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EMA *'safer sustainable communities'*

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Climate variability in the land of fire and flooding rain

Critical issues that impact on community response during major disasters in Australia

Monitoring the effectiveness of incident management systems and the performance of Incident Management Teams

How we use case studies in emergency services management training

historical snapshot

© *The Age Saturday Extra Picture by Cathryn Tremain*

The tragedy at Port Arthur occurred just after 1:00pm on Sunday 28 April 1996 shattering not only the small island state of Tasmania but the rest of Australia.

The peaceful serenity of the popular tourist attraction was destroyed when a lone gunman used a military-style weapon to kill 20 people who had been enjoying refreshments in the Broad Arrow Café. He continued his shooting rampage outside, leaving behind more dead and injured. The siege continued into the following day as the gunman held hostages at a nearby cottage. In all, 35 people died and 22 suffered various forms of injury.

Martin Bryant was arrested on the afternoon of 29 April 1996 and pleaded guilty to the crimes. He was sentenced to life imprisonment without parole.

Cover: Prime Minister John Howard talks with banana farmers in a destroyed plantation ten kilometres north of Innisfail, Queensland after Cyclone Larry *devastated the surrounding areas in far North Queensland, 22 March 2006.*

SMH Picture by ANDREW TAYLOR

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

FOREWORD

National Emergency Management Plan a step closer for catastrophic disasters

Tropical *Cyclone Larry*'s category 5 impact on Northern Queensland, while not classified as nationally catastrophic, has certainly had a severe impact on the community, economy and infrastructure of the region.

In recent times, Australians have witnessed unimaginable scenes of devastation and human misery associated with the South Asian earthquake and tsunami, *Hurricane Katrina* across the southern US and the massive earthquake in Pakistan. These were the worst of the natural disasters that rocked the world this decade, not to mention the human-caused incidents we cannot forget.

Mercifully, we have not experienced such devastation on our shores. These events have however, made Australian emergency managers wonder how we would cope with such disasters if one was to occur in Australia.

These questions have been contemplated by the emergency management sector in the *Review of Australia's Ability to Respond and Recover from Catastrophic Disasters*. The review commenced in 2004 following a recommendation from the Council of Australian Governments (COAG) in its report *Natural Disasters in Australia; Reforming mitigation, relief and recovery arrangements*. This review was then expanded after Boxing Day 2004 to include reference to tsunami issues.

A national working group, formed to review the COAG report, had its recommendations considered at a special meeting in April 2006, of the Augmented Australasian Police Ministers' Council in Melbourne, chaired by the Attorney-General. As a way forward, the nine Ministers with emergency management responsibilities were unanimous in urging an early finalisation of a National Emergency Management Plan.

This plan, currently being prepared by the Australian Emergency Management Committee (AEMC), would include rapid provision of fundamental necessities such as food, shelter, medical and financial services to the Australian community in the event of a catastrophic disaster. The plan would support the National Emergency Protocol as adopted by COAG on 10 February this year. For those AJEM readers who like definitions, a catastrophic disaster is one beyond any one government's ability to cope in terms of response and recovery arrangements.

In considering the report, the Ministerial Council agreed that jurisdictions should undertake further work on the agreed priorities identified from the Catastrophic Disasters Review, with the intention of enhancing Australia's emergency management capability and capacity.

All of this work is just an extension of the excellent emergency planning work already being undertaken across the emergency sector in Australia. However, I believe it will bring an entirely new perspective to attitudes about disasters that impact on our nation's wide range of communities and mark a milestone in Australia's disaster preparedness.

Trevor Clement
A/Director General
Emergency Management Australia

Queensland emergency response capacity: policy implications for the future

Grant Pitman examines a range of critical issues affecting emergency management impacting on community response during major disasters in Australia

Abstract

Disaster management policy is under review by the Australian Government. One of the major policy issues is shared resource management and the defined boundaries for resource roles and responsibilities to avoid confusion and risk. This includes the unnecessary waste and duplication of federal, state and local government resources during times of disaster. Resource management protocols have to be accepted, understood and practiced to be effective. The public demands a clear point of contact for disaster response and relief and the role and relationship of government agencies such as defence and emergency management could be expanded. Further discussion is required on the different needs in urban and rural communities, for example organisation, control, resources, response time and communications. Differing models may need to be examined, such as control versus decentralisation or regional control. In times of disaster, can the defence agency guarantee a reasonable response considering its global obligations? These issues will significantly impact on community response and resources during a major disaster in Australia.

This article discusses and examines a range of critical issues affecting emergency management co-operation between state/territory agencies and the Defence Forces. Issues to be examined include legislation/policy, information sharing, role differentiation, organisational values, managing resources, development and supporting agency infrastructure to achieve effective co-operation, and co-ordination during a natural or human disaster.

Introduction

Recent world events of terrorism in London, the United States and Indonesia, and increasing global natural disasters such as tsunamis, earthquakes and hurricanes, have impacted significantly on national and international government resources. Economic and emergency resource response has cost Australia $36.4 billion from 1967 to 1999 (Scanlan, 2004:15). Queensland, for the same period, recorded $7.9 billion, or 22 per cent of Australia's natural disaster costs. The Queensland Government's spending obligations over the past six years has cost $324 million (Scanlan, 2004:15). To address this economic deficit, the Australian and state/territory governments have developed policy, guidelines and legislation on the prevention, preparedness, response and recovery funding capacity for disaster management. The desired outcomes should emphasise the need to prepare for disasters to reduce their impact on physical infrastructure and on human life and in doing so, to restore community functionality. A government review was instigated to address economic and social costs to the Australian community of natural disasters. Whether the review was sufficient and comprehensive enough to analyse the effectiveness of policy and structures has been questioned. Furthermore, some have raised concerns whether there was a need for additional funds to address gaps in disaster management resources throughout Australia.

In June 2001, the Council of Australian Governments (COAG) commissioned a review of Australia's approach to natural disasters and the arrangements for dealing with them. The major objectives were to determine whether the current arrangements and framework for assessing disaster risks, the mitigation action being taken, and the way disasters are presently being dealt with throughout Australia were sufficient to effectively meet the needs of Australian communities affected by natural disasters.

The resulting report, *Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements*, released in February 2004, concluded 'that current arrangements could be improved by broadening the focus of disaster management beyond historic disaster response and reaction, toward anticipation and

mitigation of disasters' (Scanlan, 2004:16). Furthermore, the COAG report recommends a unified national approach, with a strong emphasis on prevention of the consequences of natural disasters. The report further describes desirable attributes of a national framework for natural disaster management in addition to a range of commitments required by all levels of government to reform Australia's natural disaster management over the next five years. This report could have provided the mechanism for a greater alignment of resources between state/territory and Australian Government agencies, for example, emergency management and the Defence agency.

The states/territories have formally given their commitment to this report. Further emphasis, based on the *Queensland Audit Report* (2004), was placed on the development of an holistic, integrated and balanced approach to disaster management and is supported in the *Queensland Disaster Management Act 2003* (QDMA). The recent *Review of the Queensland Disaster Management System* by Queensland Audit Office (2004) further argues that a 'more robust risk management framework is necessary given the complex and dynamic nature of the environment in which the disaster management system operates which includes changing demographics and national indicators' (Scanlan, 2004:16–17). However, the new *Queensland Disaster Management Act* needs further development to achieve an integrated and balanced approach to disaster management in co-operation with other federal agencies such as Defence.

Governments are looking to efficiently use the existing resources within the local, state/territory and federal jurisdictions. Historically, one of the emerging frontline Australian Government departments that has provided resources to state/territory disaster management agencies, particularly in Queensland, is the Department of Defence. However, in recent times the resource priorities of the Department of Defence resources have been governed by national interests that have a higher priority. Australian Defence Forces overseas commitments would greatly hinder the provision of local aid. Both the state Disaster Management Act (2003) and the new Defence Assistance to the Civil Community (DACC) policy guidelines provide a framework for the respective agencies within Queensland to share resources and co-operatively interact during times of crisis.

Legislation and guidelines considerations – state and defence

While the Australian Government recognises the constitutional responsibility of the states and territories, it has accepted broad responsibility to support them in developing emergency management capabilities. This broad responsibility is based on the Australian constitutional provisions for external affairs and the 1997 Protocols to the Geneva Conventions of 1949, which include civil defence. The Australian Government also has responsibility for military defence and recognises a need for co-operation and co-ordination with the states/territories for civil defence policy (Appendix A – Definition of Civil Defence and Appendix C – Legal Authority to Engage in Disaster Management). Primary responsibility for the protection of life, property and the environment rests with the states and territories (www.ema.gov.au).

Thus, states/territories have responsibility for the protection of the life and property of their citizens through emergency management, including civil defence. On the 31 March 2004, the *Queensland Disaster Management Act* (QDMA), previously known as the *State Counter-Disaster Management Organisation Act 1975*, was proclaimed. During the second reading of the Disaster Management Bill, the Minister for Emergency Services indicated that the legislation recognised that 'Disaster Management is a partnership between the three tiers of Government – Commonwealth, state and Local' (Queensland Disaster Management Bill, 2003: p. 2). The minister further addressed the need for a strong relationship between the various levels of government in disaster mitigation, prevention and preparedness as well as response and recovery from disasters.

Of particular interest in the legislation is the definition of disaster and also the delegation of powers to appoint disaster officers by the District Disaster Coordinator (DDC). QDMA recognises that an event (disaster) would seriously disrupt a community and require a significant co-ordinated response by local government supported by state/territory, and Australian Government agencies. An event (disaster) could also be a failure of or disruption to an essential service or infrastructure, or a terrorist attack against the state (Section 13, QDMA).

The QDMA provides for the declaration of a 'disaster situation' at the district level by DDC with the approval of the Minister for Emergency Services or at the state level by the Minister for Emergency Services and the Premier (Sections 64, 69, QDMA). Once a declaration has been issued, the DDC (or a Declared Disaster Officer) may exercise an additional power only during the period of a disaster situation and only to do any of the following:

- ensure public safety or public order;
- prevent or minimise loss of human life, or illness or injury to humans or animals; and
- prevent or minimise property loss or damage, or damage to the environment.

Full details of the additional powers provided during a disaster situation are contained in Section 77 of the *Queensland Disaster Management Act*. However, in general they include:

Newspix/Chris Hyde

Police and fire crews combine resources in times of emergency.

- the power to control the movements of people, animals and vehicles (including evacuations);
- the power to control the supply of equipment and services;
- the power to commandeer property or equipment; and
- the power to remove or destroy animals, property, and/or equipment.

The QDMA provides protection from civil liability for the state/territory agencies and local councils and listed individuals from civil liability for certain acts or omissions made under the QDMA, providing they are done in good faith without reckless disregard for the possible occurrence of personal injury or loss or damage to property. The Queensland Act does not extensively cover the use of government resources, or the operational relationships with Australian Government agencies, although the powers and duties of the Commonwealth regarding defence are derived not only from section 51(vi) but also from other sections of the constitution (for example, sections 68, 51(ii), 69, 70, 114 and 119). Defence in its basic connotation has been understood as meaning defence against hostile, warlike action (actual or potential) from some external source (Moens & Trone, 2001:105). Emergency management is not covered by constitutional provisions for national defence and policy directions based on civil defence and foreign affairs provisions have been developed between the Australian Government and the states/territories.

During 2004, the Department of Defence updated their *Defence Assistance to the Civil Community Policy and Procedures* (DACC). The general principle for the implementation of DACC guidelines is to be regarded by state authorities as the exception rather than the rule; 'Defence resources are intended to be used for Defence purposes only' (Defence Assistance 2004). However, it has always been the position and constitutional responsibility of the states and territories to protect the lives and property of people within their boundaries. Where a disaster is actually or potentially of such a magnitude that state or territory resources are inadequate, unavailable or cannot be mobilised quickly, the Australian Government accepts a responsibility for providing support and funding when requested.

The principle to be applied to the provision of emergency response under the DACC guidelines is that the state/territory governments are primarily responsible for combating disasters and civil emergencies using available state/territory professional and volunteer services and commercially available resources. Australian government resources (including Defence Forces' assets) may be made available in situations beyond the resources and timeframes of state and territory authorities.

The current DACC guidelines cover six categories. Counter-terrorism resources shared between governments are covered in more extensive policy guidelines and will not be discussed in this article. The first three categories cover counter-disaster emergency assistance. Categories four to six deal with non-emergency assistance (including law enforcement needs where no force is used). Of importance to the discussion on future policy implications are the first three categories referred to in appendix B. The guidelines also cover indemnity and insurance issues affecting Australian Government staff operating under the DACC guidelines.

Issues impacting on legislation and guidelines

The new Queensland legislation provides the DDC with the authority to delegate to agencies and personnel (declared disaster officers) the authority to perform specific or generic functions during a declared emergency event. There is scope for Defence Force personnel to be provided with these emergency powers as well as being covered by the liability provisions under the Act. Presently, occupational health and safety regulations and training limitations reduce the support defence personnel can provide on an individual basis during a disaster. Traditionally, due to their role and responsibilities under Commonwealth legislation (Ward, 1992), military personnel have not accepted civilian powers. The adopted practice is for military personnel to be accompanied by a civil authority with associated powers to perform specific emergency-type tasks. This approach requires additional resources from civil authorities; a need for constant joint reporting and supervision; and effective communication lines during critical or severe emergency operations. Often, military resources and skills would be more efficiently used if disaster management Acts and associated guidelines

clearly defined and provided delegated powers during times of disaster. It is often argued that it is not appropriate for military personnel to be given state powers due to their militaristic training and use of lethal force. This factor applies less today than in the past with the Australian Defence Forces often being deployed, whilst not being armed, in peace keeping roles in foreign countries. However, there is long standing arrangement of providing Australian Government powers to police officers to perform tasks where the possible use of lethal force may be required.

With the increased use of Defence Force resources, there should be scope for specific military units to operate within state legislation framework to improve resource, communication and management efficiencies. Military units are adaptable and could provide emergency response. Presently, the design of the Defence units is to fight. They are provided with supporting logistics and personal support units. Defence equipment is primarily designed for warfare. The issue of command can be managed in a shared co-operative arrangement for tasks that do not require the use of lethal force. Similar management and command/control models exist involving state/territory agencies and could be applied in the military context. Perhaps increased funding should be provided to the Defence Forces to improve their emergency management response capacity.

Generally, DACC guidelines one and two have no cost recovery implications. However, civil authorities are able to claim under the *Commonwealth-State Natural Disaster Relief Arrangements* and *state Disaster Relief Arrangements*. Although the Department of Defence has the ability to absorb cost, any indicative cost for the whole event would limit what benefits could be achieved either by increasing civil resources or improving or maintaining improved Defence Force resources and capabilities. Defence costs should be included in any future emergency response resource capacity, enabling funding between state/territory and federal levels to increase appropriately at both levels to address and support local emergency management capacity.

Information sharing, the allocation of resources and access to resources is of critical importance. Interfacing knowledge of civil and military resources and their management is limited and relies on traditional information systems. An improved emergency resource management system between state/territory and federal agencies could be integrated into a secure system where timeliness of information is often critical in dealing with crisis events. In addition, secure communication systems between emergency and military services would significantly improve co-ordination; responsiveness; reduce duplication of support services; ensure increases in emergency productivity; and promote preparedness for major disasters. The adoption of this strategy would require additional funding.

During the past 20 years, there has been an increasing tendency by governments generally to add, broaden or even change roles, functions and responsibilities of public sector and emergency response agencies. The Department of Defence has not been exempt from this policy. Administration and operations expansion by the Australian Government for threats of terrorism, border protection, policing actions, international rebuilding and security, and a variety of emergency management, public order and social services has progressively changed the roles and functions of agencies such as the Defence Forces. Although the Defence Force has and will continue to have a primary role in military outcomes, secondary roles such

Newspix/Lindsay Moller

Australian Defence Forces are often deployed in peacekeeping roles in foreign countries.

as emergency management appear to be becoming integrated into their core business. Civil authorities with scarce resources, significant population growth, massive infrastructure development and an increase in natural and human disasters are keen to gain access to military and Australian Government resources through bureaucratic or political means. Future emergency management roles and responsibilities need to be fully integrated into the military organisation/policy and infrastructure to achieve a seamless response to emergency management issues. Establishing a supportive quick reaction function between emergency services and the military as an alternative strategy could be considered within the DACC guidelines similar to the model and funding/resource arrangements currently operating in the United States (Wright, 1997:290).

Due to the complexity of human lifestyles, technology and infrastructure in our communities, when an emergency/crisis event occurs, there is community expectation that highly skilled people and sophisticated resources are required. National skilling standards, workplace health and safety legislation, liability issues, industrial and union requirements and other related standards make the workplace more complex during emergency events. Often, organisations such as the military have specific and specialist knowledge, skills and equipment – such as communication equipment – to support emergency management requirements. With a wide variety of tasks occurring during a natural disaster a range of differing skills needed. It is difficult to provide timely and appropriate skills training during a disaster and a needs analysis review of training and tasks performed during a disaster should occur. A policy for up-skilling and shared-skilling should be developed between emergency agencies and military organisations, with a registered database to address response and recovery tasks assigned to Defence personnel. Certainly, this approach of skilling military personnel from an appropriate training budget, particularly reservists, is being used for disaster management in the United States (Wright, 1997:70–71).

Under the QDMA, when a declaration of a disaster occurs, the overall responsibility for the disaster generally rests with DDCs and often shared control will occur with other agencies, including the Defence Force. All military staff are under the control of the military command. However, co-ordination of military resources, including personnel where delegated powers are provided, could be more clearly defined in an MOU in the emergency management context. In addition, private contractors generally assist in the management of defence services and resources by way of guidance, instruction and technical detail. For example, desalination plants are managed by a private contractor who is the only one aware of current status of readiness and serviceability of units and has physical access to the stock. The needs that arise from the use of Australian Government resources and private contractual arrangements better define the role of emergency management during state/territory disaster operations. Where Defence resources have been deployed or redeployed for other Australian Government requirements, a central database system and funding arrangements need to exist to advise state/territory emergency management services of their deployment so alternatives could be considered. When military resources, including human, financial, material and other logistical services, have been deployed for extended periods, alternative strategies are critical for response and recovery – particularly long-term recovery. The aftermath of a terrorist attack has similar demands on emergency services as does a natural disaster. There may be less warning of a terrorist attack as opposed to some natural disasters.

Conclusion – integration of legislation and guidelines

Emergency management has become a central focus of government and community activities. All tiers of government in Australia are actively involved in developing legislation, policy, funding and guidelines to address prevention, preparedness, response and recovery of emergency management. Interaction between state and Australian Government agencies is becoming more important due to resource usage and sharing, co-operation, information sharing, co-ordination and defining of role linkages. Historically, goodwill and broad policy principles have been used to manage emergency events.

It is now timely to address these issues of 'disaster management' because of the heightened awareness of the Australian Government and its citizens to the recent events/disasters in Indonesia, London and the United states caused by terrorism, tsunamis and other natural disasters. To address the challenges of a changing environment, the Australian Government and state/territory agencies such as the Department of Defence and emergency services, will need to consider the following changes required to the roles and functions of all levels of government agencies as a result of better integration of legislation and national guidelines.

These include:

- legislation, policy and procedures portraying an acceptance of joint co-operation;
- integration and security of information resources, media and intelligence;
- joint training and skill auditing to address possible gaps in emergency response and recovery;
- liability coverage and public compensation for all levels of supporting government agencies where joint powers are operating;
- joint costing and shared responsibility for increased funding by the state/territory and Australian Government authorities to demonstrate actual benefit realisation;

Newspix/Lindsay Moller

Australian forces land on Banda Aceh's foreshore from the HMAS Kanimbla.

- the establishment of a central data base that gives clear and current availability and serviceability of emergency stocks and holdings for supporting emergency management;
- power sharing between multi agencies responding to a terrorism attack or natural disaster;
- legislative changes necessary to facilitate the power sharing responsibilities of multi levels of government agencies and authorities; and
- MOUs or the development of a model for managing resources in a shared control and command approach including the hiring of civil contractors and the introduction of resource contractual arrangements.

Provided the above issues can be successfully addressed and co-ordinated, emergency management services at all levels of government, particularly the Department of Defence, will allow communities in Australia to be confident of the response that the government provides to safeguard the personal safety and well being of its citizens during times of human and natural disasters.

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APPENDIX A

Definition of civil defence

Australia's ratification of the 1977 Protocols Additional to the Geneva Conventions of 1949 means that the definition of civil defence which appears in Article 61 of Protocol 1 applies to Australia for the purposes of international law. It reads as follows:

- 'civil defence' means the performance of some or all of the undermentioned humanitarian tasks intended to protect the civilian population against the dangers, and to help it to recover from the immediate effects, of hostilities or disasters and also to provide the conditions necessary for its survival. These tasks are:
  - (i) warning;
  - (ii) evacuation;
  - (iii) management of shelters;
  - (iv) management of blackout measures;
  - (v) rescue;
  - (vi) medical services, including first aid, and religious assistance;
  - (vii) fire-fighting;
  - (viii) detection and marking of danger areas;
  - (ix) decontamination and similar protective measures;
  - (x) provision of emergency accommodation and supplies;
  - (xi) emergency assistance in the restoration and maintenance of order in distressed areas;
  - (xii) emergency repair of indispensable public utilities;
  - (xiii) emergency disposal of the dead;
  - (xiv) assistance in the preservation of objects essential for survival;
  - (xv) complementary activities necessary to carry out any of the tasks mentioned above, including, but not limited to, planning and organisation.

As a result of this definition the functions of civil defence can be summarised as:

a. Protecting the civil population against the effects of hostilities or disasters;

b. Assisting the civil population in recovering from the immediate effects of hostilities or disasters; and

c. Providing the conditions necessary for the survival of the civil population [www.ema.gov.au].

APPENDIX B

Types of assistance

(Defence Instructions – General, 16 March 2004, p: 3 – 4)

Counter disaster and emergency assistance

The Australian states/territories have Constitutional responsibility for the protection of the lives and property of personnel within their boundaries. Where a disaster is actually or potentially of such a magnitude that state or territory resources are inadequate, unavailable or cannot be mobilised quickly, the Commonwealth accepts a responsibility for providing support when requested.

The principle to be applied to the provision of emergency Defence Assistance to the Civil Community (DACC), is that the state/territory governments are primarily responsible for combating disasters and civil emergencies, using available state/territory professional and volunteer services and commercially available resources. Australian Government resources (including Defence assets) may be made available in situations where the state/territory authorities are unable to react with sufficient speed, or lack the necessary resources or skills.

Categories of counter disaster and emergency assistance

Category 1.

DACC Category 1 is emergency assistance for a specific task(s) provided by Local Commanders/Administrators, from within their own resources, in localised emergency situations when immediate action is necessary to save human life, alleviate suffering, prevent extensive loss of animal life or prevent widespread loss/damage to property. Provision of DACC Category 1 assistance should not normally exceed 24 hours.

Category 2.

DACC Category 2 is emergency assistance, beyond that provided under Category 1, in a more extensive or continuing disaster where action is necessary to save human life or alleviate suffering, prevent extensive loss of animal life or prevent loss/damage to property, and when state/territory resources are inadequate.

Category 3.

DACC Category 3 is assistance associated with recovery from a civil emergency or disaster, which is not directly related to the saving of life or property.

Categories of non-emergency assistance

Category 4.

DACC Category 4 is non-emergency assistance provided to other government departments or authorities, to state/territory/local government or other authorities or organisations, commercial enterprises, non-profit organisations, or individuals or bodies in the general community.

Category 5.

DACC Category 5 in non-emergency assistance of a minor nature which can be provided to local organisations from within the resources and authority of the Local Commander/Administrator, and which does not compromise unit effectiveness or readiness.

Category 6.

DACC Category 6 is support to civil authorities in the performance of non-emergency law enforcement related tasks where there is no likelihood that Defence personnel will be required to use force.

APPENDIX C

Legal authority to engage in disaster management

(Scott Trappett, M. Public Policy & Administration, Barrister at Law)

A convenient starting point in any debate on the power to act is of course the moral imperative. If Defence Forces, police and disaster management personnel turned their collective backs on potential and actual emergencies who would fill the void? Effective disaster management planning and response have gone well beyond the capabilities of an ad hoc community response. Like the formation of 'policing' in London by Robert Peel 1829, the disaster management function has become logically specialised. This has gone a long way to develop professionalism and a high standard of disaster management action that engenders trust and the validation of the Community.

This moral high ground with the community should not be underestimated. The recent deployment of a 25-person specialist team of health and emergency services personnel from Queensland sent to help the Banda Aceh Tsunami victims (Queensland Government 2005) is an interesting case in point on the 'authority to engage' question. In a landscape of thousands dead, injured and missing the needs of victims together with a willingness and ability to respond was all that was needed for the team to engage in the Aceh Province. Thus if there is a request for action, coupled with an ability and willingness to respond no further authority is required.

The professionalism (and abundance of resources) of the Department of Defence no doubt gives them the 'moral' authority to engage. However, their roles have a number of firm legislative foundations to assert a right to act.

Section 51 (xxix) of the Constitution provides the Commonwealth to make laws for the peace, order, and good government of the Commonwealth with respect to: external affairs.

The majority in the Tasmanian Dam Case, following three of their number in the majority in Koowarta v Bjelke-Peterson, determined that entry into an international agreement by the executive in itself pertains to external affairs, so that s51(29) is available to give effect legislatively to the terms of the agreement within Australia. There is no overriding requirement that the subject matter of the agreement must be indisputably international in character or of international concern.

Additionally section 96 of the Constitution provides the Commonwealth may grant financial assistance to any state on such terms and conditions as the Parliament thinks fit. This so called 'power of the purse' provision provides a 'carrot and stick' approach to the Commonwealth to offer a tied grant to the state on such terms the Commonwealth thinks fit (eg: to allow the Defence Force to operate in a state Government role).

1. Queensland Government (2005). Specialist team helps out in Indonesia. Sectorwide, March 8
2. Koowarta v Bjelke-Peterson (1982) 39 ALR 417
3. Commonwealth V Tasmania (1983) 46 ALR 625

The case study method and management learning: making the most of a strong story telling tradition in emergency services management education

Mark Wall considers the use of case studies in emergency services management training

Abstract

Emergency services managers learn from practice yet practice is an expensive and sometimes a dangerous teacher. The case study method allows for a vicarious experience and reflection on practice and has use as a management teaching and research method. As such it should feature early and often in emergency services management education and in related training and development for practitioners in this field.

Introduction

Story telling is embedded into the culture of emergency services, and it is a powerful medium for replicating and improving that culture. Rather than rail against the tendency, trainers and educators should capture, harness and direct it. Story telling by experienced emergency services personnel, and the facilitated, critical and reflexive examination of those stories, can be usefully employed in the education and development of emergency service managers.

The focus of this research is on the selection of teaching methods that support the acquisition of knowledge, skills and attitudes—dispositions in other words—suitable to good emergency services management. Eventually, a larger body of work will be attempted, but here a strong tradition of story telling is joined to a body of literature on the case study method. The intention is to propose the combination of story telling and case study as a viable educational method for fostering appropriate dispositions for emergency services managers.

To ensure that a proposal for a recommended way of teaching management is convincing, as to its merits relative to other approaches, story telling must be established as endemic to the culture of emergency services and some parallels must be drawn between it and the case study method. The case study method itself is introduced and interrogated as a research and teaching approach relevant to this field. The attempt is to build on and acknowledge the strong story telling tradition, and to show why this tradition lends support to the proposed teaching method. For reasons of space only, discussion is limited to general management, made up of the functions of planning, leading, organising and controlling, rather than operations, incident or event management.

Story telling traditions

Story telling is one of the ways individuals seek to validate, and sometimes embellish, their experience and practice. In telling the story, the speaker passes on information about values, practices and lessons learnt. Stories are often, and mainly, the means by which organisational culture is replicated, reinforced and reinvigorated (Bartol et al 2001:82). Herreid (1998:163) notes that 'stories are … natural allies in the transmittal of the wisdom of the tribe from one generation to the next'. In the emergency services field, as in most action-oriented and action-based vocations, there is a strong story telling tradition.

Experience shows that emergency services and the armed forces rely on inter-action story telling to reinforce, and indeed to introduce, certain values and practices. There is also a kudos associated with having been at a certain scene or incident. The resulting 'war story' both celebrates and advertises this. The sort of 'hot action' that occurs only occasionally in policing, for example, is usually short lived but seems to characterise that work in the popular imagination, is usually short lived. By their nature, war story type events usually involve only a few actors, usually the first and second responding crews, in key positions. Most emergency services work is fairly routine and dull, sufficiently so to have been described by more than one retiring officer as 'years and years of boredom punctuated by moments of

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Adequately training and equipping personnel is a foundation for successful teams.

stark terror'. The attraction to action is therefore quite strong, even understandable, and most jurisdictions have experienced problems with an over response to certain incidents. In my own practice I became aware of a service that had difficulty meeting its mid-week, night shift patrol car commitment. Yet the same service managed to field nearly three times that number of cars, at short notice, in response to a high-speed pursuit. Officers attended from all over the command area 'just in case' — just in case they could help, just in case they could get into the action and, arguably, just in case they could at least see something that might sustain a later anecdote or story.

None of this is problematic. Indeed it is appropriate for emergency services to have an orientation to action. For the most part the consequences of this can be accepted, including a temporarily reduced response to lower priority incidents, and some elaborate story telling, rather more easily than the reverse. What can emerge is a fixation with the 'front line', if there is such a thing, and a glorification of the operational officer at the expense of meaningful consideration of other issues. General management, not so much incident or event management, can be one of these.

Stories of good management do not abound in the emergency services (in fact it is probably fair to say the opposite). This is not to propose that examples of good practice are similarly rare. Successful teams and competent individuals are not 'found', they are not in nature, rather they are recruited, selected, trained, deployed, equipped and remunerated. Good management puts the rescue team, for example, into the vicinity of good practice and the resulting good practice story implies, at least in part, a good management one. What is required is a harnessing of the story telling process to deliver good management content. Suitable stories, cases in other words, need to be built up by educators and trainers.

Good emergency services management

What is largely missing from the contemporary considerations of emergency services management are those topics related to its higher level functioning and philosophy of practice. Questions such as 'why we serve' (Hermitage 1999) and 'how management can directly support service delivery' (Small 2002) need to be routinely appraised. Similarly, questions relating to learning and professionalism like the ones raised in this paper, require examination (Ramirez 1996). In the end though, the focus remains on 'how management can be good in both senses – technical and ethical' (Gardner 2002).

Most emergency services managers learn their professions essentially as apprentices learn their trades. There is always a degree of 'looking over the shoulder' of a manager or supervisor, which is supplemented by some brief classroom-based exposure to management theory. The result is largely a continuation of the status quo now underpinned by a pet theory or popular opinion. Managers rely on satisfactory practice, and theory or opinion that corresponds, rather than critical research and action learning to inform their decision-making. There are a number of reasons for this but one that can be relatively easily changed is the practice of management education.

Management practice is amenable to change and is not yet faultless. What is required is a clear path that breaks with traditional management practice and a licence to tread that alternate path. In other words, alternative management prescriptions need to be sanctioned and modelled. Part of that modelling work can be done through story telling, and the vicarious learning available through the case study method. Management educators in emergency services can use the case method both to research managerial alternatives and to teach them. Research is, after all, a process of inquiry leading to understanding, while education is a process of facilitating the development of understanding in others.

Research and learning using the case study method

According to Walker (1980:33) a case study is, 'the examination of an instance in action'. He continues, 'the study of particular incidents and events, and the selective collection of information on biography, personality, intentions and values, allows the case study worker [writer, teacher, student] to capture and portray

these elements of a situation that give it meaning' (Walker 1980:33). Essentially case study research is descriptive and the task is centred on the portrayal of just what is going on in a certain individual instance. The case researcher looks to provide a thick, rich description of context, specifics, individuals, groups, generalities and uniqueness in the face of questions such as, 'What is happening here?', 'What is it like to be a manager here?', 'How can others share this experience?'. The case study researcher first builds the portrayal of the case under examination and does this through techniques such as participant observation, unstructured interviewing and document examination. The intent is to produce a fine-grained description with an emphasis on 'illumination' through the specifics of the case (Stenhouse 1978). Admittedly this is more than simple, one-dimensional story telling but it is a difference of degree not kind.

MacDonald and Walker (1975:4) add that 'as a method of research, the case-study commands a respected place in the repertoire of theory builders from a wide range of disciplines; medicine, law, engineering, psychology and anthropology are examples. The case can generate a theory as well as test one; instance [or example] and abstraction [or theory] go hand in hand in an iterative pattern of cumulative growth'. The case study method is generally seen as a set of rules, procedures and techniques that stand in fairly stark contrast to the usual suspects of experiment and survey-based research. Yin (1993:xi) notes that 'the method is appropriate when investigators desire to:

a) define topics broadly and not narrowly;

b) cover contextual conditions and not just the phenomenon of study; and

c) rely on multiple and not singular sources of evidence'.

As management is largely a matter of decision-making, the overall aim of a management case study is to explore, describe, illustrate, test, explain or exploit certain decisions within particular contexts, among various agents and from multiple perspectives (Hussey and Hussey 1997).

Eventually, case study research and teaching needs to stand or fall on its utility as a means to a selected end. While ends will vary, it seems reasonable to suggest that the case study will have 'understanding' as at least one of its objectives. The illuminative-descriptive case study is a case in point. I can recall the matter of a police officer who became too overweight to fit into a patrol car. Such a case can be used to 'floodlight' a general area of management concern, say, managing the recalcitrant or depressed employee through the technique of 'spotlighting' a particular manager – employee relationship. The case description would allow the reader to experience vividly the 'instance' (the officer's experience, the gradual development of the problem, the lack of timely intervention, etc). The question can then be asked (appreciating that the study is socially and culturally constructed both as a case and as a study) '…what is there in this case study that I can apply to my own situation, and what clearly does not apply?' (Walker 1980:34). The emphasis is on the reader as problem solver/practitioner and this is so even when interpretive explanation or naturalistic generalisation is attempted by the case study author. Such a strong 'reader' focus allows the case study the extreme luxury of an end outside the sometimes esoteric and narrow world of research. The end proposed is an understanding that can lead to wise action as a professional practitioner.

Teaching and learning with cases

A story is suitable as a case, and ultimately suitable as a case study, for a number of reasons. Primarily, a suitable story must be fleshed out, it must be more than a passing anecdote and it must be populated by the characters it involves. For example, in raw form, a critical anecdote, a unilateral diatribe, a subversive spray, a tall story and a plaintive bleat are not suitable. This is not to say that cases critical of management should not be used any more than it is to say that cases critical of the workforce should not. Indeed any type of story is suitable if it can be 'turned over', examined from a number of perspectives, interrogated for context, vicariously experienced, and studied and researched in all its rich detail.

Yin (1993) provides a detailed description of case studies as a research tool that clearly points to their use as a teaching and learning method. By classifying case studies as exploratory, descriptive and explanatory, Yin appears to be targeting the higher level learning objectives of application and analysis (Bloom 1956 cited in Grossman 1994:7). Leenders et al (2001:5–7) make the link more explicit when they note that the case study method permits participants, including the writer, educator and students, to 'learn by doing and teaching others'. They maintain that the skills developed from the approach include:

- qualitative and quantitative analytical skills;
- critical thinking skills;
- decision-making skills;
- formulating congruent action and implementation plans; and
- application skills.

The method itself is not new as a pedagogical device or teaching practice. Although it is often attributed to the Harvard Business School, or more generally to the teaching of law and medicine (Hunt et al 1977; Gray and Constable 1983; Davis 1998). Mauffette-Leenders et al (2001:v) claim that the basis or origin of the case study is the Socratic method. This is the method of

teaching, not by telling, but by asking. The facilitator uses participant discussion and guided questioning to move through the case, to introduce variations and hypotheticals and to test conclusions, generalisations and rules of thumb. The process is critical, it calls on participants to give reasons, to know why something should be done or is the case. Most importantly it demands critical thinking, identifies gaps in the evidence and uncovers assumptions.

Emergency services management, as a paradigm practitioner discipline with an orientation to practical problem solving, decision-making and action, can benefit from case based teaching. The case method, with its focus on action in real settings, can be used in the profession to validate and extend good practice. Cases that are practice-based and problem-oriented can inform novice and experienced practitioners alike. Equally important, exposure to the case study method allows research to become part of practice. Cases are digestible and they accord with the practitioner culture. They do not intimidate like other forms of research.

Practitioners competent in the method can experience new or other instances, and will also become better skilled in interrogating their past and current professional practice. The intention is that the practical knowledge of experience (know how) is extended, and that some of it is even made explicit as propositional knowledge (know that or know what) for the cumulative benefit of the individual practitioner and the profession. Additionally, Merseth (1994:1) reports that case studies have utility by exposing users to multiple perspectives. Students interpret cases differently and knowing this helps them to appreciate and work better within a pluralist society. Accordingly, case study students can grapple with the central normative issues of public service (know why) within the relative safety of an educational setting.

The basic goal and principles of a philosophy for emergency services management must be based on good management practice, and not on any apartheid of knowledge. Good management is good in both senses of the phrase: that is, technically and ethically (following Gardner 2002) and will be appropriately made out in the three dimensions of:

1) knowing how to do something;

2) knowing what should be done; and

3) knowing why.

Management of this type will depend not on scientific generalisations and replication but on decision-making and judgment that is true to context, defensible, and reasonable in the circumstances.

Case study research, and the case study method, can directly address practitioner concerns with good work and as such, emergency services managers are 'natural case study workers' (Walker 1980:34). Decision-making is their primary work and each decision is made in the absence of textbook answers and 'silver-bullet' solutions. As Thompson and Strickland (2001:C–2) put it, 'each managerial situation has unique aspects, requiring its own diagnosis, judgment and tailor-made actions'. The case study method straddles the chasm between passive methods of classroom instruction and inherently risky and expensive workplace learning. Learning is by doing, but the action of the instance is vicariously experienced and the analysis, discussion

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Emergency services training requires action based and social setting situations.

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Practitioner students need to understand research and practical application to become good decision-makers.

and subsequent reaction are done by the learner as a surrogate to the original case actor. The essential premise is that through knowing one instance we are better prepared to know another. The emphasis is on what often, frequently, usually or generally happens and what can be done about it. The significant variables, in a real setting, give you a feel for managing uncertainty rather than a knack at law-like prediction.

Room for improvement

As Walker (1980:34) has noted, practitioners are 'natural case study workers … they all tend to make judgments on the basis of knowledge of the particular instance, rather than by reference to research findings'. They are not looking as researchers for penultimate 'truths', but for guidance for good practice.

The case study method is proposed as a method of outstanding utility in the preparation of decision-makers for complex social settings (McAninch 1993, Hunt et al 1977 and Gray and Constable 1983). Practitioner students are immersed in the detail of a researched instance, and required to hone their skills as decision-makers. The objectives of the method in this context are to:

- increase understanding;
- build analytical skills;
- practise planning;
- enhance judgment; and
- gain in-depth exposure to various contexts (Thompson and Strickland 2001:C–3).

For case study teaching, Hamilton (1978) proposes a context-based interpretation that generates provisional generalisations for verification through comparison and action. In essence, Hamilton (1978) calls for a way of knowing that fits earlier prescriptions for a reasonable basis for management decisions. Emergency services management is a social and action based profession. Accordingly, knowledge in the field can have utility only in light of informed action in a social setting. The crucial ingredient is judgment and a first test of that can be drawn from Walker (1980:45) who writes that, 'case study research relies heavily on face validity – the judgement that the results seem to fit the reality.' As the problems of emergency services management and case study research are seldom mechanistic, or technological, evaluation of possible solutions needs to take into account the complexity of the case. The idea of an initial judgment based on face validity is useful here. The concept is similar to the lawyer's test of 'at first blush' and, while first impressions can deceive, it works as a starting point for critical analysis, participant discussion and eventual provisional conclusion.

Conclusion and future directions

The ultimate purpose of emergency services management education is wise action and good practice. The use of the case study method allows learners to synthesise a critical research and action learning approach into their professional practice. This is an example of the much vaunted 'learning to learn'. Case students do learn content but more importantly, they learn process. Case studies discourage rote learning, thrive on complexity, explore plural perspectives, are open to the contested nature of public policy, and they best approximate that most powerful educational method – learning from experience. Most authors agree that case studies extend practice, aid practical deliberation and assist reflection. Case work requires the student to give reasons, to ask why and to anticipate. As the skilful case practitioner unfolds the story, builds the complexity and introduces the subtleties the student is close to the instance in action, safe in the educational setting and free to experiment, research and learn.

The case study method is proposed as a research, teaching and learning technique in emergency services management education that has educational and

organisational merit. There is sufficient support in the literature to make the first claim. The fact that management in the emergency services is neither perfect nor unchangeable makes out the second.

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Blazer to the Rescue! The role of puppetry in enhancing fire prevention and preparedness for young children

John Lidstone reports on a study into the use of puppetry performances for children to enhance their knowledge of fire safety

Abstract

Public education has repeatedly been shown as a cost-effective means to reduce the cost and impact of hazardous events on human lives. There is considerable overseas literature on the educational value of puppet-mediated educational intervention in public safety programs. However, effective and useful formal evaluation of its use in the context of fire safety education was found to be very limited internationally and reports of Australian experience of these kinds of interventions are negligible. This paper reports on a 12 month research study, funded by Emergency Management Australia, through its 2002 Grant in Aid scheme (Project 12/2002). The study was of a fire safety educational puppet show based on the Year 1 Queensland Fire and Rescue Service (QFRS) *Fire Ed* program, and presented to early childhood students (P – 3) in Queensland. An independent evaluator attended all the performances to observe the students' reactions. He then accompanied them to their classrooms after the performance to discuss their reactions and returned four to six weeks later to discuss fire safety with the students and to assess the impact of the performance on their longer-term understanding of fire safety issues.

The study found that the puppetry performance served to enhance student knowledge of fire safety by providing new knowledge, reinforcing previously learned knowledge and providing a new context in which they could rehearse their knowledge. The study also emphasised the importance of humour in teaching students about potentially disastrous situations.

A serendipitous finding was that while younger students (those in pre-school and years one and two) focused primarily on the fire safety message, by Year 3, many students considered that they 'knew it all' and expressed greater interest in the medium of puppetry than in the fire safety message. From this it was concluded that while constant reinforcement of safety messages is essential, we must guard against 'fire safety fatigue' that may lead to complacency.

Public education and disaster mitigation

Within a broad public policy context, the economic effectiveness of education programs in the areas of public health and safety have come under increasing scrutiny over the last 20 years. A recently released report by the Department of Health and Ageing (2003) clearly shows that such programs in the areas of tobacco consumption, coronary heart disease, HIV/AIDS and road safety do work. They have a major economic effect, both in the total return to society of investment in public health interventions and in savings to government. It is reasonable to conclude that a focussed national campaign to increase fire safety awareness among school students in the range P–3, the most vulnerable group in the community, would also have significantly similar benefits.

Puppetry as an educational medium

Puppetry is one of the oldest of the performing arts and is found in almost all cultures and historical periods across the world. In places and time periods where entertainment and education were relatively undifferentiated, puppets were used to entertain, satirise, depict historical events, folk tales and myths, and to attempt to explain the inexplicable. In the West, where education and entertainment before the advent of the Internet and cable television (as represented by the Discovery Channel and the Muppets) for many years appeared to drift apart, puppets appeared to be relegated to the sphere of children's entertainment. However, throughout this period, there was a steady stream of research reports on their efficacy in the areas of school counselling and education.

Schmidt (1985) cited reports from as early as 1936 that identified the therapeutic effects of puppets on children with behavioural problems. In the 1970s, Maurer (1977) wrote 'of puppets, feelings and children', while James (1987) refers to puppets as 'the elementary school counsellor's right or left arm'. Carter (1987a; Carter, 1987b) wrote at length about the use of puppets to treat traumatic grief. The interest of counsellors has not waned, and Carter and Mason (1998) have given guidance on the selection and use of puppets in counselling.

While the use of puppetry in Australia appears to be quite limited, experience in many other countries (particularly in the USA, Canada, UK and South Africa) has demonstrated that puppets provide a very useful teaching tool (Roysdon, 1982) and has been shown to have major benefits as an aid in regular and special education—as a motivational strategy, an instructional tool in the curriculum, a remedial and therapeutic device, and as an entertainment and recreational tool.

In the wider context of education, Timmreck (1978) described 'creative health education through puppetry' and Egge (1987) discussed 'puppets and adolescents: a group guidance workshop approach', while Kuse (1980) described approaches to using puppetry to help children learn elementary science.

While puppets can apparently be used to promote a wide range of learning (Leyser, 1984; Bredikyte, 2000), the literature is particularly supportive of its efficacy in promoting desirable social behaviours. Thus, Anderson (1983) discussed the contribution of puppets towards changing student attitudes toward the disabled, while Meleskie-Lippert (1994) discussed their contribution to improving the awareness of personal and oral hygiene in second graders, and Kelly (1997) considered improving student discipline at the primary level. Most recently, Yoon (2001) on behalf of the *African Research and Educational Puppetry Programme* has published an evaluation of the 'No Monkey Business' performances which are designed to introduce children to issues of sexuality, life-skills, gender, abuse and the facts of HIV/AIDS in South Africa. The aim was to encourage and strengthen individual children's self empowerment, body awareness and self-worth.

The use of puppetry in the context of public safety education appears to meet the needs of both education and public safety requirements in that it provides students with educational experiences, while promoting the understanding of self, feelings, attitudes, and behaviours and assisting children to gain an understanding of the feelings and ideas of others (R. B. Carter & Mason, 1998), (Schmidt & Biles, 1985), (Maurer, 1977), (James & Myer, 1987). A 1993 New Zealand study on children's knowledge of fire safety (Constable, 1993) found that a positive approach to imparting the message was essential where:

- students were asked questions to determine what they had learned;
- they were told what to do, not what not to do;
- they knew the why and how of fire safety;
- they received practical activities to follow up the visit by fire safety officers.

The Blazer to the Rescue! project

Ros and Hugh Childers founded Mana Puppets in 1998 and developed an initial script for a fire safety puppet show in 1999. The script built on the ideas of the Year 1 Queensland Fire and Rescue Service (QFRS) *Fire Ed* program. In May 2001, QFRS granted Mana Puppets a licence to use their *Blazer* fire safety koala character in the production entitled 'Blazer to the Rescue!'
A successful proposal to the Emergency Management Australia grants program led to the current project whereby this performance was presented to students ranging from pre-school to Year 3 in ten schools in and around Brisbane.

The specific objectives of the study were to:

- refine the puppet show for the target audience and to validate the safety messages with the Queensland Fire and Rescue Service (QFRS);
- present it to students in the target age group in ten schools in both metropolitan and rural-urban fringe state and private schools;
- research the effectiveness and potential of both this specific program and the concept of puppet-mediated fire safety initiatives with Years P–3 students; P–3 at the time of data collection in Queensland referred to Preschool (voluntary but almost universal for children in the year in which they reached five) to Year 3 who are 8-year olds.
- identify specific factors that influence the immediate reception of the safety messages, their influence on behaviour and their long-term retention; and
- assess the potential of this medium as a way of promoting safety in other disaster contexts.

Blazer is the puppet fire safety koala character used during the performance.

The story

Scene one

The playboard (the puppet theatre set) involves a high rise unit where three little pigs, Percy, Peter and Patty, live. In the opening scene, the two boy pigs are panicking about their flat being on fire. They go to the window and shout and then decide to call the fire brigade. It is Patty who demonstrates the correct way to make such a call and reinforces the emergency number. Blazer (the koala) then arrives in breathing gear and, having reassured the pigs about the noise of his breathing and praised them for standing near the window, rescues them by ladder.

Blazer then addresses the audience directly and reinforces a variety of messages including the telephone number to call (000), the information that should be given to the operator, how the pigs knew that they could not/should not use the stairs (the door was hot), and where they should wait (just inside the window).

Scene two

Scene two opens with Percy complaining that his piggy tail has been burned in the fire and singing a song, *I put cold water on my burned bottom … and the burn got better soon*. The pigs then discuss the causes of the fire – which apparently included 'putting undies in the oven to dry', leaving 'socks in the toaster to dry' and 'leaving a heater on near the curtains'. Patty then declares that she is not prepared to live with the boys any more until they learn fire safety. The three pigs then depart to build themselves houses: of straw, of sticks and of bricks.

Scene three

Percy finds some straw and decides to build a straw house which would have lots of exits. 'Blazer said we needed to have lots of exits'. There is a brief aside when an animated lighter tempts Percy to play with him, but commonsense prevails and Percy asks Blazer to look after the lighter. The audience is asked to comment on how safe the house of straw is, and, realising that he could be a 'homeless pig again', he goes off to see if the others have managed to build safer houses. On the way, Blazer talks to Percy about what to do if his clothes catch fire and in a song reminds him to:

Never put your undies in the oven.

Never put your clothing on heaters to dry.

Never put hot gadgets near carpets or curtains,

Furniture or anything else that could catch fire.

Scene four

Peter has found building a house of sticks has tired him and plans to have a sleep after a barbecue. He plans to build the fire near his house and this leads Blazer to explain the difference between a 'good fire' and a 'bad fire'. Having agreed that a fire should not be built near a wooden house, Peter makes a cup of tea while Blazer checks the rest of the house and suggests that smoke alarms would be a good idea. The audience is asked how many of them have smoke alarms fitted at home. Peter and Percy leave to buy alarms while Blazer checks on Patty's progress.

Final scene

Patty has finished building and is busy installing her new electric appliances, although one appears to have a frayed cord. As she plugs it in there is a bang and the lights go out. Patty wants to pull out the cord, but is warned not to do so by Blazer who explains the dangers of the 'burn that can kill with a touch'.

The three pigs join to sing their final song and take their exit, while Blazer comes out to have a final question and answer session with the audience. Questions include:

- In a fire should you hide under a bed or in a cupboard or should you get out quickly?
- How should you get out of a burning room?
- What should you do if your clothes catch fire?
- What should you tell the fire brigade when you call?
- Why shouldn't you go through a door that is hot?
- What were the things that started the fire in the pigs' first house?
- Why should you not go back into a burning building?
- What can you put in your home to warn you of a fire?
- What should we do to make cooking out of doors safe?

Successful responders are invited to come to the front and manipulate the puppets behind a half size playboard while the whole audience join in with a final rendition of all the fire safety songs.

Research methodology

Ten schools were selected to represent both state and private systems, higher and lower socio-economic systems and a range of student ethnic origins. Once identified as willing to participate, the project proceeded in five phases.

1. A video recording of the proposed puppet show was prepared and reviewed by representatives of the Queensland Fire Service. The script was adjusted in response to feedback, although it must be said that little change was proposed.
2. A set of photocopy-ready materials suggested for use by the teacher in class before and after the presentation was sent to the school, together with confirmation of the day and time of the performance.
3. The 45 minute puppet performance was presented to the students.

4. The researcher visited one or two classes of students in their own room with their own teacher for a follow-up discussion immediately after the performance.
5. Teachers were invited to give the researcher access to any follow-up work undertaken by the students either as suggested by the project or at the teacher's own instigation.
6. The researcher returned to the classes about four to six weeks after the performance for a final discussion.

The discussions with students both immediately after the performance and on the return visit were guided loosely by a set of written questions (an *aide memoire*) which were provided in advance to the teacher. However, the actual discussions were much less formal than this would suggest, and in fact, took the form of very open unstructured informal conversations between teacher, researcher and class.

The guiding questions used immediately after the performances were as follows:

- What did you particularly like or dislike about today's performance?
- What do you think Blazer particularly wants you to remember about fires?
- Are there any things that you already knew about fire safety that Blazer forgot to mention today?
- Have you or your family ever been involved in a fire? What did you and your family do?
- How could the puppet show be made better for children of your age?

The guiding questions used in the follow-up visit were as follows:

- You remember a few weeks ago we had a puppet performance called 'Blazer to the Rescue'. What are the main things you remember about that performance?
- What did Blazer remind you to do if you are in a room or house that is on fire?
- What did Blazer remind you to do if your clothes catch fire?
- Can you remember the mistakes that the pigs made that might cause a fire?
- What did you learn that might help you make sure that your own home doesn't catch fire?
- What would you do in your own home if it were to catch fire?

Table 1. Details of the schools and classes included in this study.

	Type	School description	Number of classes				Total Ss
			Pre-school	Yr 1	Yr 2	Yr 3	
1. 1	State	Rural/urban fringe, high SES		5			120
2. 2	State	Rural	1	1	1	1	45
3. 3	Private	Regional urban	3	3			118
4.	State	Rural/urban fringe, low SES		2	2	1	125
5.	Private (Religious)	Urban		2	2	1 (Composite)	106
6. 6	Private (Religious)	Urban	1	2	2	2	100
7. 7	State	Urban		4			90
8. 8	Private (Religious)	Urban		2	2	3	160
9. 9	Private. (Religious)	Urban		2	2	2	162
10. 1	Independent Community	Urban		2	2	1	75
TOTAL	5	25	13	11	1,101		

Note: At the time of this study, children in Queensland entered Pre-school in the year in which they turned five. Year 1 is 6-year-olds, Year 2 is 7-year-olds and Year 3 is 8-year-old children.

Depending on the particular school, the performance was presented in an undercover area or large hall. The playboard was set up along one side and the students sat on the floor two to three metres in front. While Ros operated the puppets either behind or in front of the playboard, Hugh sat at a table to one side operating the sound system and various stage effects. The researcher sat with the class teacher at the side of the room where he could see the playboard and puppets and the faces of the audience while taking notes throughout the performance. Each teacher was provided with a sheet describing the nature of the project, explaining the interest of the researcher in the students' reactions and listing the key questions. His presence caused no comment or interest from the children.

At the end of each 45 minute performance, the classes returned to their usual rooms and the researcher visited one or two classes depending on the time available before the next formal break. In the classrooms, it was explained to the children that 'John is interested in what you have learned from the puppet show you have just seen and how it could be made even better for children of your age'. The discussion in the classroom was usually conducted by the class teacher in conversation with the researcher. This 'three-way' conversation between the two adults and the class was found to cause minimum disruption to usual classroom mores while engaging the students as 'serious participants' in the evaluation. Before leaving, the researcher formally asked the teacher on behalf of the class, if he might return in a few weeks to learn more about students' understandings of fire safety. The teachers were also invited to send the researcher copies of any follow-up work the students might produce after the performance. Depending on the normal school routines, the classroom discussions between researcher, teacher and class varied between 20 and 45 minutes. This would be about as long as any single activity could be with children of this age.

Observations from the performances

In observing the children at each performance of *Blazer to the Rescue!*, two features stood out. Firstly, all children watched with rapt attention throughout and, secondly, few if any children failed to respond to questions that were asked either by the puppeteer *per se* or as *Blazer*. They responded readily to questions about what they should do if their house were to catch fire and used a mixture of 'learned' responses such as *Get Down Low and Go! Go! Go!*, or *Stop Drop and Roll* and more generic responses such as 'We should get out of the house quickly'. One boy had obviously learned the lesson well from his teacher: 'You go on your hands and knees with your head down and your bum up in the air!' Despite fears expressed in some quarters that Australian students may be influenced by American TV programmes which promote the US emergency telephone number 911, these children in South East Queensland had no hesitation in responding with 000. Furthermore, they seemed quite unperturbed by whether it was expressed as 'zero zero zero', 'oh oh oh', 'nought nought nought' or with the use of the word 'triple – as in 'triple zero, oh or nought'. This was true regardless of the ethnic origins of the children or their mother tongue language. It appears that children of this age are well versed in the theory of what to do in the event of a fire – a tribute to their teachers, parents and those members of the hazard management community who target schools as part of their public education mission.

The humour in the presentation – especially references to burned bottoms, barbecued pork, undies in the oven or socks in the toaster – was generally enjoyed by all. The enthusiasm of the reactions appeared to depend on the general nature of the school ethos with some evidence that students in religiously-based schools sought the tacit approval of their teachers before expressing their own amusement at the notions. A similar variation was observed between schools in reaction to the music that accompanied the performance. In schools with a strong music curriculum, the students picked up the various rhythms quickly and knew how and to what extent they could respond. There was considerable ethnic variation in the schools involved, but whether the students were of European, African, South American or Asian origins, there seemed little difference in their responses. However, a considerable variation to this pattern was observed in the Aboriginal and Torres Strait Island School where students showed a much more muted response to both the jokes and the music. This was also the only group of children who appeared 'shocked' by the inappropriate behaviour that was the source of some of the humour. For example, when Percy Pig finds a lighter and says 'A lighter – you'll be fun to play with', the children in this school spontaneously said (rather than shouted) 'No!!' On the other hand, at the end of the performance, these children were particularly enthusiastic at the chance to touch and manipulate the puppets. Unfortunately, the researcher was unable to investigate possible cultural influences on these reactions and it may be necessary to undertake further research in this area.

Discussions with students – immediately after the performance

As noted above, although the discussions in each classroom were generally unstructured and conducted by the teacher with appropriate input from the researcher, both the researcher and teachers had copies of an *aide memoire* of five questions to guide them and to ensure consistency. The account that follows is structured according to those five questions.

1. Likes and dislikes about the performance

Back in the classroom, the children were interestingly critical of the performance, as might be expected from a generation to which so much entertainment is available.

Children present when a gust of wind at an outdoor venue blew the playboard over were keen to analyse where the wind had come from, while a comment from a girl that she particularly liked 'the girl pig because she is so sensible' immediately brought forth the comment from a boy that 'the show is boring – I know all that stuff!' Children were happy to discuss the types and volume of the music in the show, and responded well to those teachers who insisted that any observation beginning 'I think that …' had to be followed by 'because ….'. The jokes were particularly popular but on a number of occasions the boy-pigs were described as a 'bit silly'. A number of boys regretted what they saw as a lack of realism in the performance. They would have liked 'real smoke' and 'real water coming out of the hose'. One particular boy in Year 3 explained that 'puppet shows are not as good as television because you can't swap channels'. Over all classes visited, it appeared that the younger children commented most on the story line and message of the performance, while those in Year 3 appeared most concerned with the technical aspects of puppeteering and the strengths and weaknesses of puppetry as compared with other entertainment media. These older children also enjoyed carrying the metaphorical aspects of puppetry further and suggested the addition of other puppets to represent water (*a water puppet*) and two separate puppets to represent fire (*wildfire* as an evil puppet and *backburner* as a good puppet).

2. What does Blazer want you to remember?

When asked what they thought Blazer particularly wanted them to remember from the performance, there was rarely any doubt. Few children had any hesitation in repeating *Get Down Low and Go! Go! Go!*, *Stop Drop and Roll*, 'don't go back into a burning building', 'don't wait to collect your favourite toys' and 'dial triple zero', although there was considerable uncertainty about whether or not they should look for pets before leaving! Suggestions from the teachers or the researcher that perhaps the safety of pets could be left to the Fire Brigade were accepted, although often with some reluctance.

The conviction of so many children that *they* should dial triple zero led the researcher to ask how many children had telephones in their bedrooms. In some classes, well over half answered in the affirmative and follow-up questions from the teacher concluded that many children had play phones or 'real' telephones that are not connected to any exchange. Whether they would differentiate reality from fantasy in the event of an actual fire was impossible to determine in the context of this study. On the other hand, confusion about the order in which things should be done, and who should do them was a recurring theme in the discussions. The following dialogue occurred in a Year One classroom.

Teacher:	What would you do if you discovered a fire in your home?
Children:	*in unison* Call zero, zero, zero
Teacher:	When?
Children:	*silence*
Teacher:	Would you get out of your home or go to the phone?
Children:	*long silence, then …*
Hannah:	*very tentatively* Get outside?
Carlie:	*reassured by the nod of approval from the teacher for Hannah's response* I would wake up Mum and Dad and shout and bang.
Daniel:	*a little doubtfully* Sometimes you would rescue your pets.
Another child:	Alive things you'd have to.
Teacher:	You can't wait for them can you?
Daniel:	*obviously uncomfortable* You'd have to.

At this stage the tension and discomfort in the class was palpable, and with a glance at the researcher, the teacher moved the discussion on.

In another class, the issues were seen differently.

Year Two

Teacher:	What does Blazer want you to do if you found a fire in your home?
Jamie:	Get down low and go go go.
Katie:	Stop whatever you are doing and stop drop and roll.
Talin:	If there is a fire and a lot of smoke, get on your knees and go.
Teacher:	Where would you go?
Talin:	To the phone.

3. Blazer's message and 'What Blazer Forgot'

Few children were in any doubt about the message that Blazer wanted them to receive. In all classrooms they vied with one another to repeat the established mantras of fire safety – *Get Down Low and Go! Go! Go!*, or *Stop, Drop and Roll*. However, further discussion revealed that they were far from sure of the difference between these two injunctions. The link with either smoke in the room or with burning clothes was rarely made explicit and the subtleties of potential fire threats, eg a fire in the house, a fire with considerable smoke in the rooms, and a situation where a child's clothes are on fire all appeared to be poorly differentiated in the children's minds. Chloe stated quite confidently that 'if the room is on fire, you should put your hands over your face'. It

was only when asked what they already knew about fire safety that most children appeared to drop back into the vernacular and state what they could imagine doing if their own homes were on fire. Thus, most did appreciate that the most important thing to do was to get outside as fast as possible. Hannah (Year 2), very seriously, said she thought that Blazer should have told the pigs to 'Shout very loudly for Mummy or Daddy' – on the face of it, a most practical and sensible suggestion. Jade also pointed out: 'If your coat is on fire, take it off'. Relatively few children were able to articulate the reasons for *Get Down Low and Go! Go! Go!*, or *Stop, Drop and Roll*. – that the dirty or smoky air collects near the ceiling was rarely mentioned. While all children seemed to gain some satisfaction from enjoining others to make personal sacrifices – 'don't go back to get your Playstation even if it is new!' – they appeared somewhat confused by the conflict over whether to save pets or not! In one class of Year 2 students, a discussion developed about whether it was right that pets should be treated differently from baby brothers and sisters – the general consensus was that they should not! While they accepted that they were instructed not to search for, or wait for, pets, the researcher was far from convinced that they would indeed act in this manner in a real emergency. Mitchell (Year 1) was quite determined to confirm that he should 'feel the door first in case it is hot, in case there is a fire outside the door. Else it might zoom in and kill you!', while Karlen in the same class said they should 'Stop panicking and don't run'. Lauren, in a more conservative classroom, reminded us rather primly that you should 'put all matches safely away from children'.

Discussions on what Blazer may have forgotten varied quite considerably between schools and may have reflected the usual teaching style of the school or the teacher. While in some schools and classes, the researcher observed students attempting to gain approval from the teacher by being 'very sensible' and repeating precisely what they had been told, in others, students had obviously been encouraged to be more creative. Thus, Damien suggested that Blazer should have told the children to 'have a whistle by your bed', and Hannah thought they should have been warned to 'jump out of a window if there is a trampoline there'. Mitchell wanted to record that 'If your Mum and Dad smoke, tell them not to throw cigarette butts out of the window of the car'. Justin explained in great detail: 'If there is a fire on the other side of the door, don't open the door. Put a pillow on the window and punch through it to get out. (*proudly*) – Mum told me that when I was three years old'. Shaun, however, added cautiously 'If the handle is hot, it might be the sun'. Finally Rose pointed out that Blazer might have mentioned that 'You shouldn't phone the fire brigade unless there really is a fire', although her reason for refraining from this was that 'you might get into trouble'.

Children were encouraged to participate during most stages of the performance.

Across the whole cohort of students, however, there seemed to be little that Blazer had 'forgotten' to remind students, although the ways they interpreted his words varied quite considerably. Differences between those students who felt they should only respond with the 'conventional wisdom' they had been taught and those who allowed their imaginations greater freedom are hard to interpret in this study. It may indicate that what children of this age say they would do, and their actual behaviour in a hazardous situation may vary more significantly than we would wish.

4. Personal experiences of house fires

Interestingly, only in about half the classrooms did any child admit to having experienced a fire at home, and of these, half went on to describe bonfires or barbecues that had apparently become a little larger than expected, which were usually dealt with 'by Dad' or in one case, 'Dad and his mate from next door'. One child described a frying pan fire in the kitchen where 'Dad helped me to find my doll and then we got out' while another told of a television that had caught fire, 'but Dad turned it off'. In one classroom, the teacher confided that two children had burned their own home down after playing with lighters, but neither volunteered to speak on any of the questions.

5. How could the show be improved for children of your age?

Although all children made suggestions, the hypothetical nature of the question generally appealed to the older rather than the younger children. Some younger children, eager to please, suggested that the pigs could be re-cast as horses or cows, while some children suggested that it would be more realistic if people had been used. On the other hand, many of the comments from older children reflected the sophistication of children's entertainment in the 21st century. Thus, suggestions that the show should include hoses that shot 'real water', the need for 'real smoke and flames' and a regret that it was 'just one show – you can't change channels for the boring bits' were not uncommon. It would be better if 'someone got hurt and the ambulance had come' and the trees had had 'real' branches rather than being 'just painted' so that they could have had birds in them. Such reactions were in contrast to the interest shown, especially by the Year 3 students, in handling the puppets and the whole process of puppetry as an artform that occurred in most of the venues both before and after the performance. When prompted, they appeared quite happy with the way the traditional story of the three little pigs had been adapted, although some suggested that a larger number of characters would 'make it more interesting'.

Perhaps Toby, a mature Year 2 boy in a composite Years 2/3 class, expressed the view of many of his more mature colleagues most clearly when he said 'Show us what to do if the curtains catch fire. Show us a fire extinguisher and real life stuff. Show the real stuff – with people!'

Discussions with students – a month later

When the researcher re-visited the schools about four to five weeks after the performance, he again took an *aide memoire* to guide the discussions. The account that follows is based on the questions:

- You remember that a few weeks ago we had a puppet performance called *Blazer to the Rescue!*. What are the main things you remember about that performance?
- What did Blazer remind you to do if you are in a room or house that is on fire?
- Can you remember the mistakes that the pigs made that might cause a fire?
- What did you learn that might help you to make sure that your own home doesn't catch fire?
- What would you do in your own home?

The main memories of the performance

When asked about their main memories of the performance, younger children tended to respond initially with a reference to 'fire safety' while older children mentioned the 'three little pigs' as their first thought. The younger children mentioned *Stop! Drop! and Roll!* and *Get Down Low and Go! Go! Go!* spontaneously and then described details of the performance later – often basing them on the humorous aspects. On the other hand, in a Year 3 class, however, recall was as follows:

Olivia: It was called Blazer to the Rescue! and it was about the fire brigade. They had a fire and needed to escape through the window, and the fat guy wanted to get his play station.

Chloe: The fat pig wanted his play station but he wasn't allowed to as he would get badly burned.

Other children 'remembered' that socks had been put in the microwave (rather than the oven), that the pigs had to build new houses because they had lost their home, although no comment was made about the three different building materials, that one pig found a lighter and wanted to play with it, and finally, one child volunteered that they had to remember 'Never play with fire without supervision' – a form of words that again seemed recalled rather than interpreted.

As the discussions continued, however, most of the same details as recorded in the discussions immediately following the performance were elicited.

Remembering Blazer's message

The specifically taught forms of words *Get Down Low and Go! Go! Go!* and *Stop Drop and Roll* and were remembered with great accuracy. Often, in many classes, however, a great deal of prompting was required to elicit the different circumstances in which each of these injunctions should be obeyed.

Year 1 Teacher: Why should you Get Down Low and Go! Go! Go!?

Students: *silence*

One student: *tentatively* To avoid smoke?

Another student: The smoke is up high?

While a Year 3 student responded: 'If there is a fire in your room, don't phone Nanna. Get out of the house', a Pre school child who had no hesitation in responding *Stop Drop and Roll* and *Get Down Low and Go! Go! Go!* seemed quite confused when asked where she would go.

Zoe: Stop Drop and Roll and Get Down Low and Go! Go! Go!

Teacher: Where would you go, Zoe?

Zoe: To the door.

Teacher: If the door feels hot, what would you do?

Zoe: Don't go. Call Blazer.

Another child: Ring the police on zero, zero, zero.

Continued questioning failed to reassure that Zoe, faced with a fire, would either remain on her knees or move towards a window when faced with a hot door. In another Preschool class, Lewis said that he would Stop! Drop! and Roll! if he were in a room on fire. He went on to say that he would 'go and find a telephone if you don't have one in your bedroom'. Why would he 'drop'? 'To go and find a phone – you get down low so you don't get burned. Smoke is hot and height is hot, but cool is down'.

The evidence from many classrooms suggests that these young students remember the basic message, but over time the messages become muddled and the appropriate behaviours may not be forthcoming in a genuinely hazardous situation.

The pigs' mistakes

In almost all classrooms, children had little difficulty in remembering the 'silliness' of the pigs, however, girls in particular often pointed out that the 'biggest' mistakes were made by the 'boy-pigs'. In a few cases, children seemed to extrapolate from the 'mistake' and its underlying message and in so doing, missed the point. For example, when a Year 1 child remembered that one of the pigs had 'put her undies in the oven' another immediately stated that she should have used a clothes line or a dryer. Perhaps such a literal reaction is to be expected from those so young, although it could also reflect an attempt to gain teacher approval.

Lessons retained from the presentation and how children think they would react in their own homes

In many of the classroom discussions, these two guiding questions from the *aide memoire* were considered together and became part of a more general discussion on what children know about fire safety and what they would do in the event of a fire in their own homes.

Given that the designers of the presentation were at pains to ensure the consistency of their message with other fire safety initiatives, especially those undertaken by the Queensland Fire Service, it is not surprising that in most cases the children 'remembered' fire safety advice from a wide range of sources, regardless of whether they had received it originally from the puppet presentation. Unfortunately, in some cases, they also appear to have integrated some 'folk wisdom' as well as some poor advice into their memories. Thus, Georgina in Year 3 'remembered' Blazer as advising her to 'smother a fire with a blanket' or 'stomp on it with your feet' or 'put sand on it' – which seems reasonable if the problem is an out-of-control camp fire but which was not advice given by Blazer. However, it did lead to an interesting discussion during which one boy said he thought there were special kinds of blankets that you should use, but he didn't know what they were called. Other children 'remembered' that Blazer had told them 'if you are camping and there is a fire, get in the car and put a blanket over you'. Of greater concern, perhaps are those children who 'remembered' being told to 'blow the fire out', 'turn the fans on in the house to make the house colder' or perhaps to 'go and get a hose and squirt it'. The first two of these comments brought forth rebukes from others in the class who pointed out that 'fire needs air, so you would just make it worse', while the teacher suggested that before attempting the third response, the child might like to call her parents or another adult. Mark thought that 'if there's a fire, you should put salt on it', while someone else advised that we should all 'get special paint that won't catch fire'.

A surprising number of children referred to problems they anticipated in getting out of their rooms – usually through the windows. Thus they frequently referred to the need for telephones in their rooms, knowing where keys to security doors were located, and having ready access to screwdrivers in order to remove security screens. It proved impossible to obtain accurate information on the extent to which these items were available to the children themselves, or whether they were improvising on themes which originated from a wide range of sources. One girl would 'wrap myself in my own special doona and then the fire couldn't hurt

Ros Childers and her alter-ego Blazer.

me' while another would 'get a big bottle of water and put it on the fire'. When 'jump out of the window' was suggested, a disturbing number of children responded to follow up questions from either the researcher or classroom teacher about high set or two storey houses by referring to 'placing a trampoline under the window', 'jumping on to the top of the fence', or 'using a parachute'. The mystical properties of doonas, used by many parents including the present writer to calm a worried child, emerged in a more dangerous context with the suggestion that one girl would 'wrap myself in my doona and then jump from the window'. In one school, the teacher summed up such a discussion by 'reminding' the children that 'it is better to break a leg in a fall than to burn to death in a house'.

These discussions in almost all classrooms revealed that over time, the messages, whether first received from the teacher, a visit to the school from the Queensland Fire Services or from Blazer, get muddled for a significant number of children. The mantras of *Stop, Drop and Roll*, and *Get Down Low and Go! Go! Go!* were repeated with scant regard for the different conditions under which each might be appropriate. Myths such as getting a hose, jumping from a window and putting butter on burns, emerged from a relatively large number of classrooms. Advice such as 'if the door is hot, then wet your hands before touching it' are potentially very dangerous and may be interpreted as reflecting an attempt by the children to integrate the wide range of advice they receive from 'official' sources with societal myths, half truths and their own sense of incongruity when they attempt to use the theoretical perspectives they have received with novel situations.

Conclusion

The public education for disaster reduction conducted by the various organisations concerned with reducing the fire toll appears to have been very effective with the children and schools involved in this study. By the time children reach Year 3, after perhaps four years of group education, most have received a wide range of advice and training from their parents, teachers, the fire services, television and in the case of these children, dramatic and or puppet presentations such as *Blazer to the Rescue!* It would be invidious to suggest that any one form of presenting safety information is more effective than any other. In fact, all appear to be effective to a greater or lesser extent with all children. However, the messages received appear to become muddled in a relatively short time. When this is put into the context of a generation used to rapidly changing, dynamic media, it may be suggested that frequent reminders of the fundamental messages needed by the children need to be presented in as varied a way as possible.

In the current study, all the children enjoyed the puppet presentation, with the younger ones in the cohort primarily receiving the fire safety message and the older ones (Year 3) focussing initially on the puppets and then enjoying critiquing Blazer's message. About half of the Year 3 children appeared to feel that they were 'too old' for the three little pigs and perhaps that is why they initially showed more interest in the art and mechanics of puppets than the story itself. However, this does not mean they exhibited significantly more sophisticated understandings of fire safety than the younger children, and indeed, on follow up visits, referred to Blazer's advice in much the same way as the Year 1 children.

Many of the children had already received a visit from the Queensland Fire Service and had undertaken various classroom activities with their own teachers before they watched the puppet presentation. Although it might be suggested that *Blazer to the Rescue!* might usefully have preceded the Fire Service visit, there is ample evidence provided by this study that Blazer re-presented the message in a way not previously experienced and therefore contributed strongly to maintaining its integrity. *Blazer to the Rescue!* – both as a form of presentation (puppetry) and in the way in which it presents the fire safety message – is revealed by the study as being a highly effective medium for children of Years P–3.

In terms of improving the script of the Blazer presentation in particular, and the fire safety message as given to children in general, there is obviously a lack of understanding about the technical equipment involved. At various times in the discussion with

children, it emerged that there is confusion about the difference between fire extinguishers and the tanks of breathing apparatus. Further, some children seemed to believe that fire alarms might actually help in putting out fires. Perhaps they had failed to observe the difference between sprinkler systems in the ceilings of public buildings and the smoke alarms installed in many houses. It was not until the writing of this paper was well advanced that the researcher saw links in his notes between children's reactions to smoke alarms and fire, and the common parental reaction of flapping a towel or newspaper at the alarm to stop it shrieking when activated accidentally. Finally, and perhaps only marginally concerned with the issue of fire, the children often referred to the characters as 'boys and girls' or as boy pigs and girl pig and noted that it was the boy pigs who caused the problems by being 'silly' and the girl pig who was 'sensible and got it right'. Perhaps in these days of concern at the lower levels of performance of boys at school, this aspect of the message might need some amendment, although to adult eyes, Patty was far from the paragon of virtue perceived by the girls.

The least recall at all stages of the study concerned electrical fires, and even after considerable prompting, this aspect of the puppetry performance appeared to have had little impact. There was perhaps some confusion between electricity as a cause of a fire (similar to a lighter or barbecue) and as a threat in its own right – 'Electricity – the burn that kills'. Perhaps the abstract nature of electricity itself makes electrical safety a separate issue that requires further research with young children, beyond the scope of the current study.

However, the study reveals further significant causes of concern in 'fire-proofing' young children. That a month or so after the children's most recent 'reminder' of the fire safety message so much myth and magic should have crept back into their internal narratives emphasises the need for ongoing reminders of the fire safety message at least throughout their primary school years and perhaps throughout the lifetime.

The most compelling evidence of this was seen with the twin mantras of *Stop drop and roll* and *Get down low and Go! Go! Go!* While nearly all children of all ages could parrot them both, a significantly large number failed to differentiate between the former being appropriate when clothes are on fire and the latter when there is a lot of smoke. For children of this age, the conditional: 'If your clothes are on fire, then …Stop drop and roll' does not seem to be appreciated. For some children, the injunction to 'put your hands over your face' appeared to be associated with the 'get down low and go go go'.

Given the range of accommodation options available, children of these ages obviously need to be trained in the specifics of fire safety in their own homes. However, in only one school were all children in Year 1 encouraged to draw a house plan with the help of their parents and to agree in advance which routes to follow

The Blazer character often addresses the audience directly to reinforce the messages.

to leave the house in an emergency. (The researcher found this an interesting phenomenon in view of the inclusion of materials to encourage this approach provided to teachers before the performance).

Differences between those students who felt they should only respond with the 'conventional wisdom' taught and those who allowed their imaginations greater freedom are hard to interpret in this study, but may indicate that what children of this age say that they would do, and their actual behaviour in a hazardous situation may vary significantly. Perhaps a further study could be conducted in which children of this age are placed in a simulated house fire and watched to see how they react. It might also be possible for those responsible for 'debriefing' children after house fires to record their recollections of their actual behaviours in order to create a database for further analysis.

The final conclusions that must be drawn from this study are:

- puppetry presentations such as *Blazer to the Rescue!* have huge potential for presenting and reinforcing safety messages including fire safety for children in the early childhood years;
- such messages cannot be regarded as 'one-hit' remedies but rather need to be reiterated frequently throughout the school years (and probably throughout our lives) through a variety of media, not only to ensure that the messages are retained, but also to delete misunderstandings that constantly reappear; and
- the messages must be constantly re-evaluated for their relevance to changing societal conditions and to ensure that they are appropriate for the developmental stages of those to whom they are presented.

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Counting women in the Australian fire services

Merilyn Childs argues that there are inadequacies in current data reporting mechanisms and there is an urgent need for the inclusion of productive diversity in the fire services

Abstract

This paper argues that it is time to take into account the existing and potential roles women do and could play as paid, retained and voluntary fire fighters in the Australian fire services. Specifically, it argues that women must be 'counted' and 'made to count' more effectively through the adoption of more rigorous reporting of labour market statistics by agencies across Australia that deploy fire fighters. It presents an analysis of the inadequacies of current data reporting mechanisms, as exemplified by the statistical profile of women fire fighters for the period 2002-2003 in Australia. In concludes by arguing that there is an urgent need for the inclusion of productive diversity in the fire services in future national research priorities.

Background

It is striking that very few women are employed as paid full-time fire fighters within fire and rescue agencies within Australia today – on average, less than 5 per cent and in some states less than 2 per cent (Childs 2004). It is striking because it is noticeably at odds with other public sector employment, and out of step with wider Australian labour market trends, where female participation in paid and unpaid labour is significant, increasing from 44.7 per cent in 1983 to 55.9 per cent in 2003 (Australian Bureau of Statistics, 2005). It is also at odds with the police services in Australia, where female participation in uniformed labour had reached approximately 10 per cent by 1995 (Wilkinson and Froyland 1996). To place the participation of women in fire fighting in context, it is useful to consider data reported in New South Wales by the Office of Equal Opportunity in Public Employment (Premier's Department) for the period 2002, as shown in Table 1.

Table 1. Statistics for workforce diversity in NSW Public Sector agencies for 2002.

The figures for women include all women in each agency, both operational (uniformed) and non-operational (civilian)

Level	Total staff	Respondents	Men	Women
Ambulance Service	3,049	51%	74 %	26 %
NSW Police	17,738	58 %	68 %	32 %
NSW Fire Brigade	3,375	100 %	95 %	5 %

Source: http://www.eeo.nsw.gov.au/statistics/. Downloaded 12 November 2005, Office of Equal Employment in Public Employment

Anecdotally, the emergency services volunteer and retained labour market appears to be in trouble, particularly in rural areas. Ageing populations, population drifts, two-income families, declining social capital, and competition between emergency service agencies for labour are contributing factors. Although competition to enter paid full-time fire fighting work remains strong, social change and change to the work fire fighters do (Childs et al 2004, 2005b) means there exists considerable pressure on such agencies to develop internal labour markets that strongly reflect the diverse profile of the Australian community. This is seen by some as a critical factor in managing the risk of changing threat environments. As Brian Robertson, the Commissioner for Fire and Emergency Planning in the United Kingdom commented in 2002,

[….] our Brigade must be prepared to deal with a complex range of risks and hazards, from terrorist attacks and major incidents to domestic and industrial fires, road accidents, other special services and the frequent resource-consuming calls involving abandoned vehicles, rubbish and open spaces. London's diversity also needs to be reflected in our workforce,

because this is the way in which we will able to provide a truly appropriate service that is responsive to the needs of those who use it. We are making steady and ever-faster progress in meeting our local recruitment targets and this year we are devoting further resources to this task (Robinson 2002 p.2).

Yet, if you put the word 'diversity' in the same sentence as 'fire fighting' in any key word search on the Internet it soon becomes obvious that these words, when combined, refer largely to ecological diversity, diversity in building codes, or approaches to risk management. They do not refer to the meaning given to this term by the Australian Government's multicultural policy; that is 'utilising the language and cultural diversity of Australia's workforce and population for the economic benefit of all Australians'. Diversity may be 'a touchstone of the Australian nation' (Diversity Australia) but arguably it has yet to become a touchstone of the fire services industry or the Australian emergency services industry more generally.

Enarson and Meyreles (2004, p.5) recently argued there is a 'surprising lack of attention to gender' in terms of emergency management literature in Australia. The participation of women in emergency management—including the fire services—is critical through service delivery (front-line and support personnel), as well as through community participation (as community members). Yet strategies to enhance community safety and strengthen community resilience in Australia rarely include questions about gender (Childs, 2005a) with few exceptions (but see Cottrell and Anderson-Berry 2002, Dolan, date unknown).

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What is known about the participation of women in the fire services of Australia?

Gender reporting of female fire fighters in Australia

What is known about the participation of women in the fire services in Australia? It takes little time to realise that scant interest has been paid to exploring this question in a co-ordinated fashion. Unlike the policing service, the fire services do not have a body such as the Australian Institute of Criminology in place to collect and analyse data. Nor does a process exist whereby labour market statistics might be strategically developed and analysed to inform national and state based decision-making. The only regularly available systematically reported labour market statistics of internal labour markets of Australian fire services agencies are through Annual Reports published online (although some states/territories provide additional reports through state-based equal employment agencies). Therefore Annual Reports, limited as they undoubtedly are, were used as the basis for initiating a snap-shot of the participation of women in fire fighting in Australia. This approach is discussed further in the methodology section.

Methodology

In attempting to find some answers to the question *What is known about the participation of women in the fire services in Australia?* a number of methodological problems were faced. The first problem was the creation of a workable definition for 'women in the fire services' that enabled the collection of data that acknowledged that women's fire fighting labour was diverse. Women's participation in the Australian labour market remains characterised by a diversity of experiences, such as unemployment, underemployment, casualisation, voluntary labour, lower earnings on average, and the need to find work-life balance (Australian Bureau of Statistics, 2003). A definition was sought that captured 'difference' in the way women engage in fire fighting work. It was known from field experience that women engage in fire fighting work in different types of agencies and make different types of contributions, for example:

- as paid full-time personnel sometimes deployed as *remote-area fire fighters* in land management agencies;
- as *volunteer fire fighters* in bushfire fighting agencies (and sometimes doing paid labour in civilian roles in the same agencies, or other agencies with fire fighting functions); or
- as *full-time fire fighters* in fire and rescue agencies doing a whole range of first-responder and community education tasks only some of which were related to fire fighting.

Consequently, the decision was made that the primary interest of the study was to ask questions about women in fire fighting, regardless of the nature of their employment, or the particular industry sector they were deployed within. For this reason, and because the aim was to better understand the participation of women in fire fighting regardless of where they did their work, 'fire fighting work' was defined broadly in the following way:

By fire fighting work, we are referring to fire fighting as part of urban fire and rescue, bushfire, land management, air services, and defence services. That is, all fire fighting done by women, regardless of whether it is paid, casual or volunteer.

The second problem to be solved was to identify sources of existing data that might be analysed to inform the study. It became clear that the Australian Bureau of Statistics' (ABS) labour market data could not be relied upon. The Australian Standard Classification of Occupations (ASCO) provided only two definitions of fire fighters—Fire fighter and Senior Fire fighter. These categories do not adequately reflect the population definition nor the reality of fire fighting work in Australia. In addition, where ABS statistics were available for the category 'volunteer' the data itself was not helpful to this study. For this reason, the decision was made not to use ABS statistics as they would not provide a comprehensive national overview of the categories being mapped.

Another source of data might have been provided directly through surveys sent to Human Resource Departments of fire fighting agencies. However, a field trial of this approach encountered a reluctance and suspicion on the part of some agencies to provide data, and difficulty validating data given by others. The approach seemed ad hoc and flawed. Consequently, and in the absence of other data sources, a decision was taken to mine existing data reported in the public domain in Annual Reports (1996-2004), by all fire services agencies in Australia. The tentative assumption was made that human resource departments would have initially provided the data for these reports. This data source was supplemented, from time to time and for varying reasons, by internal fire agency documents, and even, on rare occasions, by verbal account. Data about internal labour markets, including gender breakdowns, was developed into a typology that included careful notes about the numerous limitations of the data. For the purposes of this paper, selections of data for the period 2002-2003 are reported.

In the early stages of the study it was realised that statistical reporting was often incomplete, unreliable, confusing, and misleading. It was conjectured that no particular priority had been placed on developing high quality information about the fire services labour market. Consequently, although data is reported here, it is done so with the accompanying argument that better reporting mechanisms need to be developed as a

Table 2. Statistical data – women employed as career and retained fire fighters 2002–2003 in fire fighting agencies dependent on full–time fire fighters

Agency	Data source	Total career	Total female (career)	Percent of females/ career	Total retained	Total female (retained)	Per cent of females/ retained	Total female career and retained	Per cent of females career and retained
NSWFB NSW	Annual Report	3,214	Not reported	Not reported	3,249	Not reported	–	191	2.9 %
TFS (Tas)	Annual Report	251	Not reported	Not reported	Not reported	Not reported	–	Not reported	–
MFB (Vic)	MFBB HR	1,508	26	1.7 %	Not reported	Not reported	–	Not reported	–
QF&R (Queensland)	Annual Report	4,143	Not reported	Unclear	1,936	Not reported	–	Not reported	–
ACTFB (ACT)	Annual Report	287	5	1.7 %	0	Not reported	–	N/A	–
FR&S (WA)	Annual Report	827	17	2 %	Not reported	Not reported	–	Not reported	–
MFS (SA)	Annual Report	935	16	1.7 %	Not reported	Not reported	–	Not reported	–
TOTALS		11,165	Unreliable						

national priority, not only for women fire fighters, but as means of proving a credible and co-ordinated evidence for labour force planning in this industry. The figures and conclusions reported here are therefore tentative, despite the use of publicly reported statistics.

Volunteer agencies, for example, published a figure for total volunteers but this was not reported on the basis of gender breakdown, nor was it possible to ascertain from these 'broad brush' figures if the volunteers were front line operational fire fighters or those providing operational support functions such as communications, catering, transport, or providing administrative functions. Data collected from land management agencies similarly lead to problems of interpretation. While total workforce figures were available, and gender breakdowns provided, it was not made clear, even through cross-referencing, if these operational personnel had also provided fire fighter functions.

It was clear that it was not possible to report demographic findings of any reliability at all prior to 1996. Prior to 1996 Annual Reports were unreliable, incomplete or conflated statistics in such a manner to make extrapolation from them impossible. This hinted that the issue had only just begun to be taken seriously in terms of reporting. In addition, legislative requirements to report male/female employment patterns only applied to paid personnel so it was not possible to gain reliable data about volunteer women fire fighters. Even where female employment was reported, many agencies saw no need to differentiate women on the basis of their employment categories and functional areas, although this was often done for males. An educated guess was made that conflation of figures created an impression of greater numbers of uniformed women than actually existed. Tables 2 and 3 show where data was not available or unreliable.

Statistical overview

Typical of statistical reporting was the conflation of 'career' and 'retained' women fire fighters into one figure.

It can be seen that in the 2002-2003 reporting period NSW (NSWFB) 2.9 per cent of fire fighters were women, including retained and career, or 191 women fire fighters of a total 6463 personnel (male and female). In Queensland (QF&R) women made up 6 per cent of fire fighting personnel (a total of 6079 career and retained) but this figure is a conflation across all departments, so it is impossible to be sure what it means. Years of fieldwork indicate that fire fighting agencies argue there is a difference between the skills of 'career' and 'retained' or 'volunteer' personnel, and it is (anecdotally) notoriously difficult for retained or volunteer personnel to gain employment through general recruitment campaigns for paid permanent fire fighters. So the statistical conflation seems odd.

In volunteer fire fighting agencies reported figures appear to have even less meaning. In NSW RFS for example, only 'total' figures were reported – 570 career personnel, and 67,058 volunteers. Gender breakdowns were not available in the 2002/03 reporting period. This was similar in the Northern Territory. In the

Table 3. Statistical data– women deployed in paid and volunteer positions 2002–2003 in fire fighting agencies dependent on volunteer fire fighting labour

Agency	Data source	Total career	Total female (career)	Total volunteer	Total female (volunteer)
RFS (NSW)	Annual Report	570 (operational and support personnel conflated)	Not reported	67,058	Not reported
CFA (Vic)	Annual Report	425	Not reported	42,607	4,720 (identified as operational)
TFS (Tas)	Annual Report	251	Not reported	4,866	621 (operational and support personnel conflated)
RFB (Qld)	Annual Report	72 (perm full and casual staff)	Not reported	48,677 (includes RFB, chief fire wardens and vol. fire wardens)	Not reported
BFS (WA)	Annual Report	Not reported	Not reported	21,168	Not reported
CFS (SA)	Annual Report	69 (all personnel conflated)	14 (5 operational roles)	16,280	1,271
TOTALS		1,387		151,979	Unreliable

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Australian fire services agencies need better mechanisms for reporting women's participation in operational and support roles.

Victoria CFA there was clear reporting of total numbers of volunteers, as well as a gender breakdown (11 per cent or 4,720 operational volunteer women). However, it was unclear what these women do. The same can be said for Tasmania, where the percentage of women was shown (12.8 per cent) but it was not possible to know what their roles were. Contrast this statistical reporting practice with that adopted by Australian police services, which provide data about female police officers in Australia to the Australian Institute of Criminology (Wilkinson and Froyland 1996). This data not only provides researchers with an accurate picture of women in policing, but the picture includes a break-down of ranks and allows for the development of evidence-based recommendations focused on advancing women police officers to higher ranks. No such data source exists within the fire services.

In summary, the data collected can be summarised to suggest that:

- By the 2003-2004 reporting period, up to 5 per cent of the Australian 'career' fire fighting labour (that is, full-time frontline fire fighters) were female with a range of less than 1 per cent in some states to nearly 5 per cent in others - but no conclusions about their level of employment can be drawn.
- Up to 30 per cent of the volunteer fire fighters were female, although this varies across the country. It is not possible to know what this participation means in terms of operational or support function deployment, or what it means in relation to frontline fire fighting or other fire fighting functions.
- Up to 30 per cent of fire fighters in land management agencies were female. Space prohibits the inclusion of detailed data in this paper but it is important that future research includes remote-areas and rural/bush fire fighters in population definitions.
- Air Services Australia did not provide a gender breakdown for staffing statistics, preferring instead to report 'total numbers' for 'aviation fire fighter' [ACT (20) NSW (55), NT (50), Qld (167), SA (33), Tas (36), Vic (68), WA (64) and a total of 493] (Airservices Australia Annual Report 2002-2003).
- It is not known how many, if any, women in the armed forces worked as fire fighters.
- It is not known how many, if any, women worked as fire fighters in private industry.
- It is not known how many women working as casual (retained) or volunteer fire fighters go on to successfully transition into full-time fire fighting work. A subsequent study (Childs 2005c provided some data about the reasons why women fire fighters choose or reject such a career transition).

Conclusion

The study reported in this paper provided tentative statistical data about women fire fighters in Australia, as reported in 2002-2003 Annual Reports within public sector fire fighting agencies. Only data from 2002-2003 was reported here, and data from land management agencies was summarised but not detailed. The limitations of the data were acknowledged, but it was argued that these limitations reflect an historic lack of interest in diversity in the fire services, as well as poor data reporting mechanisms that need urgent review. The poor data available for public scrutiny exemplifies a lack of co-ordinated workforce planning across the industry as a whole.

The development of base line data about diversity in the fire services should be seen as a national, state/territory and agency priority. Indeed, the issue of diversity in the fire services, including the experiences of female fire fighters, is in urgent need of systematic high quality research, as well as policy activism supported by the robust leadership by CEOs of fire service, land management and air services agencies. This was clearly identified as a key issue by delegates at the first *National Women in Fire fighting Forum* held in Sydney May 12-13th 2005 (Donnelly and Millhouse 2005).

In order to count women and the contribution women make to this industry, Australian fire services agencies need better mechanisms for reporting women's participation in operational and support roles. Arguably, workforce planning requires robust and high quality data. The challenge is yet to be met of ensuring the development of a viable, diverse and capable fire-fighting workforce that effectively and actively attracts and deploys women in paid, retained and volunteer fire fighting roles through frontline and support functions. As Goward (2005) argued, at the launch of the first Australasian Women in Fire fighting Forum;

'Fire and fire management are essential to the Australian story, to our culture, to our halls of heroes. In the Australia of this new century, women must also be seen in those halls, women's achievements and contributions must be part of that story… or the story is incomplete'

One way for women to be 'seen' is through an industry commitment to the development of high quality, meaningful, and systematic statistical reporting that is used strategically to build women in to the future of this industry.

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Property Rights: returning personal possessions after disasters

Anne Eyre and Lucy Payne investigate some key issues relating to the recovery and return of property following mass death in disasters

Abstract

Today great emphasis is placed on respecting and fulfilling the rights of the bereaved in the aftermath of disaster and other circumstances of sudden violent death. When it comes to the specific details relating to the recovery, processing and return of personal property to the bereaved, however, there are still varying degrees of understanding about the meaning and significance of personal property and a lack of clarity within and across the various responding organisations about protocols for dealing with such property. The purpose of this article is to highlight key issues relating to the treatment and return of personal property with particular reference to the role of emergency responders and other disaster managers.

Introduction

'I remember the day that the package arrived. I knew what it was…they put it in the front hall and I left for the day. We all came back that evening and the house was filled.… with this smell, and it was a combination of disinfectant, jet fuel and mildew, very distinctive smell that in some ways was offensive but in another way it was filling the house with whatever was left with Alexia in some way' (Lockerbie: My Trial, Channel 4 Television, May 2000).

This quote, from a bereaved family member following the Lockerbie bombing, highlights the emotional and symbolic significance of property returned in the aftermath of traumatic loss through disaster. In this article we discuss the practical procedures and emotional implications associated with recovering and returning such property. We discuss the unique challenges associated with property return after mass disasters and urge emergency planners to revisit their plans and guidelines in order to take into account the increasing emphasis on a rights-based approach to disaster management.

After single deaths

In the United Kingdom, procedures following an individual's sudden or violent death are relatively straightforward. In England and Wales, for example, under the *Coroners Act (1988)*, Her Majesty's Coroner initially retains the bodies of the deceased and any property found with them while they work to establish identification and the cause of death. When this process is complete they authorise the return of the body (and in most cases the property) to the family. Thus, for example, the bereaved may receive from a hospital or a police Family Liaison Officer (FLO) the clothes their loved ones were wearing and their personal possessions such as jewellery, a watch or a mobile phone (though there can be occasions when conflicts over ownership arise, putting the police and coroner in a difficult situation regarding who gets what). In some circumstances items may be retained as potential exhibits for an inquest or criminal trial before being ultimately returned or disposed of.

The manner in which these items are returned to families communicates something about their meaning and value, both for the giver and receiver. Being presented with a black bin liner and a form to be filled in gives one message; receiving a carefully prepared package accompanied by a few thoughtful words gives another. Clearly the meaning and significance of items varies according to one's relationship to them. For the police, for example, property may be considered in relation to its potential evidential value in respect of a criminal investigation and identification processes, while for family members it may primarily be of significant sentimental value (Home Office 2004:35). For the bereaved, personal property may be the last link with their loved one. It represents an ongoing connection with their last moments and the place and manner in which they died. For some, these items may have additional cultural and religious significance. In certain traditions items of clothing and jewellery may have sacred significance and there may be a requirement for the dead to be buried or cremated along with these possessions.

Professional organisations in the UK increasingly recognise the value of respect for diversity and the significance of planning and training to understand and meet cultural and psychological needs after death. The Association of *Chief Police Officers' Family Liaison Strategy Manual* (2003), includes a specific section on the return of property to families and encourages officers to consult with families with regard to what property they would wish to be returned and in what state, including the choice about whether the family wish for items to be cleaned or not. 'The family must always be consulted before any cleaning etc to establish their views….It is essential that property is returned rather than relatives asked to collect it from a location that may cause upset and trauma' (Association of *Chief Police Officers' Family Liaison Strategy Manual* 2003:46).

Specific emphasis is placed on officers inspecting property prior to return to ensure that all police and court exhibit tags have been removed. Reference is also made to health and safety considerations in relation to the searching and cleaning of property. The authors commend the policy adopted by many police forces of returning items to families which may seem to the authorities to be 'contaminated' but where, by signing a disclaimer, families' wishes can be fulfilled in terms of receiving clothing etc in a bloodstained state.

Dealing with disaster: unique challenges

In situations of mass death such as a train or plane crash, a bombing or a building collapse, the legal and logistical issues involved may make this a more complex task. The South East Asian tsunami of 2004 represents one of the most extreme example of such complexity experienced in disasters. Indeed, by their very nature, the scale of disasters makes all aspects of response and management much more complicated and time-consuming. Add to these very practical considerations the fact that international disasters are likely to involve differing legal protocols and a vast number of responding organisations (each with their own assumptions, priorities and procedures), and the issues surrounding the return of personal property then become very complex indeed.

As with other cases of sudden violent death, the first tasks of the emergency services after a disaster is to rescue and recover casualties, including the dead, to secure the site and begin necessary investigations. In the UK the recovery of property from the site forms part of the evidence-gathering process for a criminal investigation. In such circumstances the police service provides dedicated teams responsible for arrangements relating to property. Such property may be at the scene and in some instances remote from the scene, for example at a victim's home or at the mortuary. Property may also include items of clothing, freight recovered after a transportation incident or wreckage (Home Office 2004:35).

Disaster sites can cover a substantial area such that the search and recovery phase of disaster may take several days and even weeks. This was the case after the Lockerbie disaster where the disaster site covered hundreds of square miles. More recently, after the terrorist attacks in 2001 at the World Trade Centre, New York, activities associated with the identification of victims and retrieval of human remains were still taking place several years after the disaster.

In these circumstances, recovery of property and other aspects of disaster management present unusual circumstances and additional challenges. Simpson and Stehr (2004) have highlighted difficulties faced by American responders at Ground Zero where response activities deviated from what they were used to in more 'natural' disasters. They were *'shaped by the fact that the scene was simultaneously considered a disaster area, a crime scene and – it was soon realised – a mass grave. Among other things, this meant that the routinisation of recovery activities that typically takes place soon after a disaster, was instead spread out over a much longer period as new processes were established. Sifting debris for evidence, human remains, and personal effects took considerable time. It also resulted in conflict and confusion between and among different official response agencies, non-governmental organisations, and families and friends of victims as they struggled over competing needs and priorities'* (Simpson and Stehr 2004:110-111).

One example of this conflict was a much publicised scuffle that took place in November between the fire fighters, who wanted to continue searching for human remains, and the New York police following the Mayor's orders to cut back on searches and bring in more heavy equipment to clear the site (Simpson and Stehr 2004:110-111).

In mass disasters, specialist companies may be used to provide logistical support and a range of funerary and other services. Commercial providers in the UK include Kenyon International Emergency Services and Blake Emergency Services. These may be contracted by prior arrangement to work with organisations such as transport companies or local authorities and thus may become involved in disaster response activities such as body recovery and forensic identification as well as the cleaning and restoration of personal effects.

It is important that all those involved in disaster response are made aware of the roles and services likely to be provided by differing agencies so that a coherent and co-ordinated approach is followed, particularly when it comes to family liaison. Building on lessons from the past, the Home Office in the UK has recognised

that in mass fatality incidents police FLOs 'will provide the primary communication link with families limiting the potential for repetitive interactions' (draft 2004:51).

A practical and emotional task

In the UK the latest Home Office *Guidance on dealing with fatalities in emergencies* (2004) stresses the importance of addressing practical considerations relating to the recovery and processing of property and the implications of these. It states:

'In all cases it will be necessary to ensure meticulous documentation with cross-referencing to victim identification where relevant. It is important not to underestimate the storage requirements for property, whether it is at the mortuary or elsewhere. There may also be considerable resource and financial implications' (Home Office 2004:35).

It is clearly important to have clear and manageable plans in place for processing, storing, retention and return of property recovered in disasters. It is equally important to provide education, training and support for those tasked with the practical and emotional responsibility of supporting families as they go through the painful process of identifying and reclaiming their loved one's possessions.

In 1998 Matthew Wald of *The New York Times* described the emotional impact of putting such plans into action when their reporters were given access to observe activities following the Trans World Airlines flight 800 disaster. At this time the process of formalised property return to families was still in its infancy:

'If it is possible to catalogue heartbreak then the workers at the hangar in Calverton, NY, where the ruins of TWA Flight 800 are stored, have done it. It takes the form of a blue plastic three-ring binder, with 200 pages of colour photos of personal belongings, from cameras to underwear to hair dryers, anything that 230 people could bring aboard a Boeing 747 and that a diver could bring up from the bottom of the Atlantic' (The New York Times, June 5th 1998).

Wald noted that many families declined to receive the catalogue and quotes the Director of the National Transportation Safety Board who stated 'You have to have a strong constitution to go through it' (ibid).

Research has highlighted the psychological impact on responders of dealing with disasters and recommended that education on the psychological and emotional reactions should be core to training as well as pre and post deployment briefings. Research into the preparedness of those called on to provide identification services in the event of mass casualties has concluded that 'the psychological implications of mass casualty identification must be thoroughly addressed' and that 'more attention needs to be focussed on the psychological aspects of mass disaster preparedness' (ibid) in order to fully prepare potential responders to deal with mass casualty incidents (Pretty et al 2001:78).

Such preparedness also applies to police family liaison officers and other disaster responders who may accompany families in dealing with aspects of property return. Depending on local or regional arrangements, FLOs in the UK may be assisted by representatives from other organisations, for example airline representatives, social services crisis team members and/or voluntary responders. Regardless of who undertakes this task, in a large scale disaster where there might be vast amounts of property to be surveyed, it is important that such responders are carefully briefed and debriefed for this aspect of their role. They should be reminded of the importance of giving family members informed choice throughout this process and the opportunity to take their time rather than feel rushed to make decisions over such sensitive issues.

Time considerations

In January 2005, personal photographs which had been recovered from the World Trade Centre were made available for the first time to the families of those who died there. The images, including family snapshots, college reunions, fishing trips and holidays were posted on a special limited access website, thus enabling families to search for and reclaim pictures they recognised. Although almost all of the images were badly damaged, they had been scanned and digitally restored by employees of the Kodak photographic company in a project co-ordinated by New York's Post Authority. According to the journalist, James Bone, 'families who claim photographs will get the original damaged version from the New York Police Department's property archive and the new, corrected print' (Bone 2005).

In negotiating a return date with families, consideration should be given to the significance of certain dates, such as anniversaries or special dates for family members. As the example of September 11 highlights, the processing and return of property may take several years to resolve depending on the nature and physical impact of the disaster, the role and requirements of the various authorities involved and resources available. The 2004 tsunami disaster provides further illustration of the fact that processing an extensive amount of property in an international disaster is likely to take many years. Whatever timescale is decided on, all responders should be aware that families should be notified if unclaimed items are to be destroyed and care should be taken to warn and inform them of such decisions and about when any such actions will be taken. Duncan McGarry, the UK's National Family Liaison Adviser, emphasised how important it is that family needs are considered with families being given sufficient time to change their mind about the return of items (personal communication 2005).

A rights-based approach – a fundamental consideration

There has been a strong move towards considering the needs, interests and wishes of those bereaved in disaster. This positive development is increasingly reflected both in legislation and guidance relating to emergency response both in the UK and internationally. In many cases best practice in this field has arisen in response to the negative experiences of families who have drawn on their experience to campaign for change. Indeed the catalyst for the American aviation legislation included the appalling experience after the crash of Air Flight 427 to Pittsburgh. Family members who visited the wreckage of the crash, discovered a number of 'trash bins' filled with both human remains and personal effects (Walsh 1999). In the UK, Disaster Action, a charity whose members are all bereaved/survivors of disasters, work actively with the police and other organisations to achieve greater understanding and responsiveness in meeting the needs of those affected by collective tragedy.

Positive developments in relation to communication and liaison with families have also been driven in part by the recommendations of public inquiries carried out after sudden and violent death in the UK. This has included the *Macpherson Report* following the death of Stephen Lawrence; Lord Cullen's recommendations following the Ladbroke Grove rail disaster; and Lord Clarke's inquiry into the identification of victims following major transport accidents after the Marchioness Disaster. Indeed Lord Clarke (2001) recommended that after disaster there should be honest and accurate information at every stage, respect for the deceased and bereaved, and a sympathetic and caring approach throughout.

In terms of decision-making and action in the aftermath of disaster, however, there is still the potential for conflicting interests to clash and for confusion relating to the treatment of property both within and across responding organisations. Furthermore, in view of the changing roles and responsibilities of organisations involved in all aspects of disaster planning and response in the UK, brought about by the *Civil Contingencies Act* (2004), and the recent national reviews of coroners and coroners officers, the perennial challenge of updating procedures and achieving good co-ordination and communication across multi-agency and multinational boundaries remains as relevant as ever. Complexity is in part a reflection of the fact that each disaster is unique; consequently there is always likely to be a huge range of organisations potentially involved at local, regional and national/international levels. This means there are likely to be gaps and failings including, possibly, in the area of property return.

Newspix/Michael J Short

Processing the extensive amount of property in an international disaster takes considerable resources and time.

Thus despite the existence of a Family Assistance Code in Australia which supports co-operation between the police, coroners and airlines, and gives airlines responsibility for the return of victims' personal effects, in the aftermath the Bali bombings, several Australian families were unhappy with the way property was managed and returned. Grievances included the fact that after the police had informed them that all personal effects had been returned, Indonesian authorities announced they had property from three deceased victims, whom they named, to return and invited the families to claim. Some families were so upset by this that they complained to the Prime Minister and a few believe their loved one's property was stolen because valuable possessions were never accounted for (personal communication with an Australian Government official).

This reminds us to neither be complacent on account of having guidelines, codes and plans (all of which might prove fallible in responding to the next disaster), nor to push for rigid, inflexible procedures. Rather, the wish should be for the general principles and moral considerations reflected in such documents to form the basis for discussions in the aftermath of tragedy. It should inform specific strategies developed in response to any particular event. We suggest a rights-based approach to meeting the needs of the bereaved should be a fundamental consideration.

New dimensions, new challenges

In recent years concerns about the possible release of chemical, biological, radiological or nuclear (CBRN) substances or materials, whether intentional or unintentional, have led to the development of additional plans and protocols for dealing with the aftermath of such major incidents.

Within the UK Fire Service, the New Dimensions project has resulted in the resourcing, training and exercising to meet the demands of a large scale terrorist incident. Much effort has gone into the procurement of new incident response units, decontamination facilities and

enhanced urban search and rescue capabilities. However, little attention has been paid to planning, training and exercising in the meaning and significance of handling personal property during an emergency; to questions about the rights and ownership of property and the potential implications of removing it from the public without a clear strategy for its return. More generally the sorts of discussions and guidelines pertaining to cultural awareness, human rights and the responsibility of responders to those bereaved seems to be lacking within Fire Service plans.

There are, of course, specific difficulties that might arise in dealing with CBRN incidents and implications for dealing with personal property in such circumstances. The UK Home Office and others have recognised that much of the existing guidance and arrangements for dealing with fatalities (which includes issues surrounding the return of property) may not be suitable where contamination has occurred (Home Office 2004:35). More work is being done to address these issues.

Conclusion

In summary, this article has highlighted some key issues relating to the recovery and return of property following mass death in disasters. Although there are some specific aspects of legislation covering this area and useful guidelines being developed to assist responders in view of changing times and challenges, the sensitive treatment and return of property may continue to present challenges both for the bereaved and responders. We suggest it is incumbent on the latter to revisit their thoughts and procedures and to ensure that planning, training and exercising include detailed consideration of property-related issues as an important aspect of the recovery phase of disasters.

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Monitoring the performance of wildfire incident management teams in real time

Geoff Conway describes how wildfire response agencies in Victoria monitor the effectiveness of incident management systems and the performance of Incident Management Teams

Abstract

Many emergency services have well-established processes for operational review and implementing changes to structure, process and procedures as a result of lessons learnt from operational experience. This article describes an initiative implemented by wildfire response agencies in Victoria, to monitor the effectiveness of incident management systems and processes, and the performance of Incident Management Teams while they are working. It discusses the drivers for the introduction of the program, the structure adopted and the outcomes derived after three years of operation.

Introduction

Since the introduction of Australasian Inter-service Incident Management System (AIIMS) by Country Fire Authority, Victoria (CFA) and the Department of Sustainability and Environment, Victoria (DSE) as a system for managing emergency incidents, both agencies have worked actively to establish, train and develop effective joint Incident Management Teams (IMTs). Ensuring that IMT members understand their role and the critical reporting relationships and interdependencies within the team has lead to the development of training programs, exercises, regular briefings and professional development activities for these personnel.

In Victoria, the performance of IMTs has come under close scrutiny. Of particular note are the Royal Commission into the explosion and fire at the ESSO gas processing plant at Longford in September 1998, the Coronial Inquest into the bushfire at Linton in December 1998, which resulted in the deaths of five volunteer fire fighters from the CFA, and the Inquiry into the 2002/03 Victorian bushfires. Each of these inquiries spent some time examining incident management structures and processes, and the performance of the Incident Management Teams deployed to manage these incidents.

The impetus for establishing the program

A number of recommendations made by the Victorian Coroner, Mr. Graeme Johnstone, in his findings on the Linton Inquest (Johnstone, 2001) discussed the need to actively monitor safety during the fire fight. Five of these recommendations dealt specifically with the development of an audit function to oversee all aspects of incident management, the preparation of role statements and training programs for the audit team members, and training for both the auditors and those who respond to and manage fires, in the role the audit teams were to undertake.

The concept of deploying personnel to an incident to monitor the safety of fire fighters had been given some preliminary consideration by CFA and DSE prior to the Linton Inquest. However, the Coroner's recommendations gave impetus to the establishment of a program to meet the intent of the recommendation. This became the *Real Time Performance Monitoring Program* (RTPM).

Both CFA and DSE took the position that such a program had the potential to deal with more than safety issues in isolation. The opportunity to monitor the performance of individuals within an incident management team, and the team itself was also considered. Assessing the suitability of incident management infrastructure, agency procedures and AIIMS processes and roles in addition to monitoring fire fighter safety were all added to the list of tasks to be undertaken by personnel deployed to monitor the management of the incident. This position was based, in part, on the belief that effective incident management often overcame a number of the issues that lead to safety concerns on the fire ground.

Program development

CFA and DSE appointed officers to develop and implement the program. This joint approach to operational review of wildfire response in Victoria is established in the *Cooperative Agreement between CFA and DSE* (CFA and DSE, 2001). These agencies co-operate

in all aspects of incident review and performance monitoring. In developing the program, objectives where established and formally adopted by the executive officers from both CFA and DSE (CFA and DSE, 2002). The objectives were to:

- monitor the activities of the Incident Management Structure, to promote safety throughout the incident, and effective and efficient incident management; and
- promote continuous improvement in incident management by effectively measuring operational performances during incidents, and reinforcing established standards and performance measures.

To provide guidance to those officers deployed as members of the Performance Monitoring Teams, and the IMT members who are the subject of the visit, a comprehensive set of Business Rules were developed addressing such issues as reporting relationships, supervision, logistical support and reporting of outcomes. The Business Rules provide both the monitoring team and the IMT with clear principles for the process. They are:

- *The Performance Monitoring Team shall address systems, structure and process issues within the Incident Management Structure.*
- *The Performance Monitoring Team shall not address issues of strategy or tactics unless they have specific safety concerns.*
- *The Performance Monitoring Team shall identify actions to be addressed by members of the Incident Management Structure at the time.*
- *The Performance Monitoring Team shall also record comments for later action or discussion, either informally or as part of a formal debrief or operations analysis.*
- *Unless there is a likelihood of serious deterioration in safety or incident management processes, the Performance Monitoring Team shall not become involved in carrying out any incident management function.*
- *In the event that the Performance Monitoring Team believes they should become involved in incident management, the State Coordinator of the control agency is to be informed as soon as practicable. The State Coordinator shall advise the Chief Officer – CFA and the Director of Emergency Management – DSE* (CFA and DSE, 2002).

The clarity provided by these principles has ensured a sound understanding on the part of all involved as to the role of the Performance Monitoring Teams. This confidence has also been critical to the acceptance of the program among IMT members.

The Business Rules were distributed widely and were driven by the principle that all involved should be fully aware of the intent of the program as well as the process to be followed. The other key characteristics established in the Business Rules are that Performance Monitoring Teams should take a supportive, non-threatening approach to their role. For example, during the major campaign fires in Victoria in 2003, a Performance Monitoring Team deployed to a newly established Incident Control Centre found the IMT under extreme pressure to both establish the ICC and manage an escalating incident. With the support of the Incident Controller and the DSE State Coordinator, the Performance Monitoring Team spent most of their deployment supporting the planning and operations sections of the IMT.

The monitoring process is not punitive. On a number of occasions during the development of the program suggestions were made by various members of both services that the RTPM program could also be used as a means of formally assessing the performance of individual officers. These suggestions have always been strongly opposed by those personnel who developed the program and have the responsibility for its implementation. The task of managing a major wildfire is stressful and onerous. The conduct of a formal assessment in this environment would only add to the burden on the IMT and was considered inconsistent with the objectives and principles adopted by the executives of both CFA and DSE.

Photo courtesy DSE

Real Time Performance Monitoring examines the effectiveness of incident planning and the interaction between personnel at the ICC and those in the field.

Implementation

To assist the Performance Monitoring Teams in their tasks, a checklist of 'initial issues' for consideration during deployments was developed from a comprehensive list of several hundred items of indicators of sound incident management performance. It become obvious that such an extensive list had limited value as a support tool for the Performance Monitoring Teams as there would never be sufficient

time to review all the issues, nor would it be necessary to consider all of them during a deployment.

Based on a review of issues identified from recent operational reviews, a rigorous risk assessment and consideration of priorities established by senior executive officers of both CFA and DSE, the checklist was trimmed to 11 key areas of concern. These were:

- appropriateness of the Incident Control Centre;
- appropriateness of the incident management structure in place;
- safety issues;
- specific operations functions;
- specific planning functions;
- communications planning;
- information flow;
- resource management;
- change-overs;
- specific logistics functions; and
- emergency management (integration with the broader emergency management arrangements).

By limiting the checklist to these key areas, CFA and DSE are able to ensure that attention is directed to those aspects of incident management that are identified as of current concern or specific interest. The checklist is reviewed annually to ensure it is relevant to current organisational needs and priorities.

The checklist is intended to provide a starting point in the review of the effectiveness and efficiency of the ICC and the IMT. It is not intended to restrict the examination of other issues that become apparent. The Performance Monitoring Teams are encouraged to investigate any areas of concern or interest if it appears appropriate at the time.

The most critical task in establishing the program was the selection of those officers who would be deployed as members of the monitoring teams. The Business Rules established the preferred qualifications for these officers which are:

Photo courtesy CFA

Fires at Heathcote south of Sydney in December 2001.

- AFAC Module ICS 4.04 qualifications;
- Chief Officer – CFA or Director Fire and Emergency Management – DSE endorsement as a Level 2 Incident Controller or higher; and
- Experience in Level 2 or 3 wildfire operations as a member of an Incident Management Team.

However, all personnel involved in a RTPM analysis must have the endorsement of the Chief Officer- CFA or Director Fire and Emergency Management – DSE to undertake the task.

This approach was taken to ensure that those officers deployed as part of a Performance Monitoring Team had credibility with the IMT members they would be monitoring and that the advice and observations being offered would be readily accepted. While the program is not intended to serve as a mentoring process for IMT members, mentoring often occurs by default during a deployment. This reality adds weight to the decision to establish strict criteria to the selection of Performance Monitoring Team members.

Effective communication skills are also an important personal skill for the Performance Monitoring Team members. However, the key characteristic required of these officers was summed up well by one of the foundation members of the team when he said, *'Its all about attitude!'*

A key principle established in the Business Rules was the determination to deploy both a CFA officer and DSE officer together as a Performance Monitoring Team where ever possible. There are two major advantages in this process. Firstly it provides a greater depth of experience and organisational knowledge, and secondly it sends a strong message about the co-operative nature of emergency response and wildfire incident management.

It is seen as critical to the success or the program to keep the teams small. The willingness of an IMT to accept and co-operate with the Performance Monitoring Teams is based partly on the fact that they do not get in the way or distract the IMT from their primary purpose which is to manage the incident.

The majority of deployments of Performance Monitoring Teams have been for a period of 24 hours. This is considered important as it allows the team time to observe activities at the ICC, staging areas and the fire line, ensuring that they can monitor the information flow between the IMT and the fire fighter on the ground. It also gives them the opportunity to observe at least one shift change. Due to the protracted nature of major wildfire campaigns and the logistics of mobilising Performance Monitoring Teams most deployments have occurred during the second or third shift of the IMT.

The decision to deploy a Performance Monitoring Team is made at a State co-ordination level. However there is nothing to preclude officers co-ordinating emergency response at a regional level, or an IMT from requesting the deployment of a team. Once deployed, Performance Monitoring Teams report to the State Coordinator of the control agency, however, the key working relationship is with the IMT.

The initial contact for a Performance Monitoring Team is with the Incident Controller. While the team is deployed they have an obligation to keep the Incident Controller advised of their whereabouts at all times. The Business Rules give the Incident Controller the option to restrict the access of the monitoring team to the fire ground or other areas if safety or IMT effectiveness might be compromised.

With few exceptions, all Performance Monitoring Teams have been able to establish an effective working relationship with the IMTs they have been monitoring. This is a testament to the professional approach taken by both the monitoring team members and the IMTs involved.

Feedback and reporting

The RTPM program also has a comprehensive reporting regime. The key focus is the provision of feedback to IMT members, however there is also a need to ensure that those officers co-ordinating response at regional and State level are also kept informed on the effectiveness of incident management systems and processes and the performance of IMTs in the field. The reporting principles provided to monitoring teams are:

- *The Performance Monitoring Team shall advise the Incident Controller and Safety Advisor (if appointed) of any safety related concerns.*
- *The Performance Monitoring Team shall support and advise incident management structure members.*
- *Where the Performance Monitoring Team identifies an issue that can be addressed immediately they shall raise that issue with the member of the Incident Management Structure responsible.*
- *Where the Performance Monitoring Team identifies an issue that impacts on the broader incident management they shall raise the issue with the functional officer responsible (Operations, Planning or Logistics) and the Incident Controller.*
- *Where the Performance Monitoring Team identifies an issue that impacts on the safety of any person they shall immediately raise the issue with the person supervising that part of the operation, and then advise the Operations Officer, the Incident Controller and the Safety Advisor (where appointed).*
- *Prior to leaving the incident, the Performance Monitoring Team shall brief the Incident Controller, and if required, the Planning, Operations and Logistics Officers on any significant findings they have made.*
- *The Performance Monitoring Team shall, within 24 hours of completing the inspection, provide an initial report to the State Coordinator of the control agency, the appropriate Regional Director (DSE) and the appropriate Area Manager (CFA) identifying any significant findings.*
- *Members of the Performance Monitoring Team shall attend, as participants, the major debrief that is conducted for the incident.*
- *The Performance Monitoring Team shall, within 28 days of completing the inspection, meet with a nominated representative of the Chief Officer – CFA and the Director of Emergency Management – DSE to discuss progress on the report. The purpose of this meeting shall be to ensure all relevant issues have been addressed and the Terms of Reference have been met.*
- *Where possible, the final report should be submitted to Chief Officer – CFA and the Director of Emergency Management – DSE within 60 days of completing their inspection or as soon as possible thereafter* (CFA and DSE, 2002).

The Performance Monitoring Teams have also provided copies of their draft report to the Incident Controller for information and comment prior to submission, if desired. Only issues that have already been discussed with the Incident Controller, either during the visit or prior to submission, are included in the final report. This reflects the principle of openness and the need to build trust between the Performance Monitoring Teams and the IMTs.

Outcomes so far

In the three years since the program was initiated there have been 10 deployments of Performance Monitoring Teams to wildfires and another five deployments to major IMT exercises.

The information and insights gained during RTPM deployments have been used extensively by CFA and DSE in bringing about improvements in preparedness for major incident response. The reports from Performance Monitoring Teams have validated many improvement initiatives already in place. They have also been able to identify issues of concern which have not been picked up by other review processes. Review of training materials, operating procedures and checklists as well as pre-season briefings for IMT members have all been based to some degree on the insights provided by the RTPM program.

The most important aspects of the program that have made it successful have been highlighted throughout this article. In summary they are:

- No secrets.
  Everyone involved must understand the intent of the program and the Performance Monitoring Team must be very open when discussing their findings with the IMT.
- Be supportive.
  Performance Monitoring Teams

Photo courtesy DSE

Real Time Performance Monitoring Teams spend time with fire line managers to gauge the effectiveness of information flow among all levels of the IMT.

are deployed to work with people in a stressful and time-critical environment. They need to show that they can add something constructive to the process and not become a burden on the IMT.

- Team credibility.
  The officers deployed to undertake a performance monitoring visit must have the confidence of their peers. If they cannot demonstrate an understanding of the role and the challenges of the task, any observations they make are unlikely to be accepted and acted on.
- Be Realistic.
  The workload of any IMT is huge and the complexities can be extreme. Performance Monitoring Teams must not try to achieve an exhaustive review of the IMT operation. This quite simply cannot be achieved. The intent of the initial issues checklist is to provide a focus on key issues. A Performance Monitoring Team deployed to monitor any IMT will soon be overwhelmed if they try to address all aspects of the operation. They are also likely to alienate themselves from the IMT they are working with.

CFA and DSE are yet to undertake specific research on the effectiveness of the RTPM program. However, there is evidence to demonstrate that this program, in association with other initiatives in operational review, is bringing about improvements in the effectiveness of incident management at wildfires in Victoria, and consequently the safety of fire fighters responding to those fires.

Performance Monitoring Teams deployed to fires over the past three years have provided anecdotal evidence to suggest that those aspects of incident management identified in the initial issues checklist, and consequently of concern to the senior executive officers of both CFA and DSE, are being addressed by IMTs more effectively now than at the commencement of the program.

Over the past two years CFA and DSE have undertaken 'Post Season Surveys' of IMT members to gauge their views on progress in a number of areas of concern relating to incident management such as the effectiveness of briefings, and appropriateness of information flow to affected communities. These surveys also suggest that there has been a degree of improvement over the past two years.

The Victorian Coroner has been briefed twice on the RTPM program; firstly, in 2002 when it was first implemented, and again in 2005. On both occasions the Coroner indicated his support for the intent of the program and the approach taken by CFA and DSE in implementing RTPM.

Conclusion

The program is still in its early stages. There will need to be many more deployments of RTPM teams before reliable empirical evidence can be gathered to demonstrate the usefulness of this method of performance monitoring. Much of the feedback provided by Performance Monitoring Teams has been consistent with data gathered from other sources such as formal operations analysis and debrief reports. Each of these operational review tools are validating the information gathered thorough the broader operational review process.

However, a key guide to the success of the program has come from a number of the senior incident controllers in Victoria who have openly supported the program and are now expressing a desire to have RTPM teams deployed to incidents for which they are responsible. This endorsement provides great encouragement to all of those responsible for the development and implementation of this program.

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The internal organisational references quoted are available to readers on request by contacting Director of Operations/Chief Officer CFA, 8 Lakeside Drive, East Burwood, Victoria, 3144. (03 9262 8444)

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The need for private dam safety assurance: a follow-up 'model' policy from Tasmania

McKay and Pisaniello provide a follow-up policy paper on private dam safety

Abstract

Landholders in Australia have often overlooked the common law obligation to review/design dams in line with current standards because of high engineering consulting costs, complacency from believing that as the dam has not failed to now then it will never fail, and because the typical probabilities required for design floods are beyond the average farmer's comprehension. Hence, some form of regulation is needed to reduce the risk to downstream communities to generally acceptable levels. The seriousness of this problem was demonstrated by previous case studies undertaken in the 'still' policy-absent state of South Australia and the 'now' policy-driven state of Victoria.

This paper follows up the previous research by re-enforcing the need for supervision of small dams and their spillways, in addition to the larger, more hazardous dams. Tasmania provides a 'model' on how this can be achieved and its policy has been reviewed comprehensively here. The Tasmanian approach is in line with international best-practice dam safety assurance policy, and is the only state in Australia thus far to acknowledge that even small, low hazard dams need to be supervised, albeit to a modest extent.

Introduction

In Australia, a clear problem exists with private dam safety. Australia has a large number of relatively small, privately owned dams (farm dams especially) and those that have failed number in the thousands. There is an estimated 480,000 farm dams in Australia (Price et al, 2003). In 1992, The Australian National Committee on Large Dams (ANCOLD) estimated that 23 per cent of farm dams in NSW had failed (ANCOLD, 1992).

In Tasmania 445 of the 5,674 registered dams are of significant potential safety risk (Dept of Primary Industries, Water and Environment, Tasmania, 2005, p.21). In Victoria, 800 of the 170,000 farm dams are hazardous (Murley, 1987), and Lewis and Harrison (2002) reported that at least ten significant failures occurred in Victoria in the last decade. The costs of private dam failures associated with public and private infrastructure and the environment are significant, but there is no systematic means of determining this as the failures are seldom publicised and/or recorded (Ingles, 1984). An attempt to estimate these costs was made by Pisaniello (1997) based on only 37 available *recorded* dam failures* in Australia since 1857, finding that:

- of all the failures, only a privately owned dam caused loss of life (14 lives lost)†, and
- the dams 5m to 20m high (this being the typical size range of significant private dams) represent 60 per cent of all the recorded failure. Of these 50 per cent are private dams.

This provides some indication of the sort of costs associated with private dam failures in Australia and the need for policies.

One of the main concerns is that landholders tend to neglect the need for reviewing their dams and instead develop a sense of complacency, believing that as the dams have not failed up to now, then they will never fail (Webster and Wark, 1987; Pisaniello and McKay, 2005). The result is that dams are deprived of necessary maintenance and upgrading and downstream communities are placed at risk. This problem was demonstrated by recent case studies undertaken in the 'still' policy-absent state of South Australia and the 'now' policy-driven state of Victoria (Pisaniello and McKay, 2005). These case studies showed that giving more time, attention and encouragement to farmers addresses the problem to a minimal extent. Adequate assurance can only be provided through appropriate policy which requires the backing of law-makers, and effective and efficient administration of laws.

** 'failure' refers to "a lack of performance as originally intended, which has resulted in a loss of life and/or substantial costs for rectification (ie. more than AU$1,000,000) and/or damage to the environment.*

† this being the Briseis Mining dam in Tasmania in 1929.

For some time, ANCOLD has been aware of this problem and expressed concern (ANCOLD, 1972). Unfortunately, due to high levels of political ambivalence, attempts to enact dam safety Bills have not been successful in all Australian states (Pisaniello, 1997). Dam safety legislation is often considered too 'extreme' largely because of concern that it may place significant cost burdens on both Government and private dam owners to administer and conform with it respectively. However, states which fail to keep adequate registers of private dams, and establish some form of safety assurance policy on the management of potentially hazardous private dams in addition to all small dams that pose a significant cumulative risk of failure, are in effect, unconsciously devaluing the lives of people living downstream of these dams. This is compared with the lives of those living downstream of public dams to which attention has or is being given. This is especially the case in South Australia as clearly demonstrated by Pisaniello and McKay (2005). In contrast, Tasmania recently implemented policy on private dam safety which effectively deals with all the issues raised by Pisaniello and McKay (2005) as barriers to achieving effective private dam safety programs in other states. Hence, the Tasmanian approach is regarded as a 'model' policy for other states to consider, and is discussed in detail here as a follow-up to Pisaniello and McKay (2005).

The significance of the small dam safety problem in Australia

In recent times more farm dams have been built to capture water as changes to the water allocation policies in Australia have been mooted since the early 1990s (McKay, 2001). The costs of private dam failures associated to public and private infrastructure and the environment are significant, based on the limited information available, as are the failure rates. Other studies have also shown that in general dams fail more by overtopping due to inadequate spillway capacity. This failure mode represents 40 per cent of all recorded failures worldwide and embankment dams (which typify private dams) are the most susceptible representing 70 per cent of these (Pisaniello, 1997; ANCOLD, 1992; 1995).

While failures of large dams are generally more spectacular than those of smaller dams and receive much more attention, small dam failures, particularly those of privately-owned farm dams, occur far more frequently (supported by Lewis and Harrison, 2002). Therefore, in many cases, the total annual cost of small dam failures is more serious than the rare failures of large dams. Also, past events have occurred where failures of relatively small dams have caused disastrous consequences. For example, in China the Shimantan and Banquia dams failed in 1975 as a result of the cumulative failure of 60 smaller upstream dams, resulting in the death of 230,000 people (Fu and Quing, 1998). In Italy, the Stava dam near Trento failed in 1985 and while releasing only 180 ML of tailings material, it killed 268 people and caused serious environmental impact (Engels, 2005). In the United States, the Kelly Barnes Lake dam, only eight metres high, failed in 1977 killing a total of 39 people. The Lake Lawn dam in Colorado which was also eight metres high and stored only 830 ML, failed in 1982 drowning three people and causing US$31 million in damage despite warnings and evacuation (Hiser and McDonald, 1989). These past events suggest that without appropriate design, construction and maintenance, poorly managed small dams can cause significant human, property and environmental losses to the community.

This paper looks to address two main concerns with private dams in Australia in line with international experience and practice:

1. Many private dams are unsafe due to improper design, particularly flood capability design, and general lack of review and maintenance. Failure can result which can impact badly on the immediate downstream inundation zone. This concern arises because:

- most landholders hire contractors to build their dams who are typically not properly trained or skilled in the engineering design of dams,
- dam owners are generally complacent with dam surveillance, review and maintenance, and
- the typical probabilities required for design floods are beyond the average farmer's comprehension. Thus, many private dams are not built to an adequate standard. Pisaniello and McKay (2005) provide clear evidence of this.

2. The lack of safety of the small dams individually can lead to cumulative failure during medium to large floods which can produce a flood with high hazard and associated severe downstream consequences. This was demonstrated by the Shimantan and Banquia dam failures and was also found to be of concern in a flood study of the Kangaroo Creek Dam in the Torrens catchment of South Australia (LDC and SMEC, 1995). The modelling procedure adopted in the River Torrens study was reported by Kazarovski (1996). The study found that the peak inflow to Kangaroo Creek Dam would increase fourfold if all the small dams in the catchment failed at the same time (reasonable assumption for an extreme flood event), compared to the flow estimated if the dams remained intact. This meant that only the 1-in-200-years design rainfall in the Torrens catchment would produce a peak discharge similar to the Imminent Failure Flood of the Kangaroo Creek Dam should all farm dams fail. The study thus recognised the need for 'controlling the standard of construction of farm dams and their spillways'.

ANCOLD (2000b, p.10) guidelines on consequence assessment indicate that in cascade situations, the upper dam should take the hazard category for the loss of all downstream dams. This guideline interpreted strictly, and together with the findings of LCD and SMEC (1995) and Kazarovski (1996), would deem that all small dams in a catchment upstream of a large, high hazard public reservoir should also be regarded as High Hazard (due to their potential cumulative failure affect). Therefore each should individually meet the same design standard for a high hazard dam. While this area requires further research in farm dam geometry and stability when overtopped in order to assess the risk properly (Kazarovski, 1996), it has nevertheless become clear that *all* private dams in catchments of large public dams should be registered and at least controlled for spillway adequacy regardless of their size and individual hazard potential. They should be mandated to at least meet ANCOLD's minimum fall-back design criteria for Low Hazard dams (ie 1-in-100-years design flood). Tasmania is the only state so far to acknowledge that even small low hazard dams need to be supervised in such a way.

Dam safety assurance in Tasmania: a 'model' policy

Tasmania has over 30 per cent of Australia's total water storage capacity. Over the last few years there has been a large expansion of storages for irrigation underway to support the sustainable expansion of agricultural production (DPIWE, 2003). Hence, the Tasmanian Government recognised the need to tighten legislative controls in order to ensure the safety of dams in Tasmania. This was achieved by firstly making amendments to the *Water Management Act 1999* (TAS) in late 2002 and then by passing the *Water Management (Safety of Dams) Regulations 2003*, which are now in operation across the State. This policy represents best practice when compared to international standards (see Pisaniello and McKay, 1998 and Bradlow et al, 2002), particularly in terms of the sort of dams that should be prescribed under legislation and the levels of supervision and responsibility imposed upon dam owners.

The Law Reform process

The legislation has been developed in close consultation with dam experts from government agencies, Hydro Tasmania and the mining industry, and with key stakeholder groups such as Tasmanian Farmers and Graziers Association and local government. DPIWE (2003) reported that 'this has enabled the development of statutory dam safety controls that will meet Tasmania's specific needs, facilitate a self-regulatory approach and provide consistency with national guidelines.'

The legislation was introduced in line with the Tasmanian Government's policy to improve safety arrangements for the community and the environment. As a result of the thorough consultation process there was little debate in Parliament about the new regulations on dam owners. It was considered inadequate to solely rely on the non-statutory duty-of-care principles to ensure that dams were maintained in a safe condition. Further, legal advice from Crown Law had indicated that in the absence of statutory dam safety requirements, the Crown may have some liability in the event of a dam failure. The liability would be to the communities downstream and their infrastructure. The owners of the largest private dams are obliged to have an emergency plan and these have been developed successfully in consultation with the local State Emergency Services and local councils.

At the time of introducing the legislation into Parliament, the Minister pointed out that in developing the dam safety legislative framework, the Government's objective had been to achieve the appropriate balance between, on one hand, ensuring public and environmental protection and on the other, imposing restrictive and expensive requirements on dam builders and owners.

The work under the new Act has mainly been with new dams and there has been a surge in these since a 1995 moratorium on taking water from rivers in summer. Over 1000 applications for new dams have occurred in the last five years and some of the new sites are more challenging. There have also been examples of farmers sharing a larger dam.

Description of the dam safety legislation

The legislation provides for specific safety measures to be required for the design, construction and operation of all dams that hold one or more mega litres of water or waste, based on their hazard potential to the community (see s165A of the *Water Management Act 1999* and Part 2 of the *Water Management (Safety of Dams) Regulations 2003)*.

Essentially, under the Act all proposed new dams must obtain a permit (Part 8) and all existing dams have to be registered (Part 8A). The Act is administered by the Department of Primary Industries, Water and Environment (DPIWE), and an Assessment Committee constituted under the Act (see s138). The main role of the Assessment Committee is to assess all new dam permit applications. The Committee must consist of six members appointed by the Minister and nominated by various organisations in order to ensure a collective expertise in areas such as water resources, dams engineering and safety, integrated natural resource management and best practice environmental management (see s139). The ongoing safety of existing dams is supervised by the Minister and the Minister's delegates (primarily officers of the Department).

Section 165G of the Act expressly imposes a duty on all dam owners to, so far as is reasonably practicable, maintain and operate their dams so as not to cause, or be likely to cause, material environmental harm or serious environmental harm or danger to any person or property. Part 8A of the Act gives wide powers to the Minister to supervise and ensure the safety of all registered dams and that owners are not in breach of their duty. As part of this role, the Minister has specific functions under the Act (s165C) which include:

- maintaining a register of all dams,
- ensuring all dams comply with requisite standards of design, construction, maintenance and review as specified under the Regulations, and
- obtaining information and keeping records on matters relating to the safety of dams.

Dam owners can be obligated to provide information on their dams either as a condition of a permit under s157 of the Act or from a direct order from the Minister under various other sections relating mainly to ongoing surveillance and maintenance (eg ss 165F(2), 165H, 165J, 165L, 165M or 165N). The information must be provided by a person of requisite competence as prescribed under the Regulations 2003.

The Regulations 2003 for the most part provide prescribed standards for the competency of persons undertaking design, construction, maintenance and surveillance of dams, based on their hazard categories. The competencies of such persons are classified as either 'any person', 'the owner', persons of either 'Class A', 'Class B' or 'Class C' competence, or an 'Expert Team'. Definitions of these classes of persons in Section 6 of the Regulations include:

- Class A – an engineer with relevant experience in the investigation, design, construction, and day-to-day safety management of dams of a height, type and hazard category similar to the relevant dam. Note: 'engineer' is defined as a person eligible for membership of Engineers Australia, as a chartered professional engineer (Regulations, s3).
- Class B – an engineer with relevant experience in dam technology appropriate to the relevant dam.
- Class C – a professional technical specialist with relevant tertiary qualifications and relevant specialist experience in the investigation, design, construction or day-to-day safety management of dams of a height, type and hazard category similar to the relevant dam.
- An Expert Team – at least one of the persons has Class B competence, and the persons collectively have a knowledge and understanding of the causes and modes of dam failure and also have professional expertise in the following areas in so far as they relate to the relevant dam and activity: engineering surveying, hydrology, hydraulics, engineering geology, soil and rock mechanics, properties of materials, dam design, structural and mechanical design.

Section 7 of the Regulations then provides for varying 'required competency standards' criteria based on the height of the dam, hazard category of the dam, and the type of activity/information to be undertaken/provided. An example of these criteria is provided in Table 1, which is applicable to dams up to 10 meters in height. Other similar criteria are also provided in Section 7 of the Regulations for dams between 10m and 25m high, and for those greater than 25m high. Section 9(1) of the Regulations requires that Hazard categories be assessed in accordance with national guidelines published by ANCOLD (eg ANCOLD 2000a and 2000b). Similarly, all standards of design and safety management must comply with ANCOLD guidelines. These include spillway design standards (ANCOLD 2000a), the frequency and thoroughness of surveillance and review (ANCOLD, 2003) and any requirements for Emergency Action Plans (ANCOLD, 2003).

It is clear from Table 1 and s7 of the Regulations that the legislation in Tasmania encompasses all dams, large and small, low and greater hazard and clearly sets out the level of ongoing safety surveillance. DPIWE (2003) indicates that the owners of significant to high hazard dams are required to arrange safety inspections and reports by an experienced dam engineer after the initial filling of the reservoir and generally every five years during the life of the dam – for typical higher hazard irrigation dams in this category these reports can be expected to cost around $2 000. At the same time, in order to avoid placing significant cost burdens on owners of smaller, less hazardous dams, these do not require full engineering reports. These reports may be prepared by the owner by completing a pro-forma supplied by the Department (DPIWE, 2003). Perhaps, a cost-effective spillway design/review mechanism such as that reported in Pisaniello and McKay (2005), if developed in Tasmania, would well complement this pro-forma process.

Regional Water Management Officers employed by the Department make the initial assessment of a dam's hazard when they do a field inspection of the proposed dam development. This is then checked internally by the Department and if there is any doubt then a conservative approach is taken and/or the proponent is required to have the matter formally reviewed by an engineer. A dam's hazard potential will then determine the Department's mandates as to the frequency of surveillance inspections, reports, safety reviews, and emergency action plans in line mainly with ANCOLD's Guidelines on Dam Safety Management (2003).

There is no fee for registering dams. The policy looks to have all existing dams registered and any new dams are registered when they are granted a permit with the permit application fee covering this cost. Fees for

Table 1. Required competency standards under Tasmanian legislation for all dams up to 10m in height (Source: Water Management (Safety of Dams) Regulations 2003, Section 7)

Activity	ANCOLD Hazard Category*						
	Very Low	Low	Significant	High C	High B	High A	Extreme
1. Supervision of construction	Owner	Class A	Class A	Class A	Expert Team	Expert Team	Expert Team
2(a) Pre-construction investigation, design and report, other than spillway design	Owner	Owner	Class A and Class C	Class A and Class C	Expert Team	Expert Team	Expert Team
2(b) Spillway design	Owner	Class A	Class A and Class C	Class A and Class C	Expert Team	Expert Team	Expert Team
3. Design plans and specifications	Any person	Any person	Class A	Class A	Expert Team	Expert Team	Expert Team
4. Work-as-executed (WAE) report	Any person	(a) Class A, if the dam is more than 7m high; or (b) Owner, if the dam is not more than 7m high.	Class A	Class A	Expert Team	Expert Team	Expert Team
5. Comprehensive or intermediate surveillance inspections and reports	Any person	Owner	Class B	Class B	Expert Team	Expert Team	Expert Team
6. Safety reviews	Any person	Class B	Class B and Class C	Class B and Class C	Expert Team	Expert Team	Expert Team
7. Design and supervision of decommissioning	Any person	(a) Class B, if the dam is more than 7m high; or (b) Owner, if the dam is not more than 7m high	Class B	Class B	Class B	Class B	Class B

*ANCOLD (2000a and 2000b) provides further details on these hazard classifications.

permits are set by the Water Management Regulations 1999 (fees were last updated in October 2005). Current fees are 381 fee units plus –

(a) 54 fee units for each hour spent in processing the application (excluding the first 7 hours);

(b) 214 fee units where the application requires a notice under section 149 of the Act- most dam permits require advertising so this is the advertising cost; and

(c) 421 fee units where the assessment is made by the Assessment Committee- applications for smaller, straightforward dams can be assessed by the Department under delegation from the Assessment Committee. Applications which fall outside this delegation limit incur an extra charge to cover the costs of the Assessment Committee.

The Regulations, s13(1) also require that dam owners pay a fee to the Crown for assessing design, construction, maintenance, surveillance or decommissioning reports in respect of one or more dams as follows:

(a) 25 fee units for the first dam, and

(b) 20 fee units for each 0.5 hours spent in assessing the report – but not exceeding a total of 250 fee units.

Fee units are currently worth $1.17. This provides an innovative and equitable user-pays type method for subsidising the dam safety assurance policy in Tasmania.

Monetary penalties are provided for under the Act and attach to any person failing to comply with any provisions of the Act or orders made under the Act. For example, a maximum fine of 100 penalty units applies to any person failing to provide information to the Minister on the safety of their dam under s165H, and a maximum fine of 200 penalty units and a daily fine not exceeding 20 penalty units (for each day during which the offence continues) attaches to any person failing to comply with a maintenance order under s165L. Body corporates attract fines 2.5 times these levels. Penalty units are currently worth $100.

Finally, the Department provides for substantial owner education and guidance through the publication of website information and articles in Departmental and other publications.

How the policy is currently progressing

DPIWE (2005) reports that implementation of dam safety legislation and regulations following amendment to the Act in 2002 now ensures that best practice safety procedures are followed in the construction, maintenance and surveillance of dams in Tasmania. There are currently 5 674 registered dams in Tasmania, and 445, ie 7.8 per cent of these are sufficiently hazardous to require ongoing statutory safety surveillance and reporting. All of these dams have been placed on a 'prescribed dams' register within the DPIWE dams database. Of these prescribed dams, 60 are High Hazard dams, 268 are Significant Hazard dams, and 117 are Low Hazard dams, greater than 10m high. Around one third of these prescribed dams are owned by organisations such as Hydro Tasmania, mining and other companies, and municipal water authorities who were voluntarily implementing a surveillance and reporting program prior to the 2002 legislative requirements. Hence the remaining two thirds of the prescribed dams are privately owned. Since the introduction of the Regulations 2003, DPIWE (2005) reports that 218 notices have been sent requiring dam owners to undertake a dam safety surveillance inspection. To date, around 70 surveillance reports have been received by DPIWE and either accepted or notices for further information sent.

Conclusion

There is a clear need in areas where hazardous private dams exist to ensure that owners review and maintain their dams in line with current acceptable practice and take appropriate remedial action where necessary. Adequate assurance can only be provided through the implementation of appropriate policy which requires the backing of legislation. The policy must also be extensive enough to ensure that all potentially hazardous dams are supervised. This usually means that adequate funding must be made available for complete administration of the policy, and for an adequate register of all dams to be maintained. This may require some user pays. The experience of Tasmania demonstrates that dam safety programs are workable and not too costly. Elements of best practice can and do exist successfully to control the safety management of private dams and in turn provide increased dam safety assurance to the public and promote the ideals of reducing loss of life as well as environmental and economic losses.

The Tasmanian approach is in line with international best-practice dam safety assurance policy, and is the only state in Australia thus far to acknowledge that even small, low hazard dams need to be supervised, albeit to a modest extent. Most small dams individually pose only a minimal hazard, but when considered cumulatively in a catchment above, say, a large hazardous public dam, they can pose significant risk to premature breach of the public dam, and in turn, extremely serious consequences further downstream. Maintaining an adequate register of all dams, large or small, high or lower hazard, ensures that not only the larger potentially hazardous dams are kept safe, but also the cumulative failure risks posed by small dams are kept in check.

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Climate variability in the land of fire and flooding rain

Kiem, Franks and Verdon examine the relationship between multi-temporal climate variability and the risk of floods and bushfires

Abstract

Traditionally, the chance of climate related emergencies (e.g. floods, bushfires) occurring has been considered the same from one year to the next. However, recent research has highlighted the fact that this is definitely not the case. Analysis has revealed strong relationships between the El Niño/Southern Oscillation (ENSO) and the occurrence of climate related emergencies, especially in eastern Australia. In addition, climatological studies have also revealed multi-decadal epochs of distinct climate states across eastern Australia. Within these multi-decadal epochs significant variability exists in the magnitude and frequency of ENSO impacts resulting in elevated (or reduced depending on the climate state) risk of extreme events such as floods, bushfires and droughts. Given that ENSO events can now be detected several months prior to their peak impact period, the opportunity exists to use climate variability insights to more accurately predict the chance of climate related emergencies occurring in the forthcoming season or year. Understanding of climate mechanisms that deliver high risk periods allows optimisation of emergency responses and effective management and mitigation of the disasters that occur as a result of the naturally occurring climate extremes for which Australia is renowned.

Introduction

It is well known that Australia displays marked climate variability ranging from long and destructive droughts to sudden and pervading flooding, interspersed with severe life and property threatening bushfires. Therefore, in order to minimise the impacts on the social and economic security and well-being of Australians, the quantification and understanding of climatological and hydrological variability is of considerable importance for properly estimating the risk of climate related emergencies (e.g. floods, bushfires) occurring in an upcoming season or year. At present, risk estimation methods are largely empirical in that observed histories of climate extremes are analysed under the assumption that the chance of an extreme event occurring is the same from one year to the next (Franks and Kuczera, 2002). Traditionally, physical climatological mechanisms that actually deliver climate extremes have not been taken into account.

Despite the development of rigorous frameworks to assess the uncertainty of risk estimates, these techniques have not previously acknowledged the possibility of distinct periods of elevated or reduced risk. However, recent research has highlighted the existence of multi-decadal epochs of enhanced/reduced flood risk across NSW (Franks, 2002a, b; Franks and Kuczera, 2002; Kiem et al., 2003). In particular, Franks and Kuczera (2002) demonstrated that a major shift in flood frequency (from low to high) occurred around 1945. Previous authors have noted that the mid-1940's also corresponded to a change in both sea surface temperature anomalies as well as atmospheric circulation patterns (Allan et al., 1995), suggesting large-scale ocean-atmospheric circulation patterns are linked to the Australian climate.

In addition to hydrological observations of changing climate risk, climatological insights into the mechanisms of climate variability point to the invalidity of purely empirical approaches to risk estimation. Indeed, numerous previous studies have shown that strong relationships exist between rainfall and streamflow and the global-scale ocean-atmospheric circulation process known as the El Niño/Southern Oscillation (ENSO). ENSO refers to the anomalous warming (El Niño) and cooling (La Niña) that periodically occurs in the central and eastern tropical Pacific Ocean as a result of the Southern Oscillation. For a comprehensive description of ENSO and a review of research into its causes and effects refer to Philander (1990) or Diaz and Markgraf (2000).

In terms of eastern Australian climate, the warm El Niño events are associated with below average rainfall and higher than average temperatures and evaporation, whereas the cool La Niña events typically deliver enhanced rainfall totals and cooler than normal conditions (e.g. Allan, 1988; Nicholls et al., 1996; Power et al., 1999; Verdon et al. 2004b). It is well known that

the Australian climate varies markedly from year to year and these studies demonstrate that this variability is strongly related to ENSO, especially in eastern Australia. Kiem et al. (2003) demonstrate that year-to-year flood (and drought) risk also varies significantly and that this variability is also closely related to ENSO (Figure 1).

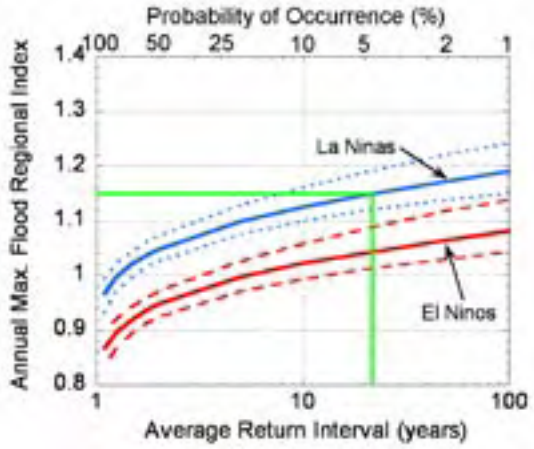
The other major climate related emergency affecting Australia is bushfires. The weather variables that generally increase the risk of bushfires are low precipitation and relative humidity combined with high temperature and wind speed. Since the high variability of rainfall and temperature in eastern Australia is strongly associated with the regional influences of ENSO (e.g. Allan, 1988; Nicholls et al., 1996; Power et al., 1999), it follows, and is demonstrated by Verdon et al. (2004a), that the ENSO also has a significant influence on eastern Australian bushfire risk (Figure 2).

Relationship between ENSO and climate related emergencies in eastern Australia

To illustrate the relationship between floods in eastern Australia and individual El Niño and La Niña events, Figure 1 shows the historic flood frequency curves associated with both El Niño and La Niña extremes. The annual maximum regional flood index (RI) shows the ratio of each annual maximum flood to the long-term mean annual maximum flood averaged across the NSW study region (Franks, 2002b). Therefore an RI greater than one indicates a maximum flood event that is worse than the historical average.

Figure 1 clearly shows that the Probability of Occurrence (PO), which is equal to the inverse of the Average Return Interval (ARI), for an annual maximum flood during a La Niña year is much higher than the PO for a flood of the same magnitude in El Niño events. For example, the PO for an annual maximum flood with RI equal to 1.0 (i.e. the average annual maximum flood) is approximately 17 per cent (ARI between five and six years) if it is an El Niño year compared with greater than 76 per cent if it is La Niña (ARI approximately 1.3 years). This implies that nearly all La Niña events will be associated with an above average annual maximum flood event. Also strikingly apparent from Figure 1 (illustrated by the green lines) is the inadequacy of the traditional '1 in 100 year flood' estimate. If the risk of flooding is assumed to be the same from year to year (i.e. the traditional and current assumption) then the chance of flood occurring during La Niña events is severely underestimated—with the PO for annual maximum flooding equivalent to the traditionally estimated '1 in 100 year flood' more than four times greater than traditionally estimated during La Niña events (ARI of 100 compared with ARI of ~23 years for the equivalent flood during La Niña years).

Figure 1. Regional flood frequency curves under El Niño (red) and La Niña (blue) conditions.



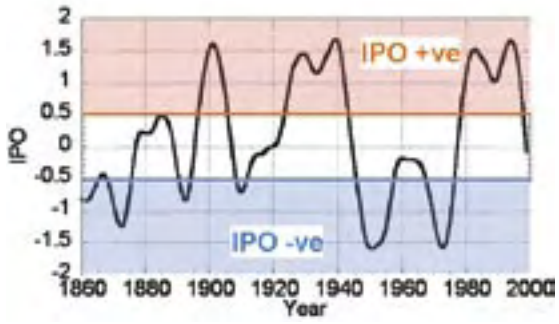
Dashed lines indicate 90 per cent confidence intervals. Horizontal green line indicates the magnitude of the '1 in 100 year flood' calculated using ALL years (i.e. under the traditional assumption that flood risk is the same from year to year). Vertical green line indicates that the probability (~4.3%) of the '1 in 100 year flood' occurring during a La Niña event is more than four times greater than traditionally estimated (see Kiem et al. (2003) for further details).

To illustrate the role of El Niño events in elevating bushfire risk, and the potential for predicting future high fire danger seasons, Figure 2 shows the percentage increase in the number of days with high (or greater than high) bushfire risk when El Niño years are compared to non-El Niño years. Daily bushfire risk is based on the Forest Fire Danger Index (FFDI; McArthur, 1967), with FFDI greater than 12 indicating a high (or greater than high) bushfire risk (Verdon et al.. 2004a). As can be seen, every station shows increases in bushfire risk with the south-east of NSW particularly elevated. This is significant given the devastating bushfires that occurred in this area in the summer of 2002/2003 and the fact that this period was also associated with El Niño conditions. While this does not mean that every El Niño will be associated with bushfires similar to those experienced in 2002/2003 (or vice versa), Figure 2 does suggest that the risk of bushfires occurring is significantly increased during El Niño events.

The results presented in Figures 1 and 2 clearly demonstrate that ENSO processes (El Niño and La Niña events) play a major role in determining flood and bushfire risk in eastern Australia. The fact that individual ENSO events can be detected at least six months prior to their consequent peak impact periods means that significant insight can be gained into the

Figure 2. Percentage increases in NSW bushfire risk under El Niño conditions compared to non-El Niño conditions.

Figure 3. Inter-decadal Pacific Oscillation index (1860-2000) – data supplied by the UK Meteorological Office.



forthcoming season or year. This enables adaptive management decisions to be made and damage minimisation procedures to be put in place before the period of elevated flood or bushfire risk. Such climate risk management strategies, based on insights gained through extensive research into ENSO and other climate processes, are now routinely applied in various domains (e.g. agriculture) in Australia and many other regions (see Meinke et al. (2005) for a useful overview).

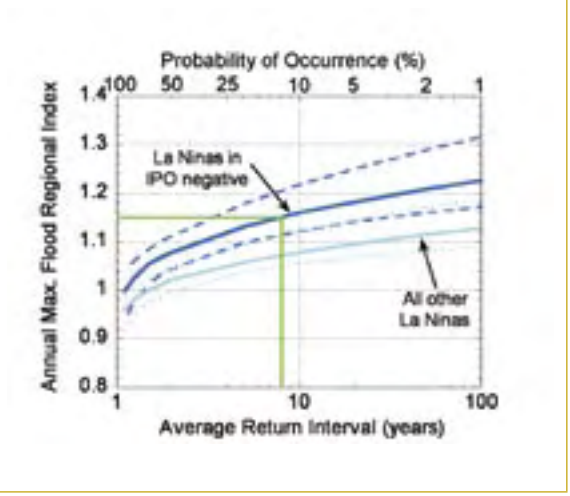
Multi-decadal variability of climate impacts in Eastern Australia

Recent climatological studies have also revealed multi-decadal variability in the modulation of the magnitude and frequency of ENSO impacts (Power et al., 1999; Kiem et al., 2003). In particular, Power et al. (1999) investigated marked temporal changes in ENSO correlations to Australian climate (i.e. rainfall and temperature) records. The temporal stratification of the climate sequences was achieved according to what has been termed the Inter-decadal Pacific Oscillation (IPO). The IPO is defined by low frequency (15 to 30 years) anomalous warming and cooling of Pacific-wide sea surface temperatures (Power et al., 1999; Folland et al., 1999; Allan, 2000), and is similar to the Pacific Decadal Oscillation (PDO; Mantua et al., 1997; Franks, 2002a). Power et al. (1999) showed how ENSO correlations with Australian rainfall and temperature changed with the observed changes in persistent large-scale Pacific Ocean sea surface temperature anomalies. Importantly, Power et al. (1999) and Verdon et al. (2004b) demonstrated that individual ENSO events (i.e. El Niño, La Niña) have stronger impact across Australia during the negative phase of the IPO, implying that there exists a multi-decadal modulation of the magnitude of ENSO impacts. Figure 3 shows the IPO index over the period 1860 to 1999.

Following Power et al. (1999) and Verdon et al. (2004b), Figure 3 indicates that persistent periods of enhanced ENSO impacts may exist at decadal and longer timescales, though it should be noted that part of this persistence is due to the smoothing algorithm chosen to produce the IPO index (see Power et al. (1999) for details). Anecdotal evidence also supports the idea of 'changes in climate' occurring during the mid 1940's and again in the mid-1970's over eastern Australia. To test the idea that El Niño and La Niña induced variability is enhanced under the IPO negative states, regional flood (Figure 4) and bushfire risk (Figure 5) data were stratified according to both the IPO and ENSO indices (Kiem et al., 2003; Verdon, et al. 2004a).

Figure 4 shows regional flood frequency curves for La Niña events under IPO negative and IPO non-negative conditions. It can be clearly seen that the PO for an annual maximum flood in an IPO negative La Niña event is even higher than the PO for a flood of the same magnitude in non-IPO negative La Niña events. As mentioned previously nearly all La Niña events are associated with above average annual maximum floods implying that flood risk in IPO negative La Niña events is *extremely* high. The PO for an annual maximum flood with RI equal to 1.1 (i.e. 10 per cent greater than the average annual maximum flood) is approximately four per cent (ARI ~25 years) during non-negative IPO La Niña compared with greater than 33 per vent during IPO negative La Niña. During El Niño events the PO for an annual maximum flood with RI equal to 1.1 is less than 0.3 per cent. Figure 4 further illustrates the inadequacy of the traditional '1 in 100 year flood' estimate. The PO for annual maximum flooding equivalent to the traditionally estimated '1 in 100 year flood' (illustrated by the horizontal green line) is more than twelve times greater than traditionally estimated during IPO negative La Niña events (ARI of 100 compared with ARI of ~8 years for the equivalent flood during IPO negative La Niña years) implying a significant underestimation of risk.

Figure 4. Regional flood frequency curves for La Nina events under IPO negative (dark blue) and IPO non-negative (light blue) conditions.



Dashed lines indicate 90 per cent confidence intervals. Horizontal green line indicates the magnitude of the '1 in 100 year flood' calculated using ALL years (i.e. under the traditional assumption that flood risk is the same from year to year). Vertical green line indicates that the probability (~12.5%) of the '1 in 100 year flood' occurring during a La Niña event is more than twelve times greater than traditionally estimated (see Kiem et al. (2003) for further details).

These results support the notion that the IPO enhances ENSO impacts. Importantly for flood management, it has been shown that in addition to modulating the magnitude of ENSO impacts there also tends to be a higher frequency of La Niña events during the IPO negative phase (Kiem et al., 2003). Therefore, contrary to the traditional assumption that flood risk is the same from one year to the next the results summarised here indicate that La Niña years are associated with enhanced flood risk (Figure 1) and that this risk is further elevated when the IPO is negative (Figure 4). Compounding the impact of the enhanced IPO negative La Niña type floods is the fact that La Niña events are much more likely to occur during the decadal/multi-decadal periods when the IPO is negative. This is supported by historical observation data where multi-year periods are associated with clusters of high magnitude floods (e.g. 1950s) for many regions of eastern Australia. Such non-stationarity of flood risk is statistically anomalous under traditional assumptions and therefore is not adequately accounted for in current flood risk management strategies. Nor are the links between climate variability and flooding currently used to predict and prepare for periods when emergency flood events are likely to occur despite the fact that such concepts are now routinely used to manage climate risk in agriculture and other domains (see Meinke et al. (2005) for an overview).

Figure 5 shows the percentage increase in bushfire risk when IPO negative El Niño events are compared with all other El Niño years. In comparison to Figure 3 (where all El Niño events were compared with non-El Niño events and it was shown that bushfire risk is elevated during El Niño events) it can be seen that IPO negative El Niño events are associated with an even greater risk of bushfire than the non-IPO negative El Niño events. This supports the notion that the magnitude of ENSO impacts is enhanced during periods when the IPO is negative and implying that bushfire risk is extremely high during IPO negative El Niño events when compared to all other years.

Figure 5. Percentage increases in NSW bushfire risk for El Niño events under IPO negative conditions compared to El Niño events occurring in non-negative IPO phases (see Verdon et al. (2004a) for further details).

Implications for emergency management

In this paper, the relationship between multi-temporal climate variability (e.g. ENSO and IPO) and the risk of floods and bushfires across NSW has been demonstrated. These results also confirm the observation that IPO negative conditions tend to be associated with enhanced impacts of individual ENSO events (Power et al., 1999; Verdon et al., 2004b) and increased frequency of La Niña events (Kiem et al., 2003), resulting in the risk of climate related emergencies occurring being distinctly non-stationary. This is at odds with current assumptions that each year is associated with the same risk of flood or bushfire. Accordingly, there are a number of implications for optimal management of emergency services.

Year to year variability of extreme climate impacts is marked in eastern Australia and is primarily the result of individual ENSO events. While individual flood and bushfire events are impossible to predict the good news is that simple detection methodologies based on indices of ENSO activity provide at least six months lead time

prior to the annual period of peak ENSO impacts (i.e. the time when bushfires and floods are most likely), usually September to April for eastern Australia (e.g. Stone et al., 1996). Furthermore, understanding of other non-ENSO processes, such as the IPO, that alter the magnitude and frequency of ENSO impacts (e.g. Power et al., 1999; Kiem et al., 2003; Verdon et al., 2004a, 2004b), has the potential to greatly improve our ability to forecast climate anomalies, and therefore high risk periods with respect to flood and bushfires. However, whether or not low frequency oscillations like the IPO (and other non-ENSO processes) can be measured in real time, or forecast months in advance, to enable improved seasonal and annual forecasts is the subject of current research. In any case, it is currently possible to use at least the ENSO related insights presented in this study to more accurately determine the chance of climate related emergencies occurring in the forthcoming season or year. The lead time provided via insights into climate processes enables adaptive planning for emergency management services in anticipation of elevated climate risk periods—a concept that is already routinely being applied to manage climate risk in other domains (e.g. agriculture).

Floods and bushfires are, and always will be, part of the Australian climate and it is impossible to prevent these natural disasters from occurring. Therefore, adequate understanding of the mechanisms that cause enhanced risk periods, and the recognition that enhanced risk periods exist but are predictable, is essential to effectively manage and minimise the damage associated with floods and bushfires when they do occur.

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Dealing with the Tsunami dead: unprecedented international co-operation

Joseph Scanlon reports on the first major research into cross-cultural handling of the deceased after mass death incidents

Introduction

After a mass death incident, recovery and identification of the dead is normally done by the country where the incident occurs. It may ask assistance in gathering information to help identify the dead and with next of kin but it will handle everything else itself.

However, after the first Bali bombings, Australia negotiated a two country co-operative agreement that set the stage for an unprecedented multi-national response to the December 2004 Indian Ocean tsunami. That response solidified the world mass death network and may lead to more detailed protocols for future similar situations. Nevertheless, in the early stages the response to the tsunami matched what has happened in other widespread destructive incidents.

In the past, there have been two distinct patterns of initial response to mass death situations.

If the event occurs at a specific controllable location the bodies are marked and photographed in place before being carefully removed by emergency personnel in line with guidelines of the International Criminal Police Organization (Interpol). Those guidelines state:

Total site security is essential… It may be necessary to fence the site or otherwise clearly demarcate it, and there will be a need for round the clock uniformed guards… All property, wreckage, bodies, etc. must remain in situ if at all possible (Interpol, 1997).

This happened after terrorist attacks on London transport, after the attack on the Murrah building in Oklahoma City, and in Gander, Newfoundland after soldiers from the 101st Airborne were killed in an air crash (Emergency Communications Research Unit, 1985).

In contrast, if the deceased are spread over a wide area these guidelines will not be followed. Instead, the bodies will be picked up by survivors and others and taken to public buildings and places of worship. This happened in Halifax, Nova Scotia after the 1917 munitions ship explosion, in Rapid City, South Dakota after the 1972 flood, in Darwin in 1974 after *Cyclone Tracy*, and in Kobe after the 1995 earthquake (Scanlon, 1998; Hershiser, 1974, Scanlon, 1979; Nishimura, 1997).

There have been two exceptions to these patterns.

Occasionally, because most or all the deceased were foreign nationals, their country was allowed to remove the bodies. After a collision between a Pan American and a KLM aircraft at Tenerife, Spanish authorities allowed the Americans and Dutch to take the bodies to the USA and the Netherlands (Brannon and Morlang, 2001). After the ferry *Scandinavian Star* was towed into the Swedish port, Lysekil, the burned bodies were taken to Oslo.

The other exception involves Israel. Under Hebraic law, a woman is not a widow unless a rabbinic court rules her husband has died. Thus Israelis will go to extraordinary lengths to identify a body. After an air crash in Sudan, an Israeli police forensic pathologist hired trackers and found and identified the bones of the Israeli pilot.

Bali difference

Bali was different because the response was not solely from the country where the incident occurred. Because so many Australians were involved, the Australian Federal Police (AFP) responded immediately and, after lengthy discussion, it was agreed they would be the lead agency in support of Indonesian police in identifying the dead and investigating the bombings. Korea, Japan, the Netherlands, Sweden, and New Zealand assisted with the dead. Britain and the United States assisted with the investigation. But everything was done under a two-country agreement between Indonesia and Australia.

The two-country agreement specified that Disaster Victim Identification (DVI) work would be done on all the deceased. While the 'D' stands for 'Disaster' DVI specialists deal with all types of death. It also specified that bodies would not be released until

Indonesian authorities approved. These two points set the stage for the tsunami.

When the tsunami struck Thailand, there was a response from every continent but Antarctica. There were diplomats from embassies in Thailand and foreign ministries around the world as well as police scene crime officers, investigators, fingerprint specialists, DVI officers, pathologists, odontologists (forensic dentists), forensic anthropologists, civilians from ZAKA (which looks after Israeli suicide bombings), and IT specialists including military personnel.

Before most foreigners arrived, as had happened after other widespread destructive incidents, survivors were collecting bodies and taking them to Buddhist temples laying them on the ground in temple courtyards. A few went to a hospital morgue. There were no records of who they were or where they came from.

Thai personnel attached a tag to each body, photographed it showing the number and posted those photos on bulletin boards and web sites. If the body was 'recognised' by someone, they could take that body. Since visual identification is unreliable and since some of those bodies were cremated it will never be known if those identifications were accurate. Other bodies were repatriated overseas with several countries – including Australia – checking them on arrival to ensure correct identification.

After discussions between Thai authorities and the foreigners assisting, it was agreed bodies would be processed at four sites known as 1A and B, 2 and 3, each managed by a different foreign country. Site 1A was the responsibility of Australia (assisted by New Zealand); Site 1B was the Nordic countries (Norway, Sweden, Denmark and Finland); Site 2 was Germany and Austria; and Site 3 was Israel. International personal worked with Thais to identify bodies using three criteria as the basis for identification. These were fingerprints, dental records and DNA. Anything else would be corroborating evidence and the working language would be English.

Information Management Centre

The identification process, while varied in order, included some basic steps. The process became that a body would be brought from refrigerated containers by Thai soldiers and x-rayed. Police officers would examine clothing and jewellery. Clothing would be removed and anything visible noted like tattoos and birth marks. Next the body went to pathologists and an odontologist where teeth were extracted for DNA. The body would be cleaned and returned to the body bag. A scribe recorded the data and took it to the Thai Tsunami Victim Identification – Information Management Centre (TTVI-IMC).

In order to identify a body two things must be done. Information acquired from the body after death – known as Post Mortem (PM) data – must be matched with information acquired while the person was alive – known as Ante Mortem (AM) data. PM data consists of fingerprints and dental records and other information taken from the body. AM data consists of things like fingerprints obtained from something the person has handled while still alive, dental records acquired from the person's dentist and/or DNA obtained from a blood sample or perhaps from something the person had used, such as a toothbrush.

In Thailand the PM data and the AM data were entered into two data bases—the Automated Fingerprint Identification System (AFIS) and DVI System International. AFIS helped match fingerprints. The system used in Thailand was SAGEM Morpho, a French system owned by the AFP. The Australian airline, Qantas, flew in a computer server and four work stations to assist in the compilation of information. The Australian contingent wanted to enter only PM data into this system until they had a good base but pressure for results forced them to also enter AM data as it became available. DVI System International, developed by the Danish firm, Plass data, working with the Danish police, helped match everything but fingerprints.

Although both systems generate possible matches between AM and PM data only a fingerprint expert or odontologist could confirm identification. When they did, a report was presented to a senior committee headed by a general from the Thai police. If that committee approved, the body was released.

There were problems using AFIS. Different countries used different methods of obtaining fingerprints and prints taken from the second layer of skin are less clear and smaller. There were problems with DVI System International because not everyone charts the same way and because 'no information' might mean a missing tooth or a tooth had never been worked on. There were also problems with numbering as people from different countries write numbers differently and handwriting can be illegible.

New Zealand, already working with Thai health officials, offered to process the DNA but China offered to do it without charge. The initial results were disappointing and questions were raised about the Chinese laboratory. However other laboratories also had difficulty as the bone samples were too small and had deteriorated. It was also a mistake to use teeth rather than bones from the femur or a rib. Months later, both the Chinese and another laboratory began to get good results. However, most early identifications came from fingerprints or dental records not DNA.

Thai personnel initially tried to sort bodies by Thai and non-Thai classification. However, those considered non-Thai were mainly Caucasian and the 'Thai' included many Asians. Singapore and Japan raised objections – as did Australia – arguing appearance and nationality were not significant identifiers. It was then agreed all bodies would be processed regardless of racial appearance.

Initially, working conditions in Thailand were intolerable with work being carried out in the open, often on the ground and with onlookers and media watching. There was 100 per cent humidity and up to 40 degrees Celsius in temperature. Gradually, the working areas were enclosed and electricians could supply air conditioning. Watching television, staff at a Norwegian company, Normeca, decided they could improve conditions and, with Norwegian government support, agreement from Thai Red Cross and assistance from Thai tradesmen, Normeca assembled a state-of-the-art morgue with air conditioning and running water.

The Thai people believe the spirit remains in the body and becomes restless if it is moved, however it is all right if the body is moved to a holy place. Normeca arranged for Buddhist monks to bless the new facility. Normeca also arranged for European and Thai meals to be provided for workers.

Other difficulties

There were still problems.

Thailand is a federal country and the dead were in three different provinces. Arrangements had to be made for those provinces to approve any identification of a body from that province. This proved difficult when one province had a dispute with the federal government.

There were disagreements among the Europeans about the proper way to deal with a body. Arguments ensued because different people were doing different things in different ways. This led to the Scientific Advisory Group (SAG) being formed. The SAG established that fingerprints should be taken using powder and sticky paper rather than ink, and DNA be obtained from a femur or rib. While coming to an agreement proved easy, enforcing it was more difficult. Newcomers maintained their own way of doing things and those running a site resisted what they regarded was interference. Some countries tried to bypass the system by taking a second DNA sample which they sent to their own laboratory and withheld the PM forms hoping for a match. They used AFIS to do 'cherry picking' searching for matches for their own missing persons. The management team refused to release any body not identified through the agreed process.

The major problem was AM data

After a plane crash there is usually a reasonably accurate list of passengers. Police can begin to collect AM data and the process of identification can begin. This was not the case after the tsunami. Thousands of phone calls to foreign ministries had to be reviewed and checked until a list was developed. Only then could police arrange for an individual's dental records or go to their home or school to look for fingerprints or DNA.

Getting the list accurate was difficult due to a number of problems. There were thousands of persons reported missing with many names duplicated. They had been reported missing by more than one person or reports were received from overseas and at home and they were reported by phone and email. In addition, so many people lost everything including mobile (cell) phones and it took time for them to contact family and friends.

Even after the lists became reasonably accurate, collecting AM data proved easier in some countries. Most Israelis serve

The collection of bodies for indentification should include a record of where the body came from.

in the military which collects and maintains dental records, fingerprints, x-rays and blood types. As soon as the Israeli foreign ministry had a list of those missing, the military provided the police with their records. When PM data became available, it was easy to match it with AM data. Sweden also had an advantage because for 30 years Sweden has taken blood from the heel of a new-born infant. The government made that data bank available to police.

Other counties had difficulties. There were so many people missing and police assigned to collect data AM were inexperienced. Sometimes they had to be sent back several times before they found a fingerprint from a diary or behind a shelf. Some became more imaginative with one Swedish officer getting prints of a child who had been at a pre-school centre and had done finger painting. Others realized children were shorter than adults and so leave their fingerprints lower down the walls and on toys and tricycles. While most dental records in Scandinavia were of good quality, in other countries dentists chart only their own work. They don't do a chart that shows what was done before someone was their patient.

But the biggest problem was DNA. There are three kinds of DNA – reference, surrogate and familial. Reference DNA is obtained from a person's own blood (which made the Swedish blood bank records so valuable). Surrogate DNA comes from something the person has used, like a toothbrush or comb while familial DNA comes from relatives, ideally parents.

Since many of the dead included father and daughter, mother and son, or both parents and children, it was difficult to know who had used the toothbrush and familial DNA was not readily available. In addition, sometimes the father was not the parent. This added to the problems of obtaining useful PM bone samples and it is easy to understand why little early identification was from DNA.

Because some countries were not efficient or perhaps not committed to obtaining AM data their nationals remained unidentified. That was the case for Thais. When it became apparent that few Thais were being identified, more AM data was collected in Thailand. As time passed, bodies were moved to the new morgue and various countries including Norway and Denmark took over the leadership. But the lack of AM data and the problems with DNA meant many bodies are still unidentified.

Sri Lanka and Indonesia

In Sri Lanka, thousands of bodies were taken to hospital casualty wards. In an effort to preserve them, some physicians painted them with formaldehyde. Then an official said the bodies presented a disease threat. While that was not true, it was believed and most dead were quickly buried.

Sri Lanka also ordered all bodies of foreigners be sent to Colombo. Because there were few foreigners, most people knew if someone was from another country, and many ended up in Colombo. Because roads were badly damaged and rail travel disrupted, others were buried because of the fear of disease.

Similar to the Thailand experience, some bodies were visually identified and released. Two people were with a tour group and their identity was confirmed by the tour operator while two others were identified by British relatives. When the two bodies from the tour group reached London, their identity was confirmed. The others, however, were not British: one was German, one Swiss.

Soon, as in Thailand, there was a multi-national agreement allowing foreign police and DVI specialists to work with Sri Lankans to identify the dead with final approval resting with the host government, in this case the chief coroner (Sri Lanka has a coronial system similar to Commonwealth countries including Australia). In Sri Lanka many had been buried. German, Austrian and British police set out to find those graves. They were assisted by local residents who knew where foreigners were buried as most foreigners were buried separately. Thus foreign police and DVI specialists in Sri Lanka had three tasks. They had to:

- do post mortems on the bodies in Colombo;
- collect evidence about foreign graves to get exhumation orders; and
- reach agreement with Sri Lanka on how exhumations would be handled.

It was agreed that when a grave was opened, an attempt would be made to identify all bodies exhumed, not just foreigners. While the lack of Sri Lankan AM data made identification difficult, British police did identify 17 Sri Lankans.

In general, things went more smoothly in Sri Lanka than in Thailand for a number of reasons. These were:

- there were fewer foreign police and forensic scientists;
- all bodies were processed in a single line with international workers and Sri Lankans sharing the work;
- searching was done on a co-operative basis with German, Austrian and British police keeping in regular contact with the logistics centre in Colombo;
- a British officer in London kept the British officer in Sri Lanka informed about Thailand so problems could be anticipated and avoided; and
- those who knew where a foreigner was buried also knew who it was. PM data could be checked against AM data for that individual.

Australia and Indonesia discussed DVI but it was agreed this was impossible as the numbers were overwhelming. The total dead numbered at least 200,000 and sufficient storage facilities equipment and personnel were simply not available. Bodies were identified by those who knew them and most were usually buried in mass graves.

While Indonesia has fingerprint records for criminals and government employees, it proved difficult to impossible to obtain AM prints for most deceased. Their homes, often their entire villages, were destroyed. If prints had been found, it would have been difficult to identify who they belonged to. Dental records were also generally hard to obtain and finding AM DNA would have been next to impossible as whole families, including extended families, were wiped out.

The Indonesian police did try to identify their own personnel – roughly 14,000 police and police family members were killed in police compounds. They identified only about 41.

Legacy from the tsunami

It is too soon to tell the full impact of what happened.

It is clear that the initial response matched the second pattern with initial recovery of bodies by hundreds of individuals. This pattern is observed in many widespread destructive incidents. This does not in any way resemble the site control approach called for in Interpol guidelines. This reinforces the evidence that the guidelines are applicable only when mass death occurs at a controllable site.

One of the benefits arising from these events is that so many police and professionals worked together to strengthen the world wide network of response to mass death. In particular, the Australian who was the first to respond to Bali 1 was in Phuket. The Royal Canadian Mounted Police (RCMP) from Swissair 111 were also there as was the Danish odontologist who worked on *Scandinavian Star*. These experts shared and learned from each other. For example, an FBI fingerprint specialist showed how boiling a hand could lead to high quality fingerprints from the dermis (second layer of skin). This was used first in Thailand and again in Sri Lanka. In addition, Plass Data's DVI System International is now the preferred system in Europe and, since the tsunami, has been obtained by Canada and New Zealand.

What is not clear is if the methods used most effectively (such as palm prints) will be part of detailed guidelines. What is also not clear is if there will be the same level of international co-operation in future mass death incidents. Since the tsunami, there have been incidents in Spain, the UK, the United States and Pakistan all of which have chosen to go it alone. Pakistan and the U.S. both declined foreign DVI assistance after the earthquake and *Hurricane Katrina*. Of course, in contrast to the tsunami, most victims were citizens of the country impacted. In addition, few countries are likely to be as willing as Thailand or Sri Lanka to welcome foreign assistance.

The tsunami raises other questions. Is it appropriate to spend so much time and money to identify hundreds perhaps thousands of dead? What is the upper limit? Would a similar response have taken place in Thailand and in Sri Lanka if there had not been foreign dead? Is it appropriate to go to a country and identify only or mainly foreign nationals?

There are no answers to these questions at present. However this article reports on the first major cross-cultural study of the handling of the dead. Most previous research has been done in Western countries like the United States, Japan, Italy, Canada and Australia. Perhaps now it will be easier to understand the issues and discuss them based on what has been learned.

Acknowledgements

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Author

Joseph Scanlon is Professor Emeritus and Director of the Emergency Communications Research Unit at Carleton University in Ottawa, Canada. This article is based on a lecture he gave at the Emergency Management Institute at Macedon.

In Profile:

Don the Disaster Man

"I spent almost a quarter of a century associated with disasters."

Don Withers, the 'Disaster Man', was Director, Counter Disaster Unit at Commonwealth Health from shortly after Cyclone Tracy in 1974 to after the completion of the Sydney Olympics in 2000. After 42 years as a Commonwealth public servant, he retired at the end of 1996. He shares with us here his reflections on his contributions to disaster medicine planning and some observations about the future.

When asked to describe disaster medicine, Don explained, "In practical terms, disaster medicine involves the modification and expansion of health and medical capabilities to counter a situation which has the potential to overwhelm services.

"In more simple terms, it's the application of military medicine to the civilian scene namely pre-hospital emergency care where numbers to be assisted exceed the immediate resources. It's really mass casualty management.

"In Australian history there have been numerous deleterious events but I think it's fair to say that disaster medicine started in Australia with the Granville Train incident in January 1977. In the northern hemisphere, disaster medicine response commenced some four-five years earlier

"The train disaster at Granville was really the first time there was a co-ordinated medical response in Australia where the resources were all under a central control. There was a detailed plan to extract the injured from the site under a controlled mechanism and to transport them to designated hospitals," he said.

With such a length of service in the field of disaster medicine planning, Don has witnessed much change. "Initially I was totally involved with Commonwealth counter-disaster medical relief. The then National Disaster Relief (Health) Committee which replaced National Medical War Plan Committee (NMWPC) was set up in 1975. This national body identified a wide range of Commonwealth resources including the Defence Medical area.

"This was 'big bang' planning to assist states and territories and the Committees prepared some outstanding material. Plans such as the National Burn Injury Dispersement Plan (actually implemented with the Bali burns victims), and Pharmaceutical and Basic Equipment List (to support 500 casualties for three days), were significant forecast planning.

"For example, basically there are a lot of small towns around the Australian coast of around 50 000 people. If they were hit by a cyclone or explosion there are three sorts of medical needs that could occur. You might have to evacuate the hospital, you might have many injured people to deal with, and you might have people in the community who are on home medication and have been evacuated to temporary accommodation. This all requires careful consideration and planning to ensure the health and well-being of those affected does not deteriorate," he explained.

However the emphasis changed as the Australian scene became more dynamic and most states and territories were, at best, rudimentary with their planning. "Only Victoria and NSW had planning personnel committed to counter disaster medical planning and co-ordination, and a single person at that.

"States and territories, quite understandably, saw their 'artificial borders' as sacrosanct and this was basically because medical registrations and responsibilities where individual to each jurisdiction. But disasters don't recognise state borders!

"I was looking at disaster medicine planning from a national viewpoint that disasters could envelope more than one state and quickly exceed its capability to handle it –particularly in non urban areas.

"There was obviously a need for national co-ordination of knowledge and policy direction and my role, which started as a pure counter disaster medical planner, evolved into a broader function that also included education and training of health professionals," he said.

Don explained that in the early 1990s the Commonwealth established a special group called the Australian Medical Disaster Coordinating Group (AMDCG) of the Australian Health Ministers' Advisory Council where all states and territories and the Commonwealth identified their resources and problems in a national forum.

"The identification of potential resources for a national response was a key element. The Commonwealth had a high priority to conduct disaster medicine conferences and symposia at the AEMI Institute at Mt Macedon. This concept was expanded on when the AMDCG established, with EMA, the National Disaster Medicine Training course. This was a key outcome for uniform performance and enhancement of the national capability," he added.

So what were some of the outcomes of this early work in disaster medicine planning? Don feels that the acceptance of the Rapid Response Medical Capability for remote areas of Australia concept as an operational collaborative effort was a major outcome. Also, he stressed that the development of a range of Australian emergency management manuals that arose from the national committee was a great step toward uniform training. The manuals were the AEM on Disaster Medicine; the AEM on Emergency Catering Guidelines; and the AEM on Safe and Healthy Mass Gatherings.

"Also, I believe that the medical and health arena is the most important group of the essential services to be activated in disaster response. The regular emergency services – police, fire, ambulance and SES – are, by their very nature, geared to perform rapid response. Not so the medical and health area. So while I would like to hope that the medical health field has maintained momentum, I actually fear it has not," he said.

When asked why he thought the initial momentum had stalled, Don explained, "In my 'reign' I held something like16 major conferences or symposia on the medical and health theme at the Australian Emergency Management Institute at Mt Macedon for medical and health personnel, and allied groups from across the nation. Expert keynote presenters were recruited from overseas to the conferences. I am not aware of any such gatherings being conducted at Mt Macedon since my retirement.

"Furthermore, medical and health articles appeared on a regular basis in the AJEM. In fact, a whole edition was devoted to medical and health aspects. In retirement I have only seen one article in nearly ten years on medical and health aspects.

"A small group of Australian experts attended conferences conducted by the World Association for Disaster and Emergency Medicine every two years on various continents of the world. Australia presented papers and brought back key themes and international experiences for Mt Macedon symposia. This also appears to have lapsed," he commented.

Don countered this however saying that he felt now was a very opportune time to make further advancement in disaster medicine planning. "Bird flu, or more correctly avian influenza H5N1, has received extensive media attention and I believe the Department of Health and Ageing is directing new resources to the potential problem. Also, I believe that while the terrorist threat to the average Australian has been overestimated, nevertheless large resources have been allocated and the end result sadly, could be a major mass causality situation.

"*Hurricane Katrina* emphasised that disasters are political events and FEMA in the USA proved an abject failure by all reports. Closer to home we were so lucky that Cyclone Larry didn't strike and devastate Cairns or Townville. The carnage, death and injuries and damage to hospital installations caused could have taxed resources – a good reason to update and trial the Pharmaceutical and Basic Equipment List for Disasters.

"With Larry it was pleasing to see the 'Alan Stretton syndrome' [*Cyclone Tracy*] being replicated by the employment of Peter Cosgrove. Perhaps EMA might keep a list of retired senior Defence Force leaders who are well trained in command control and co-ordination, for future situations of this type," he commented.

In closing Don reflected that in Australia we were very good at emergency management as we 'know a little about a lot' whereas in the northern hemisphere, counterparts specialise and thus get know 'a lot about a little' in relation to emergency management. During his latter career, Don was asked to undertake a number of consultancies for the World Health Organization in Switzerland, and Thailand, and for the governments of Hong Kong and New Zealand totalling several months over a five-year period.

"It was personally rewarding and a recognition of Australia and its professionalism in this field" he said.

In January 2000 Don was awarded an Order of Australia Medal for his services to disaster medicine. The award was instigated by state and territory medical representatives in appreciation of his services to the nation.

NOTES FROM THE FIELD

Emergency Management Liaison in the aftermath of Severe Tropical Cyclone Larry

by Trevor Jenner, Manager Capability Development – Transport & Communications
Emergency Management Australia

The third Monday of March each year commemorates the official founding of Australia's National Capital with the day marked by a public holiday. Canberra Day 2006 will however be remembered by me, and a number of staff at Emergency Management Australia (EMA), as the day that Severe Tropical Cyclone (STC) Larry wreaked havoc on communities located between Townsville, Cairns and Mt Isa in far north Queensland.

On the morning of Monday 20 March 2006 STC Larry was classed by the Bureau of Meteorology as having an intensity of Category 5 and had crossed the North Queensland coast near Innisfail at approximately 7am Eastern Standard Time. The next day (Tuesday) I received a telephone call at home requesting that I report to the National Emergency Management Coordination Centre (NEMCC) when I arrived at work.

I had no idea at the time that I was to spend the next 12 days as an EMA Liaison Officer (EMALO) working directly with Queensland Counter Disaster and Rescue Services (CDRS) staff, Queensland Fire and Rescue Service (QFRS) officers and other state and federal government departmental representatives co-ordinating the initial response phase of the disaster.

A few hours after reporting to the NEMCC I found myself in the thick of things at the Queensland State Disaster Coordination Centre (SDCC) in Brisbane. I received a briefing and handover from Peter Willett, one of two EMALOs who happened to be in Queensland on other EMA related business at the time. The focus of my work during that evening involved a request for Australian Government assistance to aid in the transport of portable milking machines from Toowoomba to the Atherton Tablelands. A RAAF C-130 Hercules was allocated to freight the machines from RAAF Base Amberley to Cairns Airport the next day.

Wednesday saw me sent from Brisbane to Cairns to join another EMA colleague, Paul McAlonan. A decision had been made to relocate the SDCC to Cairns and, after a few hours sleep, I took over from Paul and worked the night shift at the newly established SDCC. The SDCC had become fully operational with the transformation of what was normally the training rooms of the Queensland Ambulance Station on Anderson Street.

By the early hours of Thursday the tempo (and associated noise levels) in the SDCC picked up dramatically with the QFRS shift changeover. With the relocation of the SDCC from Brisbane to Cairns, QFRS was to perform the core administrative, information management, logistical and planning activities. For the next 11 days the SDCC was a hive of activity with everyone working collaboratively and cohesively in response to the devastation caused by STC Larry.

During my time at the SDCC I was joined by some familiar faces from EMA. Alex Boland assisted with the delivery of a truck load of tarpaulins and other relief supplies at Innisfail which had been transported from the Australian Government disaster stores in Sydney. Sally McKay joined the team and was involved in transitioning the relief effort from the response phase to the recovery phase. Peter Willett rejoined me to establish rotating shifts. Throughout the experience the staff of the NEMCC provided a welcome and reassuring voice in facilitating the Australian Government's response.

STC Larry was my first interstate deployment as an EMALO and the experience gained has been invaluable. It was a privilege to be a part of a response which brought together all three tiers of government to achieve a common goal. I was able to contribute to this in a meaningful way through the facilitation of some of the 38 requests for Australian Government assistance.

Cyclone Larry *destroys buildings and vegetation and floods the local area.*

EM Update

Emergency Management Australia provides national leadership in the development of measures to reduce risk to communities and manage the consequences of disasters. EM Update provides current information on activities and issues in the emergency management environment across EMA.

COMMUNITY DEVELOPMENT

2006 Australian Safer Communities Awards

The Australian Safer Communities Awards recognise best practice and innovation by organisations and individuals that help to build safer communities across Australia. The Awards work on two levels, state and territory winners are decided first and become finalists for the national awards.

The brochures containing information on the Awards and entry forms have been dispatched to state and territory coordinators and are also available at www.ema.gov.au.

Entries are encouraged for projects undertaken between January 2005 and the end of April 2006. The closing date for entries is 4 August 2006. State and territory winners are expected to be announced in September 2006 and the National Awards will be announced on 6 December 2006 at a ceremony at Parliament House, Canberra.

For further information contact Christine Jenkinson Phone: 03 54 21 5241; email: christine.jenkinson@ema.gov.au or visit the website www.ema.gov.au

Working together to manage emergencies

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

- the Local Grants Scheme (LGS), to assist local councils to fund and develop emergency risk initiatives, security upgrades around critical infrastructure and provide training for staff; and
- the National Emergency Volunteer Support Fund (NEVSF), offering funding to emergency management volunteer organisations to boost recruitment, retention, skills and training.

On 8 December 2005, the Attorney-General, The Hon Philip Ruddock MP, announced the funding of more than 400 projects, valued at $14 million through the LGS and NEVSF in financial year 2005/06. Funding agreements have been negotiated with successful applicants and work on the projects is continuing toward completion.

Applications for funding in 2006/07 closed on 3 March 2006, with some 770 applications received across both programs. State Selection Committees have met to determine the priority of all applications and a composite national priority list is now being developed. It is expected that the composite priority list will be provided for the Attorney-General's consideration in early June, with an announcement of successful projects expected in Mid-July.

For further information contact Alan Collins Phone: 02 6256 4734; email: alan.collins@ema.gov.au or visit the website www.ema.gov.au

School education

In February this year EMA commissioned Curriculum Corporation to conduct a national audit of state and territory primary and secondary school curricula and commercial resources to identify strategies to better integrate all hazards and emergency preparedness education into the school curriculum. This audit was completed in mid May and has led to the identification of gaps within curriculum and resource materials. This provided a clear understanding of the hazards and emergency preparedness needs in the Australian education system. This is an important step in preventing the duplication of resources and provides direction for EMA's and other emergency management sector organisation's efforts in this area.

The EMA schools webpage has also recently released a new teaching and learning resource aimed at upper primary/lower secondary school students, titled The Australian Natural Disaster Webquest. This webquest focuses on four prominent Australian natural disasters; Cyclone Tracy, Ash Wednesday, Newcastle Earthquake and the more recent Eyre Peninsula Fires. Students research the disaster from the perspectives of prevention, preparedness, response and recovery. It is planned that this resource is the first in a series of Australian natural disaster and preparedness webquests.

COMMUNITY DEVELOPMENT continued

A webquest is a style of teaching tool that is being embraced by schools nationally and engages students in an inquiry-orientated activity in which some, or all of the information that learners interact with, comes from resources on the Internet. In most cases, students work independently and then come together in teams to complete the task. The Australian Natural Disaster Webquest can be viewed at www.ema.gov.au/schools and follow the webquest link.

For further information contact Melanie Ashby
Phone: 03 54 21 5269; email: melanie.ashby@ema.gov.au

Inclusive Emergency Management with Culturally and Linguistically Diverse Communities (CALD).

At the Security Summit on 27 September 2005, the Council of Australian Governments (COAG) noted the importance of a consistent and co-ordinated response by the Australian, state, territory and local governments at the onset of any national emergency.

All jurisdictions attending the summit reported on proposed initiatives aimed at strengthening links with Australian Muslim communities and promoting tolerance and understanding. The Australian Government, through the Department of Immigration and Multicultural Affairs, has provided funds to the Attorney-General's Department (AGD) to undertake a number of initiatives aimed at helping the Muslim community to prepare for, respond to and ensure recovery from incidents, crises and other emergencies in Australia. The Protective Security Co-ordination Centre and EMA are the divisions within the AGD that have been given the responsibility for a number of these initiatives.

One of these initiatives is for EMA to bring together relevant emergency management personnel and multicultural community leaders, including Muslim community leaders, to participate in a National Workshop at Mt. Macedon. The purpose of this workshop is to review the Guidelines for Emergency Management in Culturally and Linguistically Diverse (CALD) Communities developed by EMA in consultation with state and territory emergency management agencies and multicultural communities in 2001.

Other initiatives EMA will be undertaking are related to the development and delivery of education and training programs. They include an emergency management awareness program, a train the trainers program and learning materials for existing EMA programs.

For further information contact Judy Parker
Phone: 03 54 21 5229; email: judy.parker@ema.gov.au

EMA Library

The annual Australasian Libraries in the Emergency Management Sector workshop was held at Mt Macedon 9 – 13 April 2006. The theme was 'Disasters, Terrorism, Corruption, Crime… a librarian's role in uncertain times'.

For further information contact Linda Hansen
Phone: 03 54 21 5224; email: linda.hansen@ema.gov.au

AJEM BOOK REVIEW

by Mike Leonard, Bushfire Co-operative Research Centre

Pyne, Stephen (2006)
The Still-Burning Bush,
Scribe Short Books, Melbourne

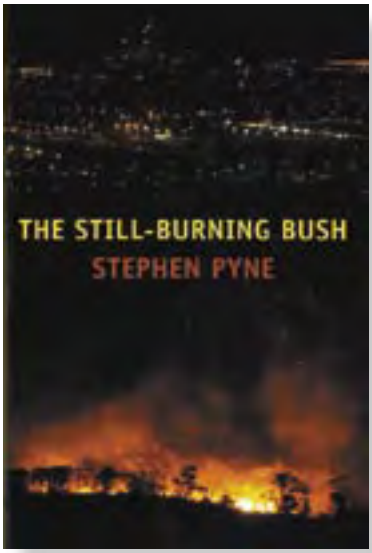
ISBN: 1-920769-75-7

Australia's size, and its federal constitution, perhaps more than any other factors have combined, at least until recent years, to limit the development of a truly national 'bushfire dialogue.' The evolution of the Australasian Fire Authorities Council over the last decade, EMA's national role, and most recently the establishment of the Bushfire Co-operative Research Centre are positive developments in this important area of public policy.

The arrival of Stephen Pyne's new book *The Still-Burning Bush*, is a timely, and welcome contribution to this emerging national debate. Pyne, a professor at Arizona State University is the author of some 17 books, a dozen of which deal with the history and management of fire. Included among these is the seminal *Burning Bush – A Fire History of Australia* (Henry Holt and Co. – 1991). Beyond the academy, Pyne spent 15 summers earlier in his life with a fire crew on the northern rim of the Grand Canyon.

His latest offering follows a recent fellowship at the Australian National University, at the invitation of Dr. Tom Griffiths. Dr. Griffiths is the author of another small, but growing list of essential bushfire related reading: *Forests of Ash – An Environmental History* (Cambridge University Press–2001). From Australia's perspective the 'Pyne–Griffiths' collaboration is a fortunate one indeed.

In an introductory 'Author's Note' Pyne suggests "Australia is among the world's firepowers. It has fires,



fire institutions, fire scholarship, and a vigorous fire politics. Only America has invested a comparable fraction of its national culture into the subject, so what Australia has to say about fire matters far beyond its own shores."

The book comes in four parts; the first two summarising how we came fire-wise, to the present–from both an aboriginal perspective and from the perspective of more recent arrivals as they struggled to come to terms with fire in the wild. The remainder of the book takes up where the author's earlier Australian book (*Burning Bush – A Fire History of Australia*) concluded, the 1983 Ash Wednesday bushfires in south-eastern Australia. And much would seem to have occurred in the past 23 years!

More than anything else this book is a testimony to what the author suggests is Australian fire's most potent symbol, "the inextinguishable firestick." Having studied and written about wildland fire around the globe, Pyne concludes that while Australia is one of the "Big Five in fire science," and while Australia often has, hectare for hectare more damaging fires, these are not the things that make Australia "fire's lucky country." Rather it is that "uniquely among developed nations, Australia kept a tradition of controlled burning."

Having paid previous generations, and particularly those who worked in forest and fire management in the post Second World War decades high praise, Pyne finds much of concern in some more recent trends. In discussing the on-going debates between 'environmentalists' and fire managers he quotes, approvingly, Winston Churchill's observation about Britain and America as two people separated by a common language. He notes the increasing subdivision of the paddocks surrounding Australia's parks and forests and the strain the 'tree-change' trend is placing on the backbone of rural fire protection–the volunteer brigades. He laments the constant re-structuring and fragmentation of public land management agencies and the often-associated de-skilling, and is concerned about a trend he observes in some quarters to view 'bushfire management' largely in terms of 'emergency response.'

The book is also an eloquent plea for the continued nurturing of a "nose-to-the-ground sensitivity to match the variety of the...(bush)." To Pyne "the proper core of (bush) fire management…should be fire, fire in the quotidian of routine life on the land." The alternative, as Pyne sees it is "doing no better and perhaps doing poorly with huge force and cost."

There is also however much about Australia's approach to bushfire management that Pyne finds

positive. Beyond the admittedly increasingly troubled survival of the 'firestick', Australians, in Pyne's view, continue to be innovators. He notes, for example, the development of aerial incendiary technology using Cessna aircraft to facilitate broad area prescribed burning, while at the same time in the US huge air tankers were drenching wildfires with chemical retardant. He comments approvingly on the development of Victoria's Community Fireguard scheme, a development that "the rest of the industrial world is scrambling to emulate." Australia's innovations in terms of building design and construction in bushfire prone areas are again considered 'leading edge.'

As to the future Pyne is more cautious, noting that "especially with a matter like fire, which is nothing if not a study in context, the particulars matter." He further suggests that "no outsider can master the requisite detail." Nonetheless, many of Australia's current dilemmas are not unique and Pyne's "few observations" are both thoughtful and perceptive. His comments on the aftermath of the 2002/2003 fire season may surprise some. In a brief review of the several inquiries that followed he finds the Council of Australian Governments' (COAG) report "a measured document, a grand expression of political technocracy, whose very reasonableness denied it cathartic power." While of the Victorian (Esplin) Inquiry Pyne concludes that it "confirmed the political triumph of the new order."

At 138 pages the book represents a very accessible summary of where we have come from 'bushfire-wise' in Australia, and of most of the key dilemmas currently confronting us. The author's views won't please all readers on all occasions, but his well-developed international perspective suggests that neither should they be ignored. His expression, on occasions, will displease some, but for much of the time his meaning is refreshingly unambiguous. Of the "recolonisation of rural lands in industrialised nations" for example, he suggests that in too many situations "newcomers, often retirees or recreationists, stuffed the landscape with wooden structures that appeared to fire as no different from logging slash."

USEFUL INFORMATION

Letters to the Editor

The Journal welcomes Letters to the Editor. Please note that letters should be no more than 300 words. Letters exceeding this limit may be edited or refused. Letters must focus on issues of emergency management or past AJEM content.

Letters must contain a name, address and contact information of the author. Unsigned letters or those submitted without contact information will not be considered.

Letters by the same author that reiterate opinions previously expressed may not be published. The editor reserves the right to reject or edit any Letter to the Editor.

Advertising in AJEM

Display and classified advertising may be accepted for publication with the agreement of the Editor-in-Chief. The editor reserves the right to insert the word "Advertisement" above or below any copy.

Conference Diary

Full details of local and international conferences relating to emergency management are available from the EMA website. For information, please visit www.ema.gov.au.

AJEM Community Safety in the Emergency Management context special edition – May 2007

A special edition of the AJEM, featuring a range of articles focussing on all aspects of community safety in the emergency management context, is to be produced in May 2007.

We are currently calling for papers focussed around this theme to be included in the special edition. If you are interested in submitting an article for the 2007 edition it must be received by the editorial team by 31 December 2006 and follow the Editorial Guidelines (www.ema.gov.au/ajem).

Contact: Cate Moore cate.moore@ema.gov.au

interesting websites

Bureau of Meteorology

http://www.bom.gov.au

The Bureau of Meteorology (BoM) website consists of a wealth of information covering not just weather warnings. It includes details about the Bureau itself and joint Bureau and CSIRO collaborations, as well as forecasts and observations, climate and climate change, hydrology, oceanography and aviation weather.

Each individual state and territory in Australia has its own page, and there are also pages with information on global weather.

In addition to the forecasts and charts there are also dynamic radar and satellite images that help track the movement of weather systems as they pass through the Australian region.

Australian Government
Attorney-General's Department
Emergency Management Australia

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EMA *'safer sustainable communities'*