Foundations of Emergency Management

by Karl Cronan, New South Wales Ambulance Officer

Emergency Management is not a haphazard practice, but a structured science performed by experts. This paper outlines the definition of emergencies and disasters in traditional and sociological terms considers the social and monetary costs and benefits of emergency management to the community. The framework of emergency management will identify the functions of a manager and relate these to the concepts of prevention and mitigation that lead to a prepared community, through planning, hazard analysis, legislation, public awareness and education. The tactical functions of command, control and co-ordination will illustrate how resources come together to provide overall effective emergency management. In viewing the human factor, consideration has been given to the physical and psychological welfare of people affected and their planning needs after a disaster,are assessed. In support of framework concepts, emergency legislation and their responsibilities have been outlined at federal, state and local government levels.

What are emergencies?

To understand what emergencies are, appropriate definitions of the terms emergency, disaster and catastrophe are required. The Encyclopedic World Dictionary (1971) defines *emergency* as 'an unforeseen occurrence; a sudden and urgent occasion for action', *disaster* as 'any unfortunate event, especially a sudden or great misfortunate' and catastrophe as 'a sudden and widespread disaster'.

From these definitions it may be assumed that these events affect large numbers of people, but this may not necessarily be the case. In a family, the death of the bread winner may be viewed as a catastrophe, in a small town the death of five community members may be considered a disaster, but in a city a multi-storey building fire might only be classed as an emergency. Humans apply a subjective interpretation to the terms emergency or disaster and mould them appropriately to fit their situations.

From an emergency management perspective, these definitions are required to be standardised and accepted by the majority, from this 'emergencies may be defined as unexpected circumstances combined to create situations calling for immediate action'. 'Disasters can be natural (or man-made) emergencies that affect the surrounding community. They are usually localised events that spin out of control and end up posing a threat to uninvolved parties' (Gigliotti and Jason 1991).

In sociological terms Fritz (1961) (cited in Drabek, 1986) defines disasters as 'accidental or uncontrollable events, actual or threatened, that are concentrated in time and space, in which a society, or a relatively self-sufficient subdivision of a society, undergoes severe danger, and incurs such losses to it's members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society is prevented'.

An event leading up to or causing a disaster is known as a hazard. A hazard is defined as 'a potential or existing condition that may cause harm to people, or damage to property or the environment' (*Community Emergency Planning Guide* 1992). These hazards can be divided into two distinct categories:

- **natural** – climatic (e.g cyclone), geophysical (e.g. earthquake) and biological (e.g epidemic)
- **human-made** – technological (e.g. transport accidents), human fault (e.g. oil spill) and hostile action (e.g. terrorist attack) (Thristan 1995).

The effects of emergencies, and 'why emergency management?'

When a hazard impacts on a community the social and material infrastructure is damaged (or in extreme cases destroyed) and this impact has a disruptive effect that places stress on individuals and communities. To understand the effect an emergency has on a community, it is a worthy purpose to explore what a community contains. Communities are made up of sub-groups, such as family groups, working or business groups and cultural social groups. A community has a structure based on social, cultural and functional lines (Thristan 1995).

During an emergency or disaster, the bonds that bind a community can be broken and this has a negative effect initially but eventually turns to a positive effect as individuals and communities attempt to reconstruct the community bonds. 'During and immediately after the emergency an immense feeling of community spirit is usually evident, with people helping others who prior to the event did not even know each other. Barriers are broken down by the need for self-survival and help of others' (Thristan 1995).

The damage to property, loss of livestock and crops, and destruction of the service infrastructure (e.g. power, water supply and sanitation) is also a serious effect of hazard impact. This may place an enormous financial burden on government (local, state or federal). An example of the enormity of destruction and cost incurred following a disaster was evident in Cyclone Tracy, where 65 people were killed, 11,500 homes destroyed or seriously damaged, power, water and telecommmunications disrupted. Damage was estimated at $500M and at least $300M was spent by government (Australian Counter Disaster College 1981).

Emergency management is a necessary function in society, 'our physical geography and climate make us prone to most forms of natural disasters' and 'we share with other modern industrialised nations the potential for man-made disasters such as industrial accidents, hazardous substances and hostile acts in peace or war' (Dunn 1983). With such a disposition towards natural and man-made hazards, emergency management takes on the function of attempting to decrease the impact of these occurrences by providing the planning required to implement a counter disaster

strategy thus ensuring all communities are prepared to handle any threat; to provide a command and control function in the event of a hazard and by providing support in the rehabilitation process. Planning, preparedness and mitigation efforts such as appropriate building codes and flood mitigation programmes, aids in reducing the effect of impact, this in turn lessens government expenditure on rehabilitation costs. 'Effective disaster management is a dynamic process which involves many disciplines such as science, engineering, health and welfare, architecture, social sciences, management and law, as well as the traditional "emergency" groups' (Australian Counter Disaster College 1986).

Framework for EM

A framework for emergency management consists of planning, organising, directing (leading) and controlling.

'The planning function involves establishing organisation goals and defining the methods by which they are attained. The organising involves designing, structuring, and co-ordinating the components of an organisation to meet organisation goals. The directing function involves managing interpersonal activities, leading and motivating employees to effectively and efficiently accomplish the tasks necessary to realise organisational goals. The controlling function involves monitoring both the behaviour of organisation members and the effectiveness of the organisation itself, determining whether plans are achieving goals, and taking corrective action as needed' (Pierce and Dunham 1990).

These concepts must be applied and a framework for emergency management constructed. This framework consists of prevention, preparedness, response and recovery. *Prevention* is defined as 'regulatory and physical measures to ensure that emergencies are prevented, or their effects mitigated'. *Preparedness* is arrangements to ensure that all resources and services which may be needed, can be rapidly mobilised and deployed. *Response* is actions taken during and immediately after a hazard impact to ensure that it's effects are minimised. *Recovery* is arrangements to ensure that a community is restored to normal' (Community Emergency Planning Guide 1992).

Framework components have no fixed commencement or conclusion. Each function has an affect on the other,

planning influences preparedness, which in turn contributes to the effectiveness of response and this response effects the amount and input required for rehabilitation or recovery.

Emergency prevention

'Prevention concerns the formulation and implementation of long range policies and programs to prevent or eliminate the occurrence of disasters' (Australian Counter Disaster College, 1981). The impact from natural forces and technological accidents may never be totally prevented but the consequences of these disasters can be lessened by prevention and mitigation.

Mitigation is an emergency prevention strategy and is defined as 'measures aimed at reducing the impact of natural or man-made disasters on a nation or community' (Carter 1991). Drabek (1986) concludes 'the concept of mitigation … that is, purposive acts designed toward the elimination of, reduction in probability of, or reduction of the effects of potential disasters. Specific examples include land-use management programs whereby people are restricted from building in flood prone areas, or the more stringent building code requirements that have been adopted by many communities with histories of seismic activity'.

When implementing mitigation strategies, in the prevention phase, four main goals should be applied.
- Containing or modifying the hazard in order to change its nature and thus to lessen the threat
- Protecting people and facilities in order to decrease the vulnerability to injury or damage
- Limiting the use of areas and facilities in order to lessen the threat
- Preventing the emergency or occurrence of a hazard (Thristan 1995).

An all hazards approach to mitigation or prevention should be considered as an important strategy aspect. This approach considers that some mitigation efforts may cause additional complications when a disaster strikes. The use of generic style plans ensures that everyone concerned stays committed to the one plan and that responding services are not duplicated. 'When it comes to emergency planning, it is most important that every conceivable action, reaction, response, resource and emotion be considered even if such considerations may later be dismissed as nonessential to the emergency planning effort' (Gigliotti and Jason 1991).

The prepared community

'The development of Australia's counter-disaster capability depends on an informed and aware community and a local government that is involved in, and supportive of, disaster prevention and preparedness measures' (ACDC 1986).

'Preparedness is supported by the necessary legislation and means a readiness to cope with disaster situations or similar emergencies which cannot be avoided. Preparedness is concerned with forecasting and warning, the education and training of the population, organisation for and management of disaster situations including preparation of operational plans, training of relief groups, the stockpiling of supplies and the earmarking of the necessary funds' (ACDC 1981).

One of the cornerstones of preparedness is planning. 'The purpose of planning is to anticipate future situations and requirements, thus ensuring the application of effective and co-ordinated counter-measures' (Carter 1991).

For planning to be effective then a hazard analysis must firstly be carried out. This analysis identifies possible effects and an appropriate plan is then formulated. Drabek (1986) cites Tierney (1980) that 'a good plan' is:
- based on realistic expectations.
- brief and concise
- details a response that can be expanded by stages, calling up resources as needed and avoiding the potentially disruptive effects of over response and convergence at the site;
- possesses an official stamp of authority.

An awareness in the community for the need for disaster prevention and involvement in the planning for such an event, is an aspect of the prepared community. In the planning stages the use of citizens to provide up-to-date information is an under-utilised resource. 'Many organisations — schools, media and the like — could provide far greater amounts of hazard information than is done currently' (Drabek 1986).

Public education by disaster management agencies also helps in the task of preparedness. This education can take the form of education through the media, education through the school system or by community involvement in training exercises and procedures.

Further factors should also be considered. These include mutual aid agreements between commercial ventures, government authorities or governments, the use of public warning

systems that are easily understood and recognised, as well as the use of government funding for the maintenance of equipment and the stockpiling of emergency supplies.

Command and Control

Emergency managers must have command and control to prevent response from becoming disorganised. To help understanding, these terms need to be defined in the context of how they apply to emergency management.

Command is the direction of members and resources of an organisation in performance of its agreed roles and tasks. Authority to command is established in legislation or by agreement. Command relates to an organisation and operates vertically within it.

Control is the overall direction of emergency management activities in a designated emergency. Authority for control is established in legislation or in an emergency plan, and carries with it responsibility for tasking and coordinating other organisations in accordance with the needs of the situation. Control relates to situations and operates horizontally across organisations' (Community Emergency Planning Guide 1992).

Command equates to organisation whilst control relates to the situation, but these are not the only considerations during an emergency response. Another aspect that requires managing is that of resources arriving at the point of impact. This is where the function of co-ordination comes to the front.

Co-ordination may be defined as "bringing together organisations to ensure effective emergency management response and recovery, and is primarily concerned with systematic acquisition and application of resources (people, material, equipment, etc.) in accordance with requirements imposed by the threat or impact of an emergency. Coordination relates primarily to resources and operates vertically within an organisation (as a function of the authority to command), and horizontally across organisations (as a function of the authority to control)' (Community Emergency Planning Guide 1992).

The human factor

'A disaster is about people, as it affects them, their living conditions and their lifestyle' (ACDC 1980). 'The emotional impact on people involved in major incidents appears to be massive and enduring' (Toft and Reynolds 1994). These quotes indicate that in times of emergencies, human behaviour is unalterably changed and these changes are not for the better.

Some common myths have arisen regarding human behaviour in times of crisis. These are:
• people panic during emergencies
• people look after themselves with little or no regard for others
• anti-social behaviour increases
• people are gripped by a sense of helplessness
• children are too young to be affected (Thristan 1995).

During the planning phase, provision should be made for the inclusion of mental health professionals to provide input. 'There is a tendency to treat disaster victims as a category of helpless and dependent human beings, who all have been subjected to the same terrifying experience and trauma. Often too little attention is paid to their individual differences, such as socio-economic background, cultural background and personal make-up' (ACDC 1980).

By the inclusion of provisions for welfare in disaster plans, planners have taken into consideration the need to provide physical, psychological and social relief to victims. Planners have then 'addressed the emotional side of an emergency' (Gigliotti and Jason 1991).

In order to address the needs of those affected, 'the range of welfare activities required in the immediate post-disaster period as assessment of injuries and damage, reception and registration of victims, information for media and relatives, emergency feeding, clothing and shelter, transport, medical and health services, animal welfare, provision of power and communications, restoration of utilities and control of access to disaster area' (ACDC 1981).

Emergency legislation

The responsibility for emergency management rests with the various levels of Government. 'Australia's emergency management and counter-disaster arrangements, reflect the fact that, under the Federal Constitution, State and Territory governments each have responsibility for protection and preservation of the lives and property of their citizens' (EMA).

'Local government by statute has the responsibility to provide many basic services, including roads, some health and welfare services and, in some states, water drainage, sewerage and electricity.

State Government has responsibility for law and order, safety, health, some welfare aspects, land transport, intrastate air transport, water, sewerage, drainage, electricity and gas, together with town planning and economic development.

Federal Government has responsibility for quarantine, monetary policy, a share of fiscal policy, aspects of health and welfare and the defence of Australia' (ACDC 1981).

'Local government plays a major role in the development of State Emergency Services and Civil Defence preparations at the local level and the establishment of local SES organisations. Moreover, Councils because of their day to day community responsibilities have ready access to local resources which can be utilised to deal with emergencies' (NSW State Emergency Services 1981).

Conclusion

Emergencies are sudden and widespread events resulting in death, destruction of property, physical and psychological upheaval and enormous financial burden. The aim of emergency management is to lessen the hazard impact and to provide timely and effective response, together with relief and rehabilitation. The emergency manager works within a framework of prevention, preparedness, response and recovery.

The use of strategies such as mitigation, planning, hazard analysis and an all-hazards approach help to minimise the effects of an impact. Through effective planning involving members of the community, education campaigns, media, training exercises, and stock piling of supplies, aids in the preparedness of a community. During a response phase a strong emphasis on command, control and co-ordination will produce a controlled, organised rescue effort. To address the human factor in a disaster, planners should include welfare organisations to deal with the physical and psychological well-being of victims. Government has enacted various legislation to guard and maintain lives and property and to provide for response and recovery.

'Perhaps the only benefit of calamity is that it binds people together in a common cause. In a time of disaster there is the opportunity for the display of some of the qualities in which Australians take pride ... initiative to make an effort and to run risks, and a readiness to help people in trouble' (Australian Academy of Science 1979).

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Karl Cronan is a Level 3 Ambulance Officer in his tenth year with the Ambulance Service of NSW. He holds a Diploma of Health Science (Pre-Hospital Care) and is currently studying for his Bachelor of Social Science (Emergency Management) through the Charles Sturt University, Wagga Wagga Campus.

Medical Displan Victoria:
Guidelines for prevention of heat injury

by Dr Rodney Fawcett, Area Medical Coordinator, Kilo Region

To maintain the body's general health and well-being it is important for the body temperature to be kept at 37°C. This maintenance of a fixed internal environment is of significance as many of the body's internal biochemical processes have critical chemical systems that perform best at this temperature. The ability of the body to gain or lose heat to maintain this constant temperature of 37°C is ultimately vital to sustaining life.

In conditions such as fighting summer bushfires the main issue is one of ensuring the body is able to maintain a reasonable heat loss in normally hot conditions. This is achieved mainly by evaporation (sweating), while small amounts of heat can be lost by the mechanisms of radiation (direct heat transfer from a warm body to a cooler environment) and convection (movement of air over the body, as when using a fan). This latter process can also aid sweating. Once environmental temperatures exceed 37°C, the only method of body heat loss is by sweating, which can be aided by increasing airflow over the body.

Heat loss is not the only factor to consider, as the work done by the body's own internal metabolic processes creates additional heat. At rest the body generates about 100 watts from internal heat and activity, but processes involving physical exertion, such as firefighting, can increase this heat production to at least 1000 watts, depending upon the level of exercise. The production of sweat involves the loss of body fluid and salts. Under normal circumstances at 20°C, a person at rest loses 2 litres of body water per 24 hours. This loss goes up with increasing heat or workload. At

For an adult		
Approximate volume of water lost (litres)	Body weight lost (%)	Symptoms caused by dehydration
0	0	
		Thirst, slowing down, weariness, nausea, emotional instability.
3	5	Stumbling, headache, increase in body temperature, pulse rate and respiratory rate. Dizziness, indistinct speech, increasing weakness, mental confusion.
6	10	Delirium, swollen tounge, circulatory insufficiency, marked haemo concentration and decreased blood volume, failing renal function.
9	15	Inability to swollow, painful urination, cracked skin, cessation of urine formation.
12	20	Limit of survivability?