the dangers or rewards of the hunting band. The hunting band consisted of groups of about ten people, nearly always men... Each person in the group reacted or responded to the other persons in the group and together they protected and met their needs as a whole. The successful hunting bands were constantly trying to come together physically, to spend as much time as possible within sight and sound of each other and to keep in constant collective touch with every move. They possessed a common objective, a single criteria for success by which all succeeded or all failed. Within the human walking radius of the camp there was enough food to support a total population of about forty, this being, too, the optimum number for sustainable procreation of the clan. The purposiveness and cohesion of the group was powerfully motivated by the fact that upon the regular supply of game and fish to their base camp depended their clan's very survival. (Jay 1975).

Thus the successful performance of the hunting groups' endeavours was a matter of life or death. Little wonder then that Aboriginal people became so strongly bound to their annual territories and land whose characteristics they knew so intimately. The Aboriginal psyche was permanently embedded and 'encoded, for those with eyes to see and understand them, in the local flora, fauna, and geological features of the land and with a script of sacred geography and sites' (Peterson 1972).

Without the aid of sophisticated radar,

high resolution satellite information and state-of-the-art computer modelling (Chen et al. 1995), small Aboriginal groups consistently anticipated changing weather patterns so preserving their clans. 'They implicitly understood the importance of the cycle of the seasons in their hunting calendars as being vital to survival' (Sewell 1998).

### **Historical records of severe weather tropical monsoon events: current realities**

The weather and climate of tropical Australia have a major influence on daily life and on economic activity in the region (Pittock et al. 1999). Although there are no detailed and scientific Aboriginal accounts of extreme weather events, there are a number of revealing Dreamtime stories (see later) and the more recent recorded monsoon stories of cyclonic impacts typify similar extreme weather events that occurred over the previous 60+ millennia.

For instance, Murphy (1984) reports on some frightening low-pressure monsoonal depression events over the last one hundred years. In March 1919 a depression formed and rapidly deepened. Bathurst Island Mission took the full brunt of the ensuing extreme weather. As described by Father Francis Xavier:

*... During the night the wind and rain doubled in fury as the seas thundered on the beach... Towards 10 o'clock, trees began falling and it was not long before our more fragile buildings collapsed. That awful night wore on until, at five o'clock in the morning, the elements seemed even more frenzied as more trees and huts fell. Finally a tidal wave came rushing in and carried away the lot... Sitting on a tree trunk at 10 o'clock the next morning, I contemplated the full force of the disaster. There was only one description — a clean sweep...*

In early 1948, vast stretches of Arnhem Land were inundated with floods after three cyclones drenched the region. 'At the height of one storm, which raged for four hours, the air was thick with flying branches and spear grass and spinifex were torn from the ground; trees were either uprooted or stripped of all their foliage; the sea rose 3.7 metres above its normal level causing Vanderlin Island to be split in three, the wind having earlier flattened the station homestead.'

Extreme events such as tropical cyclones and severe storms are thus prominent weather features capable of rapidly inflicting severe hardship and

social disruption in the Northern Territory coastal communities. Climate extremes of drought or widespread flooding are equally destructive. The long-term viability of Northern tropical settlements, operating under wet/dry tropic marginal conditions, may be adversely impacted even further in the future by climate changes associated with an enhanced Global Greenhouse Effect. Climate in the Northern Territory appears to be increasingly exacerbated by the La Nina and El Nino Southern Oscillation phenomena-ENSO, the cycle that drives Australia's climate (Flannery 1994, Suplee 1999).

For instance, the 1998 Cyclone Les sourced severe Katherine-Daly River region flooding, the 1998-1999 development of most Severe (Category five) Tropical Cyclones Thelma and Vance and the widespread 1999 Queensland and Western Australian floods, probably confirm the arrival of a more dangerous extreme weather epoch. A rise in sea level of 50cm over 100 years (5mm pa) is also expected (Jepma and Munasinghe 1998). This is of particular concern, both in relation to the probability of increasingly severe weather and of the increasing propensities to damage by storm surges at many vulnerable coastal communities.

Apart from the cost of direct damage associated with such tropical cyclones, the threat of their arrival leads routinely to the temporary shutdown of business and social operations, the disruption of transport schedules and the cancellation of settlement activities. In addition to tropical cyclones, severe lightning and rainstorms in the tropics are a major source of disruption to productive commercial and community activities, with a particular impact on aviation, shipping, road transportation and electronic communications. For example, early in 1999, 500mm of rain fell in Nhulunbuy over a 24-hour period. Such heavy rainfall deluges also virtually eliminate modern satellite-mediated electronic data and voice communications, so bringing data transfer based commerce to a standstill.

In the tropical north, flooding along the short rivers that drain to the coast occurs in most years, making many road links impassable, sometimes for days to months on end. The rain associated with tropical cyclones and rain-bearing depressions is often responsible for widespread land flooding. Heavy road transport around the coast and extra-Territorially, to and from Darwin and major settlements, in particular, is often impeded by major rivers in flood after heavy rains, that sometimes wash away bridges and embankments.



The development of appropriate lifestyles, technologies and methodologies to cope optimally with these conditions requires a proper understanding of the weather, climate, terrain and resident people of tropical Australia. Although attempts have been made to do this, there is still a long way to go (CAR 1997).

### Aboriginal and western cultural considerations

Before white settlement, Aboriginal Australians were well adapted to their limited range hunter-gatherer living in northern Australia. A typical clan group was restricted to a maximum range of about 5 miles a day due to the needs of women and children (Sewell 1998).

*Nomadism was clearly an adaptation to tracking the erratic availability of resources as they were dictated by ENSO. Nomadism has a great cost, for possessions must be kept to a minimum. The Aboriginal tool kit was thus rather limited, consisting of a number of usually light, mostly multi-purpose implements. Investing in shelter construction is likewise constrained by such a lifestyle, for there is no point in building large and complex structures when ENSO may dictate that the area be deserted for an unknown period at any time (Flannery 1994).*

Aboriginal population densities were higher in the far north (eg Gidjngali, Arnhem Land, 0.8 persons per square kilometre); nearly 100 times that of the Walberi, in central Australia, with 1 person per 88 square kilometres) (Rose 1987) with land food more plentiful because of heavier rainfall, and there was seafood in abundance (Davis 1984). Table 2 shows the abundance and variety of traditional Aboriginal food on Groote Eylandt in the Gulf of Carpentaria.

Worsley (1961) has provided detailed evidence of the abundance of extraordinarily rich bush foods that were available. Under such diets northern coastal Aborigines maintained high levels of health and fitness. It is evident that these traditional lifestyles were healthy because of the availability nutritious bush foods (Davis 1984, Hiddens 1996), fish and marine species and adequate exercise. In many

ways these lifestyles emulated those now advocated by advocates of sustainable self-renewing Permaculture (Mollison 1990, Mollison and Slay 1994).

This is in marked contrast to the expensive, externally sourced, processed, inadequate and unbalanced foods and diets of today which are amongst key factors contributing to Aboriginal ill-health (THS 1996). As the state of health is a critical determinant of many behaviours and decisions in life, including the capabilities to pro-actively contribute to hazard mitigation, we here highlight endemic poor health as a prime cause of the inability of many Aboriginal people living on remote monsoon-prone communities to adequately address emergency management issues and concerns.

Figure 2 models understanding of key factors contributing to Aboriginal ill health.

However, a few communities have comprehensive, well thought out, fully operational cyclone emergency plans, written for use by their communities. Two such are the Tiwi Islands and the Galiwinku Community on Elcho Island.

The issue of the current uneven provision of lifelines and shelter protection against cyclones is thus better understood against the legacy of the debilitating histories of most of the Aboriginal residents of the remote northern coastal communities of Australia.

Food Types	Varieties	Consumption %
Land animals	15	5
Birds	76	25
Marine and Fish	97	31
Shellfish	39	13
Plants	82	26
<b>Total</b>	<b>309</b>	<b>100</b>

Table 2: Number and consumption of traditional food, Groote Eylandt (Worsley)

### Traditional approaches to coping with severe weather

Over the timeless millennia, Aboriginal Australians developed sophisticated approaches to coping with cyclic natural hazards. Many of these are evident in their stories and manifest behaviours.

### Aboriginal myths, legends and fables

*Long, long ago, before the great flood, the Nurrumbunguttias or spirit men and women lived on earth. Then came the flood. The water rose up quietly from the sea, until it was higher than the highest gum tree... The water kept on rising... and there was no place for the people to live. Many of them drowned and others were caught up in a whirlwind and carried into the sky... some became Gods of the Sky like Pund-jil.*

*After the great flood, men and women became more numerous on earth. They were to be found everywhere. But wherever they went they did cruel and evil things to the*

Underlying factors	Direct causative factors	Ill health
<i>Political, Cultural and Identity History of European/Aboriginal contact</i>	<i>Lifestyle Food and nutrition</i>	<i>Obesity, diabetes, hypertension, heart disease, low birthweight, increased damage caused by infections</i>
<i>Loss of: Own culture, lands &amp; identity, law, family links, power over and responsibility for their own lives, meaningful activities.</i>	<i>Smoking</i>	<i>Increased risk of infections, lung damage, respiratory disease, heart disease, cancer, low birthweight</i>
<i>Demography &amp; Geography small, dispersed, remote, multi-lingual, multi-tribal mobile communities. High cost &amp; difficulties in providing services in remote communities.</i>	<i>Alcohol abuse/misuse High levels of mental stress</i>	<i>Violence, accidents, social disruption hypertension liver damage brain damage, STDs</i>
<i>Education, employment &amp; Economic Lack of relevant and culturally appropriate education lack of meaningful occupation/ employment Lack of relevant health knowledge</i>	<i>Environmental Health Overcrowded housing Inadequate standard of housing Inadequate sewerage Inadequate water supply Poor hygiene</i>	<i>Diarrhoea, trachoma and eye disease, respiratory diseases and infections, renal diseases, skin sores and infections</i>
	<i>Health Services Late presentation/diagnosis treatment Underutilisation of Health services</i>	<i>High hospitalisation rates, more severe illness, more chronic illness</i>

Figure 2: Key factors contributing to Aboriginal ill health and disinterest in emergency management (THS)

animals that had been made to share the earth with them.

There were six winds, three of which were male, and three female. The cold west wind is called Gheeger Gheeger. She is guarded by Wahn the Crow, who keeps her confined in a hollow log. It is necessary for him to do this because she has such a turbulent nature. Sometimes she escapes, and Wahn is kept busy trying to bring her back. The log is slowly decaying. When it finally falls to pieces, Wahn will be unable to control the west wind, which will run wild and devastate the earth. The south wind, Gooroondoodilbaydilbay, is accompanied by Mullian, the Eagle Hawk, who can be seen in the sky riding on her back in the form of towering cumulus clouds.

The south-east wind, Yarragah has three wives, the Budtha, Bibbil and Bumble trees. When he makes love to them, they begin to grow and put forth flowers and fruit as a sign that Yarragah, the spirit of spring has arrived.

The north wind, Douran Douran, is also a great lover. From his kisses come the floral dresses of the Coolah, Noogah, and Kurrajong trees. The east wind is Gunyahmoo.

The female winds are unpredictable and wild. They rage through the trees, breaking branches and moaning because their lovers have been stolen from them. In contrast to their behaviour, the male winds, with the exception of Gheeger Gheeger, are gentle. It is their love which cause trees to put on their leaves, and to flower and fruit, and the earth to blossom in its gentle green.

So when the great god Pund-jil becomes angry, first he makes fierce storms and winds which drive the men and women into caves and valleys, where they try in vain to shelter from his wrath. Trees are blown over, and clouds of sand choke the people while they are lying on the ground or crouched at the far end of caves where they can hardly breathe. Pund-jil calls on the wind to carry them far up into the sky...from where pieces that had been men and women fall to the ground.

The boys who were standing on the bank, saw the canoe lifted up into the air by the tidal wave. The still water broke into waves that dashed over the bank, smashing into each other and sending spouts of water high into the air...The canoe was lost to sight in the seething cauldron. The boys feared that their father might be drowned or swallowed by a great fish, but when the tumult of water subsided they saw that their father was still clinging to it doggedly with one hand, his spears in the other... Slowly the flood waters receded, and the sea went back into it's own place, and the land

steamed again under the hot tropical sun. From *Aboriginal Myths, Legends and Fables* (A.W. Reed 1993)

Blainey (1976) has noted:

By moving about the countryside in small groups, the aboriginals could efficiently harvest the foods of scattered places. There were limits, however, to the territory, which they could exploit. The limits were formally set down by tribal boundaries though these boundaries were not a barrier to everyone. But the tribal boundaries themselves had probably been drawn over a long stretch of time by the facts of geography and economics. In essence a small group of people with no transport other than their feet and with their own children and implements to carry, could travel effectively only over a moderately-sized area. Moreover, they could know the varied resources in detail only if the area was not too large.

Language embraced many shades of meaning, richly describing the environment and its flora, fauna, fish and weather and the Aboriginal modus operandi.

Availability of food depended upon the seasonal cycle. As different foods grew and ripened at different times of the year, so the Aborigines moved from place to place. When the food was exhausted they would move elsewhere. They were nomads of the coastal and adjoining bushlands, fishing, hunting and gathering food as it was available. They would move within the limits of their country unless food was scarce. If they had to

move into the territory of another group with whom they had no close relationship, then they would ask the permission of that group to do so. (Cole 1982)

The seasons of the weather, which they understood and described in fine detail, thus determined their locations and in large part determined how traditional Aborigines coped effectively with natural hazards and risks cycles. As recorded by Press et al (1995):

**Gudjewg**—Monsoon season, December-March: Monsoon time, continuous low cloud and heavy rains.

**Banggerren**—Harvest time, March-May: last storms from the coast, 'knock-em-down' storms, from the fact that the Savannah grasses are at their highest and these storms can knock them flat. Humidity remains high.

**Yegg**—Cool weather time, May-June: clear weather getting cooler, humidity drops. SE trades re-establish.

**Wurrng**—Early dry season, June-August: Cool nights, morning mists.

**Gurrung**—Hot dry season, August-October: hottest, driest period before it rains, almost cloudless skies.

**Gunumeleng**—Pre-monsoon season, October-December: irregular easterly storms in the afternoon. Humidity rises.

'Yolgnu believe that the 'male' thunder that comes in early in the pre-wet season shrinks the water holes. When the sky is covered by heavy cloud most of the day, the 'female' thunder brings the rain' (Davis 1985). Figure 3 depicts the seasonal calendar for Kakadu region Gundjeyhmi (Mayali) language.

The intimate traditional Aboriginal

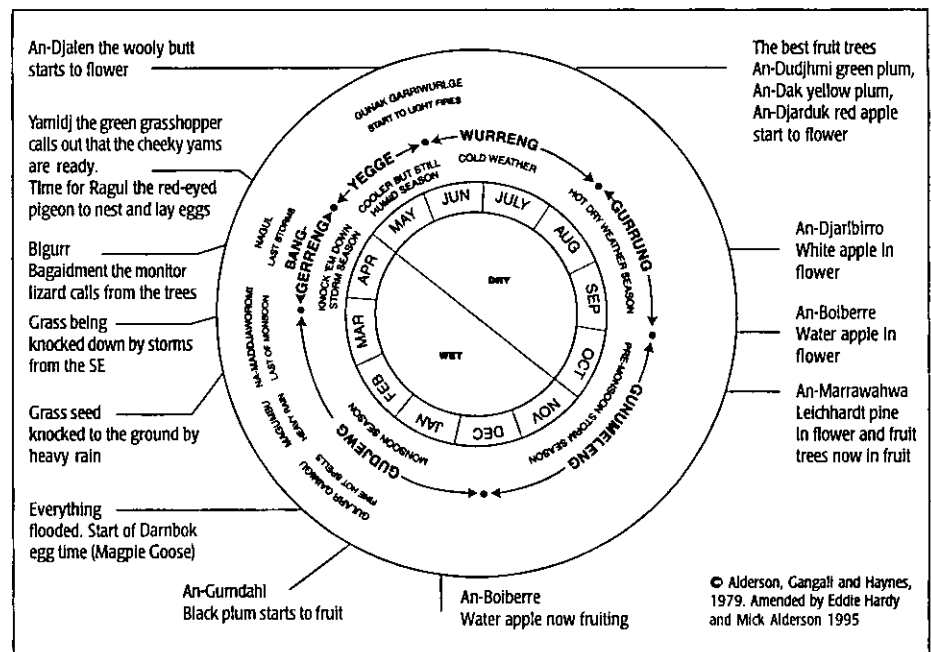


Figure 3: Seasonal calendar for the Kakadu region in Gundjeyhmi (Mayali) language

knowledge of coast and sea is comprehensively described by Davis (1984), Rose (1987) and Flood (1995). As well, there are many general descriptions by many others (THS 1995).

The following details are largely the outcome of the outstanding work of Rose (1984).

In Northern Australia, which is subjected to the south-east trade wind and north-west monsoon regime, there was a tendency for the population to break down to the individual family (foraging groups/clans) during the dry season, whereas during the summer wet they tended to concentrate. For north-east Arnhem Land the population of the almost sedentary wet season camps might exceed one hundred Aborigines. This would probably have been in the period from January to March. The number equated with approximately 3–4 clans.

The fruit of the cycad had a special value in the native coastal economies, for it enabled the women to maintain an adequate food supply on ceremonial occasions when hundreds of people, who could not otherwise be supported for such periods on local resources, are gathered in one camp for weeks or months at a time. It is clear that two quite separate factors favoured the congregation of the Arnhem Land Aborigines into larger foraging groups in the wet season: the first was the abundance of cycad nuts, particularly in the late dry season, and the other was the heavy rains during the full wet season, which restricted movement.

Before World War 2 on Groote Eylandt, Rose (1987) did not meet any family foraging groups (clans) larger than five or at the outside six married men and their families, which all told would have comprised about forty to fifty Aborigines, men, women and children. But he only visited the Aborigines in their camps when they were accessible to outsiders during the winter, when the clans would have been dispersed.

Tindale (1940) observed wet season stringy bark huts to shelter 30 or more persons which, if more than one such hut were erected, would have implied a considerably larger aggregation than forty or fifty. Rose also observed a group of two or three of such wet season huts on 28 November 1938, but their size was considerably smaller than Tindale reported (10 x 30 feet) and altogether would not have housed more than twenty to thirty Aborigines. Tindale reproduced a photograph showing ten adult men. This would have implied a foraging group numbering between forty and sixty men, women and



Figure 4: Arnhem Land escarpment cyclone and flood refuges (Russell-Smith)

children, a similar size to that calculated by Rose (1987).

As the season changed to **Gudjewg** – the cyclone season, so the clan groups too modified their living patterns to adjust to availability of food, restricted movement and security in larger community gatherings. For these times they left their smaller clan bough and bark shelters and assembled larger houses for the increased numbers of their wet season communities. The annual gatherings of the clans witnessed many corroborees, which were the occasions for passing on of the Law and Culture through verse, song, mime and dance. For periods when the heavy rains caused deep flooding, their land traversing movements were restricted, and **Gudjewg Marl-gan Sky Fires** threatened, Aborigines were in the caring company of kindred clan groups who possessed the capabilities, resources and know-how for escaping big winds and rising waters without harm. Where possible this might include, as for Manny, Mumma and Dadda in ‘**Sky-Fire**’, proactive retreat to familiar caves, or sheltering behind rocks or in shallow pits covered by heavy logs, or more modest protection in the lee of small rises or dunes. A considerable number made annual treks to more distant safer valleys of the Arnhem Land’s escarpment and plateau. (Figure 4).

*The Arnhem Land Plateau stretches 260 kms from north to south, and 200 kms from east to west. Its edges form a steep stone escarpment, rising to as much as 250 metres above the alluvial plains. Large rivers flow through the escarpment in spectacular gorges. The rivers are now estuarine and full of barramundi and huge saltwater*

*crocodiles. The presence of fresh water, abundant food resources and large rock shelters for protection against the elements made this an attractive area for prehistoric settlement. It is therefore not surprising that several rock shelters have been found with occupation extending back well into the Pleistocene (>18,000 years before the present day – BPD), when they would have been some 350 kms inland. (Flood 1995).*

*Here in Arnhem Land’s rugged, rain-strafted landscapes-its pale weathered cliffs of naked, bone-like sedimentary rock; its thunderous waterfalls; its sun-baked thickets of rain-forest vegetation; its great fetid swamps, choked with decaying vegetation and creased by the gliding forms of ravenous crocodiles—lived the Murngin people in their traditional lands the ultimate spiritual, evolutionary, and ecological source of their lives... They possessed an elemental sense of blood kinship and primordial oneness with the land kept constantly alive in their Law and Culture.*

*The Rrarigurak Gurumba Gurumba clan is the proud owner of its own estate, a divinely apportioned area of the landscape encompassing major and minor ceremonial sites, the clan having been endowed with a repertoire of sacred songs, rites and paraphernalia that have long constituted the title deeds to their land. At the sacred places (sites), sporadic upwellings of an unseen subterranean current that ultimately animates all forms of life, are the primary foci of collective clan sentiments that lie at the core of the relationship of the*

people and the land. The sacred landholdings of the clan border the expansive, stagnant waters of Arafua Swamp. Within the estates boundaries are divers terrains: lowland tropical rain forest, ridges faced by steep cliffs and cut by gurgling streams, and on higher ground, dry plateaus greened by hardy eucalyptus trees. (Peterson 1972).

Arnhem Land now possesses myriad caves in the deeply crevassed, small steep valleys with extensive rock paintings which are vivid testimonials to the lives and skills of their sheltering Aboriginal occupants over the many aeons of past wet seasons. Many of these remote, not readily accessible, sites have yet to be fully explored and documented. Few European people have ever visited these places of archaeological renown (Flood 1995, 1999).

Thus, the behaviour of traditional coastal Aboriginals of the Northern Territory as described above, enabled them to survive from generation to generation using their intimate knowledge of the land and the seasons. Over the millennia, until the disruption to their Culture by the new Balanda, the longstanding indigenes managed to master the savageries of Nature and to thrive.

Through possessing a comprehensive understanding of themselves and their environment, they carved for themselves a sustainable, high quality of life in the land that they embraced so masterfully.

### Inheritance and possible future

As summarised by Rose (1993) the transcendent rules for traditional Aboriginal culture may be distilled into four broad overarching basic laws:

- **Balance:** A system cannot be life-sustaining if it is out of kilter, and each part shares in the responsibility of sustaining itself and balancing others.
  - **Response:** Communication is reciprocal. There is here a moral obligation to learn to understand, to pay attention, and to respond.
  - **Symmetry:** In opposing and balancing each other, parts must be equivalent because the purpose is not to 'win' or to dominate, but to block, thereby producing further balance.
  - **Autonomy:** No species, no group, or country is 'boss' for another; each adheres to its own Law. Authority and dependence are necessary within parts, but not between parts.
- These enduring Aboriginal living laws

describe a cohesive interlocking balanced natural system with a paradigm very much along the lines portrayed by contemporary systems analysts (McDermott 1997) and recently re-discovered and espoused for the earth's global commons by Lovelock (1991).

The European settlers were thus seen to be, and most often still are, out of synchronicity with the Aboriginal Dreaming Laws.

*Not knowing what to remember and what to forget, they follow dead laws, fail to recognise living ones and in their power and denial promote death. By living for tens of thousands of years in accordance with their Dreaming Laws, the Aboriginal ethos*

*Dreamer of dreams, born out of my due time,  
Why should I strive to set the crooked straight?  
Let it suffice me that my murmuring rhyme  
Beats with light wing against the ivory gate,  
Telling a tale not too importunate  
To those who in the sleepy regions stay,  
Lulled by the singer of an empty day.*

*The Earthly Paradise William Morris*

*was one of perpetual human protection, maintenance, and the renewal of the entire natural world, and respectful dialogue with its kindred membership. All that has preceded us and all that comes after depends on us. What we do matters so powerfully that to evade our responsibility is to call down chaos (Rose 1993).*

Over an immense span of time the Australian Aborigines developed effective solutions for living and thriving in their challenging environments, including devising viable means of protection against severe natural hazards. It is most important to recognise this invaluable legacy for all of us, and to incorporate, where appropriate seminal Aboriginal knowledge into our modern-day settlements and counter disaster precautions and emergency management arrangements.

To overcome quick mobility evacuation problems of major communities in the face of imminent severe cyclonic threats, we need to make provision for adequate specifically designed and engineered, robust, multi-purpose, cyclone-safe, community refuges. And on the outstations too, simple expendable shelters

for their part-time residents could be constructed, together with cyclone-robust safe-shelters for the whole clan-group. Such shelters could be, for instance, inexpensive, modified, used, shipping containers, or other suitable protective structures. In such ways, for all sizes of remote human settlements, safety when under threat from severe tropical cyclones, storm surges and inundating rain, could be much facilitated. Use of appropriate, affordable technologies, and solutions to problems, based on proven approaches, is clearly desirable (Panek 1972, Boyle and Harper 1976, Harding 1982, Ayers 1999).

A much higher level of autonomy and governance, along traditional lines, could be accorded to clans and communities, so facilitating their regaining of self-esteem and fostering renewed optimism, hope and commitment for better futures.

The realisation of such initiatives would again harness many timeless invaluable Aboriginal attributes and skills, and would contribute substantially to future well-being of those living in their remote monsoonal homelands, and be a strong motivator of real progress against sound benchmarks (CAR 1998). And in a better state of health, hazard mitigation matters could begin to occupy an appropriate place.

### Ten Commandments of traditional Aboriginal settlement survival

From the above outline and consideration of past traditional Aboriginal life-ways in the monsoon region of Australia we have formulated Ten Commandments of Sustainable Settlement and On-going Survival for the Present and the Future (Marion 1996). They in many ways parallel those formulated for the AusTroPolis - Sustainable Tropical Human Settlements Project (Skertchly 1994) and by the approaches of Robertson (1983), Sommerlad, Dawson and Altman (1985), Mollison (1990), Mollison and Slay (1994), and of Roseland (1998).

The Ten Commandments aim to capture the essence of the lessons that can be gleaned from an examination of past Aboriginal wisdom and practices (Clarkson, Morrissette and Regallet 1992). They could form the basis for elaborating future brainstorming workshops and a multiplicity of appropriate future-beneficial development initiatives.

Until most remote Aboriginal monsoon region communities of Australia are lifted out of their currently repressed circum-

stances and really emancipated to raise their overall well-being, quality of life and standing, it will not be possible to develop their counter disaster preparedness and emergency management arrangements in a universally satisfactory manner.

The key to the future satisfactory state of affairs lies in part in the hands of those who could facilitate the resurgent harnessing of pertinent elements of past exemplary Aboriginal praxis. The pressing need is to learn how to cooperate with nature to ensure good living everywhere, as was the case for the past aeons back to the Dreamtime (Clarkson, Moorrissette and Regallet 1992, Burby 1998).

- **Commandment one:** *Utilise and build upon 60,000+ years of sustained successful Aboriginal civilisation. Use and develop your achieving personal, clan and community futures from knowledge and understanding of the outstanding proven successes of your traditional Law and Culture.*
- **Commandment two:** *Set progressively attainable, clear improvement goals. Formulate a Community Master Plan based incorporating the key features of 60,000+ years of successful Law and Culture expressed in contemporary modern form.*
- **Commandment three:** *Know your land and environment. Acquire the most intimate knowledge of your land and environment possible, understanding nature.*
- **Commandment four:** *Work with your land and environment. Work appreciatively and cooperatively with your land and environment, harnessing for both your and your land's good, affordable, available, sustainable renewable, resources.*
- **Commandment five:** *Maximise local/short haul, readily available, resources. Seek to maximally utilise nearby resources of water, food plants, animals and fish, building materials and all available Do-It-Yourself practical competencies and skills.*
- **Commandment six:** *Live and work sharing co-operatively. Live and work together as a co-operative clan/community group. Foster a synergistic culture.*
- **Commandment seven:** *Minimise using inappropriate, expensive outside expertise and resources. Aim to build up all available internal skills and resources, only using external resources when absolutely necessary.*
- **Commandment eight:** *Appropriate settlement structures. Design, fabricate, construct and manage houses and*

community structures that match best available sustainable resources and the specific characteristics of the environment.

- **Commandment nine:** *Appropriate essential community services. Design and progressively commission those core services essential to present and continuing well being, in both tranquil and stormy weather.*
- **Commandment Ten:** *Perpetuation of the life-ways, Law and Culture. Act to institutionalise and perpetuate your re-invigorated modernised; yet traditionally based life-ways, law and culture sustainably into the many millennia that lie ahead.*

Are not these Ten Commandments equally apposite also for other human settlements?

The many island nations of the Pacific and Indian Oceans and of the Equatorial Seas with their thousands of subsistence coastal settlements come readily to mind. Of course it is not now possible to return completely to Aboriginal human habitation arrangements of past, but there is clearly much to learn from the wisdom of the ways of such an enduring Law and Culture (Knudtson and Suzuki 1992) as that of the Australian aborigines.

The references provide rich sources of additional knowledge and inspiration as starting points to assist in overcoming the debilitating national legacy that exists on many remote coastal communities and enabling better public safety futures for all those who live at them.

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# The age of accountability?: future community involvement in disaster reduction

## Introduction

The importance of community involvement and community-based approaches in disaster reduction is generally acknowledged—in the fields both of disaster preparedness and mitigation, and of disaster relief.

In the Yokohama Message delivered by the United Nations International Decade for Natural Disaster Reduction (IDNDR) conference in Yokohama, Japan, in May 1994 the international aid and disaster community affirmed that:

*'Community involvement and their [sic] active participation should be encouraged in order to gain greater insight into the individual and collective perception of development and risk, and to have a clear understanding of the cultural and organisational characteristics of each society as well as of its behaviour and interactions with the physical and natural environment. This knowledge is of the utmost importance to determine those things which favour and hinder prevention and mitigation or encourage or limit the preservation of the environment for the development of future generations, and in order to find effective and efficient means to reduce the impact of disasters.'* (IDNDR 1994).

The Organisation for Economic Co-operation and Development's Development Assistance Committee, in its *Guidelines for Aid Agencies on Disaster Mitigation*, observes:

*'Community-based organisations, whether in rural or urban contexts, have a key role to play in disaster mitigation efforts. Such organisations can raise awareness of the hazard risks at the local level and mobilise the community or groups within it to take steps to reduce their vulnerability either through local structural measures, and by pressing for central government involvement in larger structural measures or through the development and introduction of adaptive or preparedness measures.'* (OECD-DAC 1994).

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The Code of Conduct drawn up by the International Red Cross and Red Crescent Movement, which many relief agencies have signed up to, states among its principles that:

*'Disaster response assistance should never be imposed upon the beneficiaries. Effective relief and lasting rehabilitation can best be achieved where the intended beneficiaries are involved in the design, management and implementation of the assistance programme. We will strive to achieve full community participation in our relief and rehabilitation programmes.'* (IFRC 1994).

## Rationale

The rationale for community involvement or community-based activities is now well rehearsed and runs roughly as follows.

- Because community-based activities (and community-based organisations) are deeply rooted in the society and culture of an area, they enable people to express their real needs and priorities, allowing problems to be defined correctly and responsive measures to be designed and implemented.
- The existence of community-based organisations allows people to respond to emergencies rapidly, efficiently and fairly; resources are used economically.
- The principal resource available for mitigating or responding to disasters is people themselves and their local knowledge and expertise.
- Community-based activities tend to be multisectoral, combining different activities, hazards and disaster phases.

- They reinforce local organisation, building up consciousness, awareness and critical appraisal. In this way they increase people's potential for reducing their vulnerability.

By contrast, it is said, 'top-down' programmes in which communities are not involved tend not to reach those worst affected by disaster, may even make them more vulnerable, can be manipulated by political interests, are often inefficient, usually take a unisectoral approach and do not respond to people's real needs (Maskrey 1989)<sup>1</sup>.

Experience demonstrates that programmes involving the community can be very successful<sup>2</sup>. One example is the case of the Alto Mayo district of northeast Peru, struck by an earthquake in May 1990 that destroyed more than 3,000 houses. National agencies knew little about the region and their response was sometimes inappropriate: it included bringing rice into an area where the farmers had a rice surplus. Informal community organisations were quick to respond but were often ignored by official relief agencies. However, a community-based reconstruction plan to build earthquake-resistant homes using a modified version of a traditional building technology did take root, with some 2,000 houses built in the first two years after the earthquake (Schilderman 1993).

Different issues appear in developing and developed countries. In developing countries, where the capacity of the state to protect its citizens may be limited, communities have to rely on their own knowledge and coping mechanisms to mitigate against disasters, as they have done for generations. Customary support structures can also play a significant role in disaster response and recovery. Communities in developing countries are active in disaster reduction, even in the most hostile environments, for instance

## Notes

1. Berke and Beatley 1997 is a recent detailed study that reinforces this view.
2. For a selection of other, earlier, examples see Maskrey 1989.



in the *chars* (silt islands) in the Jamuna River in Bangladesh, where people have developed a variety of structural and non-structural measures to mitigate the impact of floods (Schmuck-Widmann 1996).

In developed countries, traditional community systems have been abandoned for more individual lifestyles and forms of association. This has been accompanied by a massive extension of the role and functions of the state. One consequence of these developments is that people rely heavily on the state to support and protect them; their capacity for independent action may be limited. This may leave them more vulnerable to hazards when formal protective systems prove to be inadequate<sup>3</sup>.

But both in developed and developing countries, at times of emergency there probably will be a variety of ad hoc, largely informal responses by loosely knit groups from within communities before formal organisations are able to mobilise. These 'emergent' groups can play an important role in disaster response and are an important factor in any disaster scenario (Raphael 1986).

### A growing problem

Practice generally lags behind theory. In much disaster and emergency management work communities are still not involved; the 'top-down' approach remains common. Literature on disasters can conceal this, especially where it is produced by those involved in activities. After the earthquake in Maharashtra, India, in 1993, it seemed that nearly every agency involved in reconstruction claimed that local communities were participants in the reconstruction programmes but some of the people working there challenged this off the record. In general, critical analysis of long-term recovery and disaster mitigation projects is lacking, though analysis of disaster response is better, at least in some locations, thanks largely to North American social scientists' interest in this area.

Getting our approach right is an important and increasingly urgent task. Nobody would now dispute the fact that more and more people throughout the world are becoming vulnerable to hazards as the result of demographic, social, economic, environmental and other factors (Blaikie et al. 1994). Even some of the hazards themselves may be getting more numerous or at least less predictable. It has long been argued (though it is still disputed in certain contexts) that environmental degradation helps to cause floods and drought (Blaikie et al. 1994, Smith 1996). There is speculation

that the construction of dams can sometimes increase the likelihood of earthquakes (e.g. Seeber 1994). It now appears likely that global warming will lead to an increase in floods and droughts, and in some places windstorms (Saunders 1998)<sup>4</sup>.

### Community involvement and its problems

Some would say the explanation of the failure to involve communities can be found by looking at attitudes within some of the key actors in disaster mitigation and response—that is, multilateral agencies, government departments, non-governmental organisations (NGOs) and other disaster professionals—who are liable to be bureaucratic in their structures and systems, inflexible in their thinking and actions, and still wedded to obsolete theories of command-and-control and blueprint planning. This is a powerful argument<sup>5</sup> that can be reinforced by case studies of events around the world. The response to the earthquake in Peru, mentioned above, is one such case. Studies of responses to cyclones in different parts of the world have demonstrated the persistence of top-down responses among government organisations and NGOs alike (Berke and Beatley 1997, Intermediate Technology 1994).

We can see one dimension of this in the relationship between official organisations and 'emergent' groups after a disaster. In all disasters emergent groups appear, carrying out such activities as search and rescue, damage assessment, handling the dead, distributing relief supplies and presenting survivors' grievances. For example, during the first three days after the Mexico City earthquake in 1985, 'the organisational response was dominated by a substantial amount of independent actions' (Quarantelli 1993) while 10 years later in Kobe, Japan, a strong contingent of volunteers emerged to assist in response to another earthquake even though there was little tradition of voluntary organisation or community self-help in the city (Comfort 1996). Such improvisation is valuable as well as ubiquitous, yet it may bother disaster managers because it is outside their plans, systems and, above all, control (Quarantelli 1997).

There can be little doubt that this is one of the main reasons for the lack of community participation in disaster reduction initiatives. But there are dangers in relying too heavily on this as an explanation. It is too easy to fall into the trap of simply blaming somebody else—government or other agencies—

the problem. There are other causes too.

One of the most important, and least recognised, of these causes is that successful—that is, equitable and sustainable—community participation is inherently difficult to achieve. One reason for this is that although the phrase 'the community' or 'the village' may invoke an image of a defined, homogeneous group of people, in reality communities are a dynamic mix of different groups, forces and attitudes, often characterised by internal conflict<sup>6</sup>.

Another is that 'community' activity does not take place in a vacuum. For one thing, there are no neat boundaries between one community and another. For another, community activities take place in relation to other actors—such as government, the private sector and civil society organisations—who must also be considered as stakeholders in this matter. The relationship between the different actors is also a dynamic one, changing as a result of new knowledge and shifts in attitudes, resources and political power.

Community participation requires some shared understanding between community members and the specialists from outside—in this case, disaster professionals—who aim to assist them. Gaining this mutual understanding involves dialogue with the community. Dialogue is not the same as education or awareness raising, which are among the most common forms of engagement between disaster specialists and communities at present. Education and awareness-raising activities are one-way communications. They transmit the expertise of the specialist outsiders to those at risk but do not transmit understanding of the lives and behaviour of those people back to the professionals. This can have significant consequences, for example in the field of early warnings where a great deal of effort has gone into public education programmes without corresponding effort to understand the many extraneous factors that may affect people's readiness to respond to warnings (Twigg 1998). Yet dialogue is a messy business. It involves discussion, debate, and argument between many different

### Notes

3. This dependence may lie behind the level of dissatisfaction with the public warning and response systems expressed by victims of the Easter floods in England in 1998 (Bye and Horner 1998).

4. We do not know the likely long-term risks of industrial and technological accidents, especially in developing countries and countries in transition: such accidents are relatively few but on occasion, as at Bhopal and Chernobyl, the impact can be huge (Smith 1996, 314-340).

stakeholders. Consensus cannot be guaranteed. Dialogue is also time consuming, and therefore resource consuming.

Even where there is dialogue, outsiders find it very difficult to understand the community's environment, needs and points of view. To be sure, some of this can be blamed on the attitudes and approaches of the outsiders themselves, which is the product of their education, institutional culture and so on (Chambers 1983, 1997). But there is a more fundamental factor here, too: the impossibility of ever being able to put oneself fully into somebody else's position and see things through their eyes. We all try to fit others' views into our own frameworks of understanding, filtering the knowledge gained and reshaping it. Unfortunately, this has the effect of imposing a kind of conceptual uniformity on the diversity of people and their experiences (Bhatt MR 1998).

Getting all of the community involved can have 'political' dimensions where it threatens vested interests by challenging the status quo. It may also require outside, supporting agencies to take a lead 'political' role. For example, an Oxfam relief and rehabilitation project after severe floods in Pakistan in 1992 took steps to address women's needs, in a country where women face a number of cultural and economic obstacles to their full participation in society. The steps ranged from the relatively neutral (employment of women relief workers) to radical social innovations (introducing the concept of joint ownership of houses by man and wife) and more 'political' acts (setting up separate village organisations for women in parallel to the traditional fora run by men). Needless to say, this was not without local opposition (Bari 1997).

On a more practical level, successful community involvement takes a lot of time and effort, particularly in building trust between communities and outsiders. In the case of the post-earthquake reconstruction plan in Peru mentioned above, six months were spent in discussions with communities and other organisations to reach a broad consensus

on the building technology to be deployed before work began on building houses (Schilderman 1993).

Finally, we should not forget one very important factor: disaster professionals have to meet many different demands and often have to work under considerable pressure, especially during emergencies. Even where community participation is genuinely desired, it may not be possible to effect it.

### Understanding players and their roles

The IDNDR's Yokohama statement observed: 'Preventive measures are most effective when they involve participation at all levels, from the local community through the national government to the regional and international level' (IDNDR 1994 p 10). The same point could be made about disaster response. It goes without saying that the different levels and actors should be integrated.

This leads us into a much bigger but vital question: what are the respective roles of communities, the state, civil society (in all its manifestations) and business—and what should their roles be? In the context of global and national social and political development, this has been one of the hot topics of debate in the past two decades. It has also, during the 1990s, increasingly preoccupied academics and policy makers involved in Third World development programmes, especially in non-governmental organisations (e.g. Clayton 1996, Smillie 1995). However, there seems to have been relatively little discussion of this issue in the context of disaster management<sup>7</sup>.

Community involvement will only become widespread if these questions are posed and answers are found. At a policy level, this is arguably one of the most important tasks facing the world's disaster 'community'.

### Towards a new agenda

With these factors in mind, let us ask the questions: *will communities become more involved in disaster reduction in the 21<sup>st</sup> century, and how will this come about?* Some recent developments may offer pointers to future trends. The remainder of this paper notes a few of these developments and comments on their significance.

### The 'disaster-resistant' community

In November 1997 Deerfield Beach in Florida, USA, was designated the first pilot 'disaster resistant' community as part of 'Project Impact', a new initiative of the Federal Emergency Management Agency

(FEMA). Up to \$1 million of seed money was to be provided to support activities that would protect the community against hazards (*Disaster Research* 1997). Project Impact is very important to FEMA, as even a brief glance at the agency's website shows, and by April 1999 it was claiming that, in addition to the original seven pilot communities, 118 communities and over 600 businesses were linked to the project (FEMA 1999a).

FEMA claims that with Project Impact it is 'changing the way America deals with disasters'. The project is founded on three main principles:

1. that preventive actions must be decided at local level
2. that private sector participation is vital
3. that long-term efforts and investment in prevention are essential (FEMA 1999a)

Recent progress reports on activities under the project in several states reveal not only considerable activity but also a great variety of structural and non-structural activities, great and small, including hazard and risk mapping and assessment, public information and education, preparedness drills, improvements to early warning systems, flood proofing measures and retrofitting of buildings. Many local organisations—official, community and commercial—are involved, and this mix of organisational types is one of the most significant features of the project (Colorado 1999, Montana 1999, North Dakota 1999, South Dakota 1999, Utah 1999, Wyoming 1999).

It is still too early to assess the impact of the project. Nevertheless, FEMA's big shift in emphasis away from emergency response and towards disaster preparedness and mitigation is significant not only for the USA but also for other countries which may seek to emulate the American model. It is likely that many similar programmes will start up elsewhere in the next few years in developed countries at least as the results of Project Impact become apparent—and it will be interesting to see where such programmes take off. The pioneers are likely to be those countries that, like the USA, already have strong traditions of decentralised government and citizen activism, or where the prevailing political mood favours rolling back the frontiers of the state. Project Impact itself may be a reflection of a wider trend in the USA (notably in California) towards greater involvement of community organisations in disaster activities and greater inclusion of community organisations in government plans (Wallrich 1996, Benini 1998).

#### Notes

5. It has been stated with particular force and cogency in the context of sustainable development professionals (Chambers 1983, 1997).

6. For discussions of some of these issues see Mitchell 1997, Stirrat 1996.

7. The humanitarian aid field is an exception, but the debate here has revolved around issues pertaining to 'complex emergencies' and internal conflict, especially in Africa.

## A voice for victims

Disaster victims lose out if their voices are not heard because their needs are not recognised—as happened, for example, with elderly victims of the Kobe earthquake in Japan in 1995 who were marginalised by their reticence (Tanida 1996). A first-hand account of a disaster has an immediacy and power not found in official descriptions and offers all sorts of insight. Listening to disaster victims goes to the heart of the problem of finding the human and the social in risk and disaster. It, alone, provides a means to obtain adequate witness to the conditions of danger, just who and what has been hurt, and their needs (Hewitt 1998).

It is an essential step towards letting such people take part in and exercise some control over 'the impersonal processes and citadels of expertise that tend to dominate the disaster community' (*ibid.*). Yet the voices of disaster victims and those at risk are not often listened to, valued or understood. The rare published accounts of disasters by their victims<sup>8</sup> are therefore of particular value in educating all of us, but these are merely one-off, individual accounts.

A number of innovative techniques are now being used to give more disaster victims a voice and as a result to help disaster agencies make their interventions more appropriate. One of these is the 'Participatory Evaluation Writing' method adopted by the Self-Employed Women's Association (SEWA) in the State of Gujarat in India. This process, which involved women from urban and rural districts in focus group discussions, writing and then discussing texts, allowed the women to present their own viewpoints concerning their vulnerability to natural and man-made hazards (Bhatt E 1998). In the same state the Disaster Mitigation Institute helps victims of disasters to write their own life stories, which set the disaster event in context as well as revealing their vulnerability and capacities (Bhatt MR 1998)<sup>9</sup>. Such perspectives can also provide a counter to prevailing media treatment of hazards and disasters and may be used by the media. For example, the 'Living with

disaster' videos produced by Television Trust for the Environment in association with Intermediate Technology, which let those affected by disasters and vulnerability present their own points of view, were shown on BBC World TV in 1997 (TVE 1996).

## PLA

Giving victims a voice moves them away from the status of objects or target groups and towards that of subjects or participants in the process of disaster management. 'Participation' has become a fashionable word, especially among those working on long-term sustainable development. As we have seen above, community participation is very difficult to achieve. However, it can be achieved if appropriate methods are adopted. Such methods are now becoming available. During the next few years much more is going to be heard in disaster circles about PLA. The acronym stands for 'participatory learning and action' and it is used to cover an increasingly large basket of approaches and methods that enable local people to analyse and share their knowledge of their lives and actions, and from this to plan and implement projects to overcome the problems they face. In developed countries, manifestations of PLA include such forms as 'action planning' and 'planning for real', some of which have their origins several decades ago; in developing countries it embraces the PRA (participatory rural appraisal) movement, which has spread like wildfire since the late 1980s<sup>10</sup>.

PLA does not only provide the outsiders, the professionals, with much better information on people's environment, lives and behaviour; it also—if practised properly—allows communities to be much more involved in planning and carrying out activities<sup>11</sup>. It works particularly well in long-term development programmes which can allow more time for the participatory process to unfold and to resolve conflicting views within communities but it is used in disaster contexts. PLA methods enabled Bhutanese refugees in Nepal to articulate their views and built up their confidence to

speaking out; it also brought to light problems that were not apparent to refugee camp managers (Hinton 1995). PLA was used in a village in Maharashtra affected by the 1993 earthquake to involve people in the process of planning the reconstruction of relocated villages (official designs for village layout and houses having failed to address the villagers' needs). Even though the process exposed different viewpoints within different groups in the village<sup>12</sup>, it did arrive at a commonly agreed solution—and took only three days (Shah 1996).

More systematic work is now beginning to deploy PLA in disaster settings. The International Federation of Red Cross and Red Crescent Societies and Oxfam have published a PLA training manual for those who work with communities at risk in Southern Africa, focusing on drought (von Kotze and Holloway 1996). A project is currently under way to test and adapt PLA methods for use by communities in analysing their vulnerability to disasters and capacity to protect themselves against them. It is being managed by Dr Nicolas Hall of South Bank University in London with funding from the European Community Humanitarian Office (ECHO). The results of this work should be widely available during the next year or so. One of the techniques tried out by the project during an earlier pilot phase was a simulation exercise with villagers in the Philippines to find out how they had coped with a major cyclone, Typhoon Ruping. The villagers re-enacted what they had done before and during the event. The simulation provided valuable insights into how they had learnt about the impending typhoon, their subsequent actions to protect property and assets, and their evacuation plans (Bellers 1996).

## The victim as consumer

One novel approach, related to the above, is to treat the disaster victim as a kind of consumer of goods and services. The example identified, which may well be unique, is the 'Flood Aid Fair' held in Raciborz in Poland after the severe 1997 floods. The fair was part of a larger assistance and reconstruction programme funded by the United States Agency for International Development. It was planned in response to problems arising during the reconstruction period when aid was being distributed in an inequitable and inefficient manner because victims of the floods did not have access to information about sources of aid (supplied by donors, the government and commercial firms). The fair's aims were to stimulate an intensive exchange

## Notes

8. For example, the Chinese dissident Li Lu's account of the 1976 Tangshan earthquake and its aftermath (Li Lu 1990: 45-59).

9. Examples are printed in Fernando and Fernando 1997: 45-54.

10. Wates 1999 is a useful practical digest of participatory planning methods used (mostly) in developed countries; Chambers 1997 outlines PRA and its evolution in developing countries.

11. Inevitably, there has been some reaction against the uncritical embrace of PLA/PRA and the hype that has surrounded it. For a conceptual critique, see Stirrat 1996. In some—perhaps many—cases, projects have been 'participatory' on paper rather than in practice.

12. Women and men identified different issues as being important, and the grid layout favoured by officials and by the younger, literate men was opposed by the women, older men and younger non-literate men.

of information between donors and victims, and to promote market response to the demand for goods and services created by the flood.

The fair was modelled on commercial trade fairs. There were 146 exhibitors: food aid organisations, government institutions, municipal associations, consulting firms, building materials firms, new technology firms, financial institutions and others. The event lasted only eight hours but was attended by more than 4,000 people: homeowners and representatives of NGOs, municipalities, regional development agencies, commercial firms and government. The exchange of information appears to have resulted in additional resources becoming available for flood victims—resources such as product discounts, information about credit and access to technologies. It also exposed gaps in available resources, helped to build capacity among indigenous organisations and strengthen relationships between different actors involved in the reconstruction effort, and led to the creation of a multimedia flood aid information system (Mikelsons and Chmura 1998).

### Accountability

A key principle lies at the heart of genuine participation and community involvement. This is accountability.

The great beauty of accountability is its universality. It can be applied to everyone, from village elders right up to the United Nations. It applies to state institutions that are expected to be accountable through the democratic process, and to private sector and non-profit organisations which are not subject to democratic control. Although a universal principle, it allows for plenty of variation in method, from simple transparency at one end to democracy at the other.

### Accountability by proxy

At the moment, disaster agencies are not directly accountable to disaster victims or potential victims. Although in the case of government agencies a degree of accountability can be achieved indirectly through the democratic process, the vulnerable and powerless—who make up the bulk of disaster victims in much of the world—are not strong enough to call such agencies to account. They have to rely on others with more power and influence to speak out on their behalf: this can be called 'accountability by proxy'.

One of the main proxies at present is the media. Sometimes they can play a beneficial role, as in the Armenia earthquake in Colombia in January 1999 when

press coverage highlighted the failure of official relief services to reach some of the poorest districts (*Guardian* 1999). But it is well known that the media tend to take a stereotyped view of disasters and are often influenced by other agendas: their own and those of other interest groups<sup>13</sup>. The journalist John Pilger has characterised the international press as 'capricious by nature' (Pilger 1986). They are unreliable allies. There has been much talk about educating the media to cover disasters in a more balanced and responsible manner, but the commercial pressures of international news-gathering are so great that such moves can only make slow headway.

Non-governmental organisations (NGOs) may take it upon themselves to speak up on behalf of disaster victims. This is a role that they have been encouraged to adopt (Maskrey 1989) but the nature and extent of their involvement in advocacy of this kind has not been studied<sup>14</sup>. Community associations and similar membership-based organisations can speak with some legitimacy. The role of NGOs from outside is more ambiguous. They may see themselves as genuine partners of the local community and its organisations, speaking with one voice, but in many cases that view is not shared by the people themselves for whom the relationship with outside agencies is an unequal one (Buchanan 1996). To date, the extensive discussion about NGO accountability to those they wish to help<sup>15</sup> has provided questions rather than answers.

### Standards, charters and codes of conduct

An encouraging trend is the development of codes of conduct and sets of common standards. Several have emerged during the 1990s, mainly among NGOs working in emergency relief and stimulated largely by problems arising from the proliferation of internal conflicts and associated complex emergencies. The best known are the Red Cross/NGO Code of Conduct (1994, a broad statement of principles), the People in Aid Code (1997, covering best practice in the management and support of aid personnel) and the Sphere

Project (1998, setting out minimum standards in disaster response); others address practice in particular emergencies (Leader 1999; IFRC 1998).

By laying down common standards and regulatory frameworks, the codes and standards are intended to make their signatories more accountable<sup>16</sup>. However, accountability is not straightforward, for agencies are accountable in many different ways: to the people they aim to help, to donors, to their own mandates and the legislative frameworks in which they operate. Most of these codes are still in their infancy and there are still practical obstacles to overcome concerning implementation and compliance (Leader 1999). Nevertheless, they do represent an important step forward and within 20 years most agencies working in disaster management—in all its aspects, from mitigation and preparedness through to response and reconstruction—will probably be working to codes and standards of this kind.

A parallel but related initiative is the Active Learning Network on Accountability and Performance in Humanitarian Assistance (ALNAP), set up in 1997 by donor agencies, United Nations agencies, and NGOs of different kinds. Its aims are, first, to identify, share and uphold best practices in monitoring, reporting and evaluating humanitarian assistance projects, and, second, to move towards a common understanding of 'accountability' in this context. It is beginning to play an influential role by disseminating information and as a forum for discussion (ALNAP 1999).

### Enforcing accountability

The sets of standards and codes of conduct are voluntary agreements; those who subscribe to them are anxious to make themselves more accountable. But what happens when key actors in disaster management are not interested in accountability or even dialogue? In such circumstances, more forceful or even confrontational approaches may be adopted and it is very likely that we shall see more of such attempts to provoke accountability in the future. Some examples follow. Many are from South Asia, a region where this

### Notes

13. For perspectives on this in different disaster contexts, see e.g. Ploughman 1997; Pilger 1989: 323-329; Gill 1986: 91-102.

14. The author is currently engaged in a study of NGO activity in disaster mitigation and preparedness that aims to address this among other subjects.

15. Edwards and Hulme 1995 ranges across the current debate among development NGOs. The ALNAP network (see section 7.2 of this paper) is the relief NGOs'

mechanism for addressing the issue.

16. The Red Cross Code of Conduct states: 'We hold ourselves accountable to both those we seek to assist and those from whom we accept resources' (IFRC 1994). The Sphere Project states that it reflects 'the determination of agencies to improve both the effectiveness of their assistance and accountability to their stakeholders' (Sphere Project 1998). In the People in Aid Code, accountability is to agency staff.

is starting to be seen as an important issue (Duryog Nivaran 1996, Bhatt 1994), but doubtless similar instances could be cited from elsewhere.

One method that is currently being discussed is that of having an ombudsman for humanitarian aid to provide a mechanism by which the concerns of people affected by disasters and conflict could be raised and addressed within the international humanitarian aid community. At the World Disasters Forum in London in June 1997 British NGOs launched a study, co-ordinated by the British Red Cross, to investigate the feasibility of such an ombudsman. The study concluded that it was possible to develop an ombudsman system, drawing on the experiences of such systems in other contexts, but this would need to be tested thoroughly to establish how it might work in practice. With this in mind, the project is now consulting more widely among humanitarian agencies (Ombudsman Project 1998, 1999).

Having an ombudsman will not in itself solve the problem of poor accountability in the international humanitarian system and runs the risk of adding another bureaucratic dimension to an increasingly bureaucratic business (Peppiatt 1997). The scheme also suffers from the same weakness as the codes of conduct described earlier: it can encourage greater accountability but it cannot enforce it; it can work only if agencies are willing to be bound by the ombudsman's recommendations<sup>17</sup>. Given the political complexities of many recent (and current) humanitarian crises, it would be extremely difficult for an ombudsman to maintain the 'legitimacy and respect' (Ombudsman Project 1998) that it needs to function effectively. The practical problems are formidable, but the ombudsman idea does attempt to deal with a real need: that of providing an impartial and independent voice for victims of disasters. As long as that need remains unmet, schemes of this kind will remain high on the international disaster response agenda.

The idea of getting people to fill out 'report cards' on the quality of public

infrastructure and services has been used in the cities of Bangalore and Ahmedabad in India. It has also been piloted in relief operations, where disaster victims evaluate the performance of the agencies that come to help them (Patel 1997). Another idea now being explored in India is that of scrutinising government relief budgets, bringing issues of cost effectiveness and accountability into the open. It is based upon the success of one NGO's efforts to scrutinise state development budgets, exposing gaps between plans and practice (Bhatt 1995).

More direct action to bring government officials and victims together has been attempted on occasion. Following sea floods at Dhandhuka on the coast of the Indian State of Gujarat in 1993, local NGOs launched a community-based process to plan more effective disaster mitigation; this involved a series of planning sessions in the affected villages. Officials from several state government departments took part in the meetings. They included the Minister of Health, who came to several meetings—an unusual action for someone of that rank. Although the officials took part in the debates, they did not exercise any control over the process which appears to have been harmonious and collaborative, and led to government commitments to carry out a range of recovery and mitigation measures (Bhatt 1996). By contrast, Japanese government officials on a national television programme after the Kobe earthquake in January 1995 had to face a chorus of complaints from the disaster's victims that they were not doing enough to provide food, emergency shelter, medicine and money for reconstruction. The Governor of Hyogo prefecture, of which Kobe is the capital, was obliged to admit that the authorities had been slow and lacked co-ordination (*Guardian* 1995).

### Litigation

Following the Loma Prieta earthquake in the San Francisco/Oakland area of California in 1989, several community-based organisations got together to complain that disaster recovery plans did not take account of the special problems faced by poor and vulnerable communities in the Bay Area. A variety of methods were used to force reconsideration of those plans. One of these was to invoke the law. When it was learned that the American Red Cross intended to transfer unspent contributions for the disaster to its national disaster fund, a lawsuit was threatened. In the face of this,

and the loss of community trust, the Red Cross revised its plan and created a substantial fund for planning, community organising and training (Wallrich 1996).

We do not know the extent to which the law has been invoked at other times and in other places to enforce accountability and raise standards<sup>18</sup>. Further research in this area would be valuable. Clearly, the law is a potentially formidable tool and it is probable that the next few years will see an increase in the number of lawsuits by disaster victims and those who feel that they are being exposed to hazard by the actions of others. This has very serious implications for disaster managers and agencies. Work has already been undertaken to develop a manual on 'public interest litigation' for disaster mitigation in South Asia, which draws on laws and legal precedents in five countries in the region to suggest ways in which communities and their representatives might use the law to ensure greater security against hazards or obtain better redress after disasters have occurred (Siwakoti and Pant 1997).

### Conclusion

The theme of the TIEMS '99 conference is 'Defining the Agenda for the Third Millennium'. The trends noted above—the disaster-resistant community, voices for victims, participatory methodologies, victims as consumers and the several drives towards greater accountability—are all likely to feature on that agenda at its outset, over the next decade or two. How prominently each will feature remains to be seen, but it is very likely that emergency and disaster management is now entering an 'age of accountability'.

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### Notes

17. One of the background discussion papers to the project highlights the difficulty in setting a balance between facilitation and enforcement (Christoplos 1998).

18. It is noteworthy that US law, in the form of the 1988 Disaster Relief and Emergency Assistance Act (the Stafford Act), forbids discrimination on the basis of race, colour, religion, nationality, sex, age and economic status in all disaster assistance projects — those of both government and private agencies (FEMA 1999). Has this led to lawsuits?

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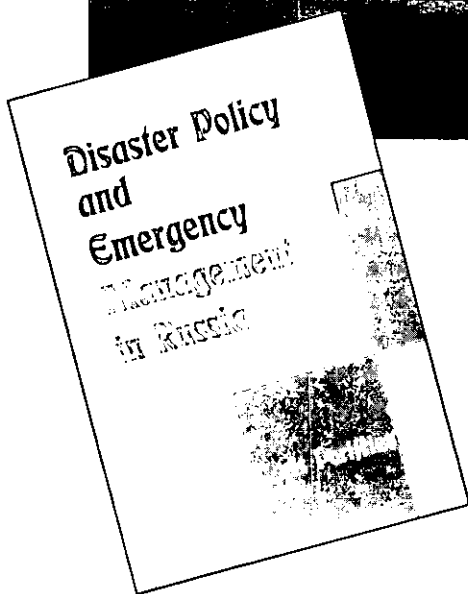
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## New Books



### Disaster Policy and Emergency Management in Russia

by Boris Porfiriev

New York, Nova Science Publishers 1998, English, 226 pages.

The peace initiatives to solve the Kosovo-crisis have clearly shown that Russia is still indispensable for building a Post-Cold-War-World-Order as well as a new, unified Europe that does not end any longer at Poland's eastern border or the Ural Mountains. Russia has become not only the pivotal-power between West and East, but also the barrier against the pre- and anti-modernism's of fundamentalist streams inside Russia and along its peripheral states, particularly in the Caucasian regions. Boris Porfiriev's book "*Disaster Policy and Emergency Management in Russia*" has as its intellectual starting point: the threats to security and safety of modern societies and social life are increasing worldwide.

Modern societies become more and more vulnerable against interruptions, disturbances and disorder, while the globalizing networking of finances, goods, services and information demands stability and durable functioning. Never again are single, isolated regional events capable of harming the whole world - the earthquakes of Kobe and Taiwan were an example of this. Both destabilised the worldwide supply with car and computer parts and thus made us aware what strategic dependency is about amidst global markets and international division of Labor.

It is this dependency of stability, reliance and continuity that makes modern societies vulnerable to attack. It is to Porfiriev's merit that he presents this wider perspective. It is not that the threats have changed. We still face natural hazards, technological risks, terrorism, sabotage, organised crime and armed conflicts in a broader range than ever, from civil wars over tribal/clan conflicts to gang wars. However, the functioning of modern societies has changed drastically. Modern societies evolve toward conditions, which need to proceed undisturbed. Thus, modernisation pacifies. On the other hand, the potential for disruption becomes increasingly dangerous because as the more sophisticated societies proceed and interact, the ruder interferences will suffice for interruption or terror. Porfiriev has carefully analysed the pre-conditions and underlying causes of emergencies, disaster and catastrophes.

Conscience of the constraints and contradictions of his own society he knows about the collisions of yesterday and tomorrow, of persistence and change, of conversation and progress.

But he also knows about other factors: of insufficient preparedness, lack of warning, relief and mitigation work, ill placed loyalties, poor design, construction and management. Three major case analysis, a Siberian Chemical Plant Accident, a major fire at the Kaminski Car Plant and the earthquake at Neftegorsk not only demonstrate the authorities competence but also the societal implications of 'events' which are no longer singularities.

The quality of Porfiriev's book, thus, is the broader, integral perspective of what modern society challenges, positively and negatively. This is all worth to reflect upon. The book has another important advantage: one learns how the Russian society after the breakdown of communism has (re)organised for coping with emergencies including marshal law. It helps us to understand the political transition of a political power which will belong to the top players in international pacification and a development which the United Nations has called the need for sustainability.

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# The experience of Traumatic Stress among urban firefighters

## Introduction

Firefighting offers the potential for a range of experiences that are in complete contrast to the 'normality' of everyday life. As an occupation it is associated with emergent danger, uncertainty and unpredictability. All of which would be anathema to a stereotypically 'risk-averse' public. How firefighters deal with the stresses of daily contact with danger remains largely unapprised in relevant literature.

Fire fighting is unusual in that, while the actual work tasks carried out are at times repetitive and similar, they are never the same. To understand this paradox it must be appreciated that even though many of the 'day to day' tasks are routine, the places in which they are carried out can vary unpredictably. Further, it is an occupation that may be incapable of being made safe. 'Safe' that is, in the sense that a conventional workplace can be made safe by adopting acceptable work practices carried out under defined and certain environmental conditions.

This article integrates the results of research on the work of firefighters with clinical data on post-traumatic stress disorder. It argues that certain operational factors and the emotional and psychosomatic effects of emergency response work may predispose firefighters to stress reactions by increasing their vulnerability to emergency trauma.

It derives from research on the work of urban firefighters in the (then) Queensland Fire Service (QFS)<sup>1</sup> and is based on many hours of interviews, field observation and 'ride along' experience with fire crews during actual emergency operations.

## Work factors

Operational fire fighting should be viewed as two different jobs. There are the mundane 'in-station' tasks of equipment maintenance and cleaning and there is the 'turnout'.<sup>2</sup> The notion of 'waiting' (prepared readiness) is one of the central factors in a firefighter's working life. Paradoxically, an alarm can occur at any time during a day or night shift. Firefighters must hold themselves ready to respond from the instant they 'sign-on' at the start of a shift, until it ends.

by P.H. Barnes PhD, Manager,  
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The in-station alarm system is an important element of the response cycle. The system used by the QFS was made up of three layers. The first part entailed the automatic illumination lights on the ceiling in the fire station.<sup>3</sup> A two-tone electronic siren was then activated followed by an electric bell. Once the ceiling lights come on, firefighters cease activities, put on their protective clothing, and move to their appliances. Before the firefighters leave the Station, dispatchers from the communications centre inform the alerted station about the nature of the alarm call and the address to which they have to go.

Many responses are to false alarms. Every response however, is treated as a real emergency until details at the scene of the alarm are known. On arrival at the scene of the emergency, if there is a fire or a life rescue required, the firefighters will go into action. If however, there is no action needed, they return to their station. Repeated false alarms are a regular feature of the working day (or night) and while expected, still increase frustration and stress. While fire does not always cause the activation of heat or smoke, all responses to an 'alarm' and the 'turnout' itself remain the same.

An important factor, little noted in the workplace Health & Safety literature on fire fighting, is the way in which firefighters become conditioned (hyper-vigilant) to changes in light intensity as a result of the emergency alarm system. Light is a powerful entrainment factor for circadian rhythms (Moore-Ede & Richardson 1985, Moore-Ede 1993). Using light as part of the station alarm signal, in combination with the two other phases, is likely also to be an extremely effective process of operant conditioning.

The resultant hyper-vigilant response extends to off-duty time as well. Stories abound in the QFS about how a light turned on at home by a spouse or other family member will often trigger a hyper-vigilant startle response, even though the firefighter might be resting at home after

finishing a shift. Similar reactions to changes in light intensity often occur during their days off between 'tours.'

It is common practice, internationally, for firefighters to sleep during nightshifts. Knowing that they can be woken up at any time does not improve the quality of sleep. Even after a nightshift without a 'turnout,' there are noticeable levels of fatigue. Evidence exists that a definite 'baseline' level of stress exists even during shifts without alarms (Lim et al. 1987). This may suggest that a degree of anticipation of the 'next' turnout is common. Such anticipation combined with the sleep interruption caused by nightshift turnouts is likely to enhance fatigue.

## Critical Incident Stress

Physical exhaustion however, is probably the most benign 'take home' artifact of the sub-culture of fire fighting. While firefighters normally do not take home the black humour of the mess room, an invisible element of their work often goes home with them: the grief and emotional shock of exposure to accident trauma.

Even though fire fighting is a well-recognised, essential and reliable aspect of the 'Institutional Safety Net,' the extent of exposure to these hazards and their effects may not be widely appreciated outside the occupation. There is a tendency for firefighters to keep these experiences to themselves even to the point of excluding their families from knowledge of daily events. These submer-sion reactions to trauma represent a hidden and sometimes secretive element of firefighting work.

The following are verbatim excerpts from interviews with full-time urban firefighters (Barnes 1996):

*I went to an MVA<sup>4</sup>, my first one. I couldn't talk about it for 2 years afterwards. My wife noticed something was wrong when I came home*

## Notes

1. The research in question was carried out in 1994. Following a major review in 1996 the organisation became the Queensland Fire and Rescue Authority: See Barnes (1996).

2. The turnout is the colloquial term for the act of responding with full lights and sirens.

3. These 'lights' are found on the ceilings of nearly every room of a fire station. In recent times the use of a physical bell has been discontinued.

that night. I said that I'd been to a bad MVA and that I didn't want to talk about it. She didn't ask! I also remember a two-car MVA I went to a few years ago. I was starting a day shift and we were 'turned out' to relieve a crew at this MVA. The accident happened at about 6am. Both couples in each car were incinerated. The first responding crew didn't realise that people were trapped until they put out the fires. We cut them out (of the wreckage) however. A friend of mine who was in the initial crew came to visit me a few days later. He told me that he had three showers trying to get the smell of burnt flesh out of his hair ... He kept smelling the bodies! (Interview Transcripts: Junior Officer)

Uncertainty is major element of the working life of firefighters. The normative use of humour and satire by firefighters is likely to act as a mask for an 'endemic' state of anxiety about knowing you can be called on to carry out traumatic and stressful work at any time day or night. For example:

*'... I think with our sense of humour, we develop towards dealing with job, a lot of that really comes home to me when you have got to deal with motor vehicle accidents. Fortunately which we don't have to do very much at all these days at (location not identified). To deal with picking someone, bits of someone out of the front of motor vehicles, if you do it once you know you can be called on to do it any day of the week that you work. I believe you have the attitude that you get these from time to time it is a horrible morbid task and not enjoyed by anyone and I don't think I would stay in the job if I had to dwell on the real aspect of the job'*

**Interviewer:** You escape, you put it out of your mind, ... the possibility that the next bell will be an MVA?

*'Yeah and that would go for people involved with bodies that we might encounter in house fires or factory fires. Death in general is not something to be considered or mulled over, it is something to be avoided. The subject of it is to be avoided from possible thoughts.'* (Interview Transcript: Firefighter)

A firefighter's training might be seen by some, as a 'vener' that offers a degree of protection from the stresses of their work, by preparing them for the reality emergency response. This is a false

assumption (Mitchell 1988a). No amount of training, can prepare emergency responders for the trauma of dismembered bodies, the screams of injured children, knowing that people may be trapped in a burning building, or having to deal with distressed people who suspect family members may be trapped. Such experiences are often so extreme that the ability to cope with them is overwhelmed (van der Kolk & Saporta 1993).

As mentioned above, firefighters can carry a range of emotional stresses with them when they go off-duty. Significant deterioration in family relationships, contact with close friends as well as problems with other work colleagues is well known among individuals exposed to trauma and human suffering (Solomon & Flum 1988). A number of firefighters of all operational ranks participating in the work reported here, stated that they had undergone a divorce or were currently separated from spouses. In such instances, individuals could suffer more extensive effects from stress. For example:

*'... I feel sorry for someone who is always going through bust ups with wives and going home to their motel room or their unit or something on their own. The only time that they get to shed that load is when you come back to work the next day.'*

**Interviewer:** How do they shed it?

*'Well obviously, they bring it up quite a lot by asking questions like, it might have been a pretty terrible thing and the subject might come up about this particular prang and they will be the first ones to say yeah yeah I went to that. Oh really, how do you feel about it ... da da da ... and that is their way of trying to shed or carry the burden of that drama. Once they keep it inside, they are on the line, they are just self-destructive. All the older guys they actually, without even realising it, they get back to the station and they will sit down and talk to you. You don't even know ... you just realise they have just spoken about it for two hours whenever it may be and then they do not want to hear about it any more because they have said their point, they shed the load for you, actually taken it off you, as well the load they are carrying themselves because they are so hardened they can do that, carry two or one on one. That is just the little things that you sit back and think, 'you bugger so that's what you were doing!'*

*'What do you do, do you go back three weeks later and thank them for that,*

*then you'll make a total wank of yourself? Do you just shut up and politely ignore that you understand it, what he has done to help you out and you use those skills and that knowledge that you have attained from him, on the next young guy or on the next Officer? It could be an older guy too that cracks. I think it is something that everybody carries and wears because there are different ways of showing it.'* (Interview Transcript: Firefighter)

Anxiety resulting from traumatic occupational experiences can manifest in a number of ways. For example:

*'... I know guys that have gone silly, well not silly, that is probably not the right word for them, but have been mentally affected from going to, being put under a stressful situation such as going to MVA's where they have come into contact with people they do know are killed and it is evident in the way they go about their work, well probably not station work, but when they turn out, how they react and respond, they have not ever really gotten over that problem or that incident which is sad because it is made good blokes who I suppose were good officers or potentially could have become good officer. I don't know how you judge a good officer but anyway they were good blokes for a start and they were doing a good job, ... it's made them dysfunctional at a job which is really bad because it has (expletive) up their career I suppose.'*

**Interviewer:** And their life?

*'And their life as well that is it. You often just think of it as just affecting their career but I suppose you know even for me looking and talking about accidents and stress, like even I drive along the road and I am always thinking about what I would look like if I was in a car mangled up or that could be me, that is weird probably rotten things to think but also sort of wonder, shit is this going to be the last time I am going to be driving along this stretch of road, and like we drive along, there has been an accident over the bridge and that and the accident happened on the two inside lines, if my wife's driving I always say don't drive in the lane, drive over here.'*

**Interviewer:** And she does not understand why you say it?

*'She will say oh why what is the big deal? I say well (expletive) last week there was a big truck going one way*

#### Notes

4. An MVA is a Motor Vehicle Accident

and a little van coming the other way and the person who was in the little van was found in a hundred pieces, that is what they don't understand. I suppose it made me a lot better driver to a degree because I am always looking out for everyone else, but she cannot understand why I am doing it, why I am being so defensive in my driving skills and that is all borne of the fact of going to so many accidents, cutting people out and thinking (expletive), this could have been avoided due to this, or this could have been avoided due to that.' (Interview Transcript: Junior Officer)

Symptoms of stress may be difficult to differentiate from the background level of practical jokes and black humour that is a normative element of fire fighting culture. Unless an individual suffering from stress behaves in a very unusual manner that attracts the attention of colleagues, his symptoms may be missed and he might not receive suitable or timely treatment. The officers whose words appear above, are some of the many firefighters whose ability to function has been affected by stress. Exposure to trauma of the kind seen by emergency workers is an occupational hazard over which they have little or no control (Brown & Campbell 1991).

With continued exposure to emergency trauma, it is possible that firefighters may become sensitised to it, and thus become more likely to suffer stress reactions following further incidents. Such sensitivity might predispose certain individuals to feelings of anxiety about coming 'on-shift.' The following interview transcript relates to such anxieties:

'... If you got stressed every time turning out to jobs you wouldn't do it would you? I find it upsetting when you find babies killed or burnt and people hacked to pieces in road accidents. You do it but that's a stressful part of the job. If it wasn't stressful you'd forget it ever happened. I vividly remember certain things that have happened, two kids burnt to death in car, a bad MVA bodies chopped up. I remember them as if they were still happening in front of me. I don't think it effects the way you run your life but it must have some effect if you remember it so well. It effects people differently. Some people spend the entire shift here dreading the bells going off. Some people who have left the job because they don't like turning out. From 7.45am until 5.45pm they'd

be nervous.' (Interview Transcript: Junior Officer)

**Interviewer:** Are you ever anxious about turning out to MVAs, ... the thought of dismembered bodies?

'... You always wonder if you get a turnout to a car accident say. I suppose one thing you are always thinking about is, to me, early years of the fire service, my first couple of accidents and extrications were people I knew and friends, and there was a couple of really bad ones in (location not identified) right when I very first started, joined up and there was two fatalities and one accident which were both friends of mine, because (location not identified) was only a small place then so you basically knew everyone and then was another one just a few weeks later with a couple of other people so often I always think oh (expletive) is it someone I know and then secondly I don't really feel scared about it, I wonder (expletive) how mangled up these lot are gonna be I suppose.'

**Interviewer:** How do you prepare for that?

'I don't know then again we might have a black humour because I suppose, we well, at (location not identified) anyway, we used to make horrible jokes about deaths and things like that and it was probably pretty gruesome to outsiders but for us it was a way of I suppose coming to grips with what had gone on. I don't know if that is the right assessment.'

**Interviewer:** Sort of like an immunisation against losing it, you joke about it?

'Well possibly, I don't know, maybe it is. That's what we used to do and we still do it so I suppose that is it. I have never been one to sit back and say oh (expletive) I went to this terrible accident and I couldn't stand it and all that sort of and then like that it has always been. I often find myself, that straight after the incident, because we can be there for a couple of hours as you know, and I will forget a lot of what has gone on when I come back. You know, I will remember the bits and pieces of it but a lot of it will be possibly blanked out of my mind. Whether that is another way of handling it I don't know. I haven't, personally, had any decapitations yet, I've had a few messy ones but most of the body parts were intact. I've had whole limbs missing. I can watch the TV and parts come on and I think oh this the 'gory' bit and I'll change the channel.'

**Interviewer:** Because of your exposure to these things on the job?

'I don't know but I just don't need to see that anymore I don't particularly want to see that anymore.'

**Interviewer:** Do you ever have intrusive thoughts about road accidents, flashbacks?

'I can still see a 16 year olds eyes, I think those things will never go away you'll always remember bits and pieces of it.'

**Interviewer:** Can those sorts of things make you harder?

'Yes you can get that way. You might show less emotion and switch that part off, to become callous.' (Interview Transcript: Junior Officer)

Once a team of firefighters return from an MVA or a fire, they are theoretically, available for another emergency response, and could be 'turned-out' at any time. If there has been an injury or deaths during the response a 'debriefing' will be offered. Details about the emotional state of the crews will be sought after returning from a difficult 'turnout.' However, if the responders themselves say that they do not need assistance, forced counseling is unlikely.

At a simplistic level, a key differentiating factor between a fire fighter and a member of the public may be more familiarity with danger. Such familiarity may not necessarily imply greater comfort with such dangerous work. The evidence listed above suggests that firefighters work with considerable degrees of concern about future contact with traumatic and hazardous situations.

Because firefighters often return to 'active' status soon after returning from a high stress turnout, unresolved emotional reactions to the horrible sights, sounds and actions of previous work and anxiety about being called to similar work, may complicate or even retard their ability to do their job. Ongoing exposures to this type of trauma without adequate counseling and stress de-briefing, may contribute to more serious and progressive emotional dysfunction.

### Physiological correlates of emergency response

The functional in-station role of firefighters was described previously, as one of 'waiting' (preparedness). It is within this mode of the occupation that the physical form of the tension is experienced. The physical reality of this tension has been established in ergonomic studies of operational firefighters (Phoon et al. 1983, Lim et al. 1987). The tension seems to derive from what must be for some individuals an almost tangible anticipation

of an alarm.

It was suggested also that with repeated and ongoing exposure to accident trauma and other sources of stress, firefighters might develop feelings of anxiety about coming to work and the nature of the alarms to which they may have to respond. I argued also that the 'turnout cycle,' as the central emergency response task of firefighting, combines with the hazards and dangers inherent to the job to offer ample opportunity for such exposures to occur.

The connection between emergency response work, long-term post-traumatic stress disorder and other anxiety conditions has been noted by many experts (McFarlane 1988a, 1988b, 1993; Mitchell 1988a & 1988b; Mitchell & Dyregrov 1993; Williams 1993). Weisæth (1989) suggested that there are three susceptibility factors or contexts that are important in the development of PTSD. These are:

1. high-risk situations—the presence of severe trauma situations
2. high-risk persons—the presence of vulnerability in exposed people, and
3. high-risk reactions—the presence of early symptoms that may be indicative of the onset of future chronic conditions.

In the case of firefighters, all three susceptibility factors are available. Their work entails going into high-risk situations on daily (nightly) basis. As a result of previous exposure to trauma, and/or knowledge of such events, they are themselves, the high-risk persons suggested by Weisæth (1989). Finally, given the conditioned response experienced when an alarm is received, firefighters may be more likely to experience traumatic reactions if the right visual, auditory cues, and action follow.

Mitchell (1988a) reported that after repeated exposures to trauma, emergency response workers could become less functional and develop chronic phobic avoidance behaviours. He cited evidence that during the air war over England in WWII, veteran firefighters and rescue workers became increasingly traumatised when faced with the destruction caused by daily bombing raids.

Folkman & Lazarus (1988) suggested that this type of emotional response could become linked to an anticipation of similar events in the future or even similar conditions. Van der Kolk et al. (1985) have reported an analogue to this stress reaction in animals subjected to repeated and unavoidable electric shocks. After a time, the animals give up even trying to avoid the discomfort and become listless and passive. van der Kolk et al. (1985)

describe this response as 'learned helplessness.' Maier & Seligman (1976)<sup>5</sup> link this act of 'giving-up' with the animal's inability to control (cease) the shocks as well as a reaction to the shocks.

Van der Kolk et al. (1985) have suggested that a generalised result of such 'inescapable stimulation' in animals, is an increased turnover of norepinephrine and increased plasma concentrations of catecholamine as well as depleted norepinephrine levels in the brain. They suggest a direct analogy between animal responses to inescapable shock, and the social withdrawal symptoms of PTSD noted in humans. They further link the decreased motivation and occupational functioning (learned helplessness?) exhibited by many trauma sufferers with chronic norepinephrine depletion.

Under normal physiological conditions, such glandular depletions are transitory. For chronically affected test animals and trauma sufferers, it is logical to suspect that some form of physiologically driven dysfunctional 'loop' mechanism is in operation. Anisman (1978) has suggested that given previous exposure to traumatic stress, the reintroduction of a stressor can lead to rapid and extreme neurochemical changes and a disruption of normal homeostatic rebalancing mechanisms.

Van der Kolk et al. (1985) also identified clinical symptoms such as hyper-reactivity (startle responses, explosive outbursts, nightmares, intrusive recollections) as being linked to chronic adrenergic hypersensitivity caused by catecholamine depletion triggered by episodes of acute trauma. van der Kolk & Saporta (1993) suggested that traumatic experiences that overwhelm a person's means to cope, can predispose them to excessive future reactions to stress. Gamberale et al. (1990) comment that such recurrent 'experiences' can cause psychosomatic changes which, if frequent enough, can lead to permanent variation of physiological functioning.

An important factor identified here but missing from the literature on trauma reactions among firefighters, is the influence of alarm systems in the entrainment of a 'conditioned' psychosomatic response. As an entrainment mechanism, the alarm system is simple but powerful. As described earlier, the alarm process used by

the QFS in all fire stations is in three parts. First, a light is turned on in the ceiling of every room in the fire station. This is followed by a two-tone electronic siren and the ringing of a continuous electric bell. At its most basic level, the alarm contains two elements that cause physical reactions that are very similar to certain key diagnostic criteria for PTSD. These being a hyper-vigilant reaction to changes in light intensity and disturbed sleep.

Startle reactions and states of hyper-arousal and hyper-vigilance are well documented as physical symptoms resulting from traumatic stress (Carlier & Gersons 1994). Figures 1 and 2 present theoretical descriptions defining how the in-station alarm system may trigger a CIS entrainment process.

Figure 1 displays how both day and nightshifts inculcate a conditioned reflex to changes in light intensity. As mentioned above, bunkroom lights are turned on automatically by the dispatching centre once an emergency call is received. Rutenfranz et al. (1977) have identified the important influence that night work has on circadian rhythms and re-entrainment of physiological functions resulting from changes in working and sleeping times.

Humans, like animals, possess innate circadian rhythms that are calibrated by 'Zeitgebers' (synchronising cues). Rutenfranz et al. (1977) confirmed that for humans, light is an important circadian trigger but suggest that it is not as dominant as awareness of clock time or the influence of social context.

Moore-Ede & Richardson (1985) however, put greater emphasis on light as an influencing factor on the rhythm of human physiology. They report that human sleep and wakefulness patterns as well as neuroendocrine and thermoregulatory systems resynchronize slowly after abrupt changes in environmental cues.

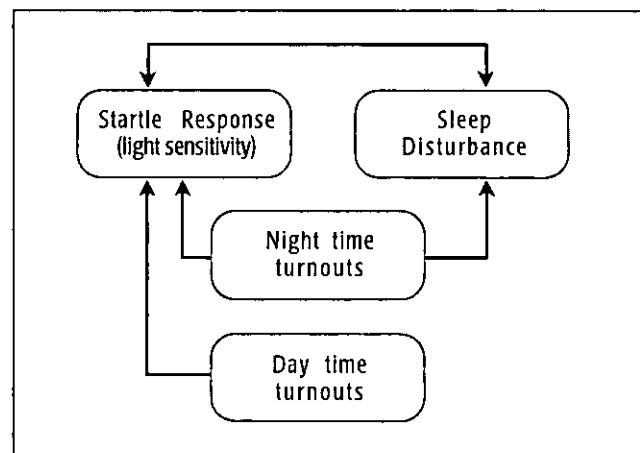


Figure 1: Relationship between Physiological response of firefighters and alarm systems.

They also suggest links between circadian disruption and digestive imbalances as well as cardiovascular disease (1985). Both of these conditions have been identified as health concerns for firefighters. Partinen (1994) suggested further, that stress and sleep disorders are mutually dependent. That is, stress causes disturbed sleep which, in turn, provokes more stress.

The relationship between hyper-vigilance and sleep disturbance suggested in *Figure 1*, may not by itself, be a significant concern. The '10-14' shift system<sup>6</sup> worked by the QFS firefighters allows four days off after the two consecutive day and two nightshifts.

This period might be adequate for rebalancing circadian rhythms in some individuals. The factor linking critical incident stress (CIS) with hyper-vigilance and sleep disorders, is likely to be pre-existing anxiety about 'turnouts' or some other aspect of emergency response work. Bourdet & Goldenberg (1994) report that concern about threatening situations or thoughts of stressful images before sleep, have been causally linked to an increased incidence of spontaneous awakenings and subsequently, reduced rest.

As suggested above, emergency response workers who are repeatedly exposed to traumatic stressors may be likely to suffer from progressive forms of emotional dysfunctioning. Gersons & Carlier (1992) showed that traumatised individuals can become 'locked' into increased levels of arousal, sleep disturbances and enhanced shock reactions. They further suggested that PTSD may be viewed as the end result of a series of self-perpetuating reactive mechanisms.

For firefighters such traumatic reactions could be characterised as retrospective (recollection of past turnouts that were stressful) and prospective (anticipation of the next alarm and what they

may be required to do). If anxiety about the next 'turnout' is present, then it is possible that 'alarms' would become a trigger reaction similar to that suggested by Gersons and Carlier (1992).

The combination of individuals already sensitised to CIS, and a system of work that exacerbates and may even progress these sensitivities, is a non-trivial problem. Given these conditions, it is possible that the progressive and ongoing cases of PTSD noted in a number of studies on firefighters may be confounded by a conditioned response to the alarm system used. Thus, the relationship shown in *Figure 2* is suggested.

For most individuals, the onset of PTSD can be diagnostically linked to a previous exposure to traumatic events or recognition of some form of overwhelming personal threat. For firefighters, all of these symptomatic and causal factors are available within the occupation on a daily basis.

McFarlane (1993) reported on studies carried out on a sample of professional, urban firefighters suffering from PTSD following the Ash Wednesday bush-fire emergency. He suggested that PTSD symptoms like sleep disturbances and hyper-vigilant reactions, are confounded by the presence of other co-existent disorders, possibly sharing a common aetiology.

McFarlane (1993) further argued that a key factor in the progression of acute CIS to PTSD in his sample of firefighters, was the presence of concurrent anxiety conditions.

McFarlane may not have recognised that such concurrent or pre-existing neuroses in his cohort of firefighters, may be linked to reactions to the alarm system used, in combination with previous exposures to CIS. Findings from this study suggest that it is extremely likely that the firefighters

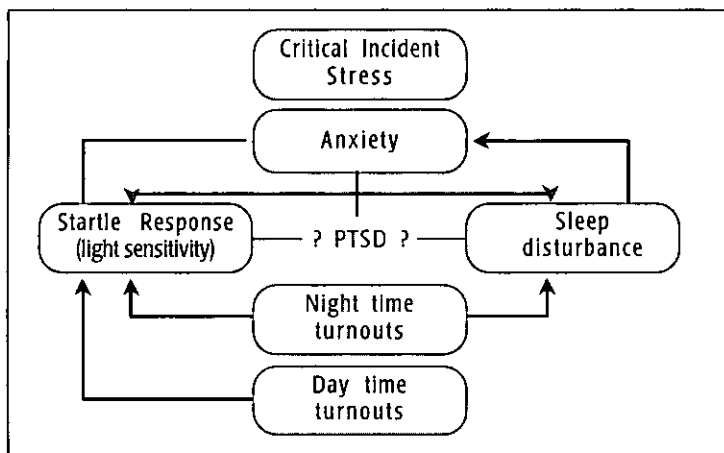
studied by McFarlane were already sensitised to emergency trauma from previous workplace exposures to CIS.

*Figure 3* displays a framework defining a common mechanism between neuro-physiological adaptations to the emergency response tasks of firefighting and established clinical signs of PTSD. The framework suggests that a mechanism similar to the chronic endocrine imbalance described by Anisman (1978) may be in operation. Workplace factors and the psycho-physiological adaptations reported in this study, are directly analogous to known diagnostic criteria for PTSD.

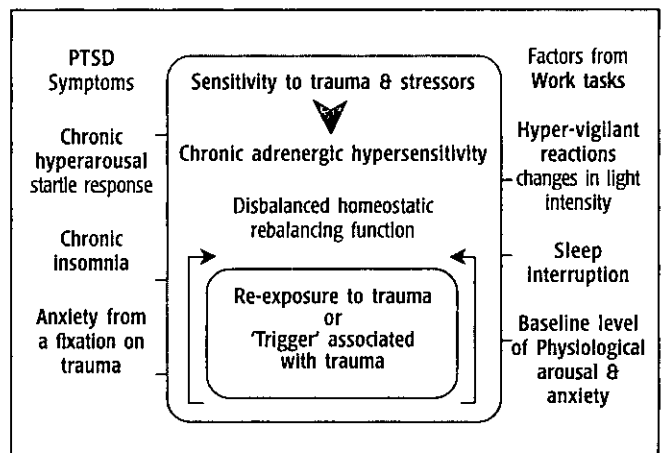
The 'sensitivity' to traumatic stress described above resembles a classical conditioned response. When a susceptible person thinks about, or comes into some contact with a 'cue' that they associate with the original trauma, they may exhibit some form of defensive reaction. For military veterans suffering from combat stress, such a cue might be the sound of a low flying helicopter. In the case of firefighters, an appropriate cue might be a fire alarm, or getting onto a fire truck during the start of a turnout, or any 'trigger' associated with their work.

Findings from the research upon which this paper is based suggest that merely driving past the scene of a motor vehicle accident that they had once attended can cause a stress reaction. Triggers causing psychic 'flashbacks' are not the only concern however.

What is implied in *Figure 3* is that a similarity exists between the concomitant factors of the work tasks of fire fighting and key symptoms of PTSD. Reactions to the work tasks in firefighting may in fact



*Figure 2: Suggested link between Critical Incident Stress and Post-Traumatic Stress Disorder among firefighters mediated by repeated participation in Emergency Response.*



*Figure 3: Mechanisms for a link between physiological factors common to the work tasks of firefighters and Post-Traumatic Stress Disorder.*

#### Notes

5. Cited by van der Kolk, *et al.* (1985:316)

6. Two 10 hour day shifts then two 14 hour night shifts followed by 4 days off,

engender a predisposition towards traumatic stress or even increase the likelihood that they may arise.

### Conclusion

Findings from studies reported here constitute empirical evidence that for emergency responders it is possible to become 'locked in' to a regular cycle of trauma exposure, and a rapid return to operationally 'ready' status. That is, they are made available for another turnout immediately, or soon after returning from a previous emergency situation.

Without the opportunity to interrupt the emotional reaction of an earlier traumatic response and with ongoing exposure, a downward spiral of 'inescapable' stress responses may be instigated. Sensitivity to such an entrainment process may already be in place for many professional firefighters and other emergency responders as part of their work tasks.<sup>7</sup>

An integrated strategy operating on a number of levels is required. Obviously, the prevention of emergency situations would eliminate the circumstances in which exposure to trauma occurs. In addition, processes that prepare and inform new emergency responders, and their families, about the traumatic reality of the work is also of paramount importance. Family support is a key factor that should not be overlooked.

These items balanced with the timely therapeutic intervention into cases of acute and chronic stress reactions is needed. Timely debriefing of acutely traumatised emergency workers is a likely means of alleviating the conditioning effects of the 'emergency response cycle' as is the availability of ongoing institutional support.

Beyond this, a more effective means to enhance the early identification and rehabilitation of chronic trauma sufferers is also needed. While privacy and ethical issues are critical factors and adherence to standard Human Resource Management principles is required, examination of opportunities on how to better deploy a safety net to cater for individuals who carry such semi-invisible injuries is important.

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7. This includes volunteers from rural fire services and retained firefighters.

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### Disclaimer

This paper should not be construed as defining policy or as an expression of intent by the QLD. Fire & Rescue Authority





# Disaster Events Calendar

**25-28 April 2000**  
**Boston, Massachusetts**

***Eleventh Global Warming International Conference and Expo (GW11): Kyoto Compliance Review-Year 2000 Conference***

Sponsors: Global Warming International Program Committee and Global Warming International Center.

**Contact:**  
Sinyan Shen, GWIC-USA  
22W381-75<sup>th</sup> Street, Naperville, IL 60565  
ph: 630 910 1551  
fax: 630 910 1561  
email: syshen@megsinet.net  
http://globalwarming.net

This conference will include sessions on climate change and extreme events, Pacific and North Atlantic oscillations, sustainable agriculture and forestry, global warming and human health, climate change and infectious diseases, as well as a symposium on energy natural resource management.

**April 29- May 3 2000**  
**Las Vegas, Nevada, USA**

***2000 National Disaster Medical System Conference***

Sponsors: U.S. Department of Health and Human Services, Department of Defense, Department of Veterans Affairs, and Federal Emergency Management Agency

**Contact:**  
NDMS  
12300 Twinbrook Parkway, Suite 360  
Rockville, MD 20875  
ph: 301 443-116  
fax: 301 443-5146 or 800 872-5945  
email: ndms@usa.net  
www.oep-ndms.dhhs.gov

The 2000 NDMS Conference will provide practical information on implementing inter-disciplinary strategies for preventing or reducing the health and medical consequences of disasters of any origin. The education will feature counter-terrorism programs, clinical updates, extreme environmental events, disaster team development, information management systems, mass gathering events, critical incident stress management, sheltering and congregate care, health systems, emergency planning, mass fatality operations, veterinary services in disasters and new standards in emergency management. The program will offer approximately 20 hours of continuing education credit for a wide range of health practitioners and administrators.

**3-4 May 2000**  
**Hong Kong**

***Tunnel and Underground Station Fires: Strategies, Standards, Practices: International Conference***

Recent road and rail tunnel fires, especially the Mont Blanc and Tauern in Europe, have again brought every aspect of tunnel fire safety into

sharp focus. Underground stations are also being re-evaluated, as they become more complex in their structure and use. Expanding on the Tunnel Fires conference, held during May 1999, the aim of this conference is to provide a forum for discussion and review of current strategies, standards and practices, to explore how attitudes are changing and consider what further steps need to be taken.

Organised and sponsored by Independent Technical Conferences Ltd and Tunnel Management International.

**Contact:**  
Stephanie Whitham,  
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PO Box 452  
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**May 4-7 2000**  
**Boston, Massachusetts.**

***Eighth International Conference on Emergency Medicine: Emergency Medicine in the Third Millennium***

Presented by: The International Federation of Emergency Medicine.

**Contact:**  
American College of Emergency Physicians  
P.O. Box 619911  
Dallas, TX 75261-9911 USA  
ph: 1-800-798-1822 or 972 550-0911  
fax: 972 580-2816  
email: edmeetings@acep.org  
www.acep.org/meetings

**May 8-11 2000**  
**Baltimore, Maryland, USA**

***CPM 2000—Contingency Planning and Management Annual Conference: 'Furthering Business Continuity in the New Millennium'***

Sponsor: 'Contingency Planning and Management' Magazine.

**Contact:**  
CPM 2000  
WPC Expositions  
84 Park Avenue  
Flemington, NJ 08822, USA  
ph: 908 788-0343 ext. 135  
fax: 908 788-9381  
email: CPM2000@witterpublishing.com  
www.contingencyplanexpo.com.

CPM 2000 will feature both a conference and trade show on business continuity planning. The program includes over 50 sessions on various aspects of contingency planning.

**May 15-17 2000**  
**Sydney, Australia**

***Futuresafe 2000 Convention and Exhibition***

**Contact:**  
ICMS Australia Pty Ltd  
GPO Box 2609

Sydney NSW 2001  
ph: 61 2 9241 1478  
fax: 61 2 9251 3552  
www.nasca.com.au

**May 16-19 2000**  
**Orlando, Florida**

***International Emergency Management Society (TIEMS) Seventh International Conference: 'Emergency Management in the Third Millennium'***

**Contact:**  
Suleyman Tufekci  
University of Florida  
Industrial and Systems Engineering  
P.O. Box 116595  
Gainesville, FL 32611-6595 USA  
email: tufekci@ise.ufl.edu

A conference for emergency and disaster leaders, planners, managers, researchers, educators, and practitioners interested in exchanging information on the use of innovative methods and technologies to improve the ability to avoid, mitigate, respond to and recovery from natural and technological disasters.

**May 21-25 2000**  
**Tokushima, Shikoku, Japan**

***Eighth International Conference of the Natural Hazards Society***

**Contact:**  
Russell Blong  
Natural Hazards Society  
c/o Natural Hazards Research Centre  
Macquarie University, NSW 2109, Australia  
ph: 61-2-9850-8397  
fax: 61-2-9850-9394

or The Natural Hazards Society  
PO Box 49511, 80 Glen Shields Avenue  
Concord, Ontario, Canada L4K 4P6  
email: NHS@ocs1.ocs.mq.edu.au  
www.es.mq.edu.au/NHRC/NHS

The major objectives of the Society are to promote research in all aspects of natural hazards, to assist in the distribution of emergency response plans for countries around the world and implementation of educational programs on hazards prevention and mitigation.

**June 3-6 2000**  
**Miami, Florida**

***Reaching Women and Children in Disaster: A Global Workshop for policy makers, practitioners and researchers.***

**Contact:**  
Betty Morrow  
International Hurricane Center  
Department of Sociology and Anthropology  
Florida International University  
Miami, FL 33199 USA  
ph: 305 348 160; fax: 305 385 7364  
email: morrowb@fiu.edu

The organisers are currently seeking program ideas and sponsors



