

The community: central to emergency risk management

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Introduction

Emergency management can be defined in many ways, but ultimately it means that some people are making and implementing decisions that impact on community or public safety. As a management activity, it can draw on accepted management principles and practices and apply them in an emergency management context.

There are many books and courses run on management, and they tend to share a common theme for the process, summarised in *Table 1*. Recently there has been a steady increase in interest in a particular management tool known as risk management, and it seems at first sight to be appropriate for those who deal with emergency management. This generic risk management process is widely used in industry to minimise works exposure to risk of injury, accident or breakdown, and also in the financial institutions to minimise exposure to financial loss. Standards Australia has published a standard on Risk Management that details a number of significant steps in the process.

However, the concept of risk adopted by the financial sector and that adopted by the heavy industry sector is a little different to that readily understood in the area of public safety and emergency management. A series of guidelines for the use of Emergency Risk Management is currently being prepared that will enable uniform application of the generic principles of risk management to the emergency management sector. *Table 1* compares the terms used in:

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- general management practice
- risk management as presented in AS 4360
- Emergency Risk Management as defined in the guidelines.

This paper addresses the role of community in satisfactorily implementing emergency risk management.

Community

Community is a term that can have a wide range of meanings. Nearly all of them are applicable in the emergency management context.

A community is a group that has a number of things in common, generally defined by location, but which may include such things as shared experience or functions.

This general definition of community means that it may be applied to a wide number of groupings in which people may need to interact with emergency management.

- Community can be defined *geographically*. Households, neighbourhoods, suburbs or towns, local government areas, metropolitan areas, regions, states, and the nation are all ways of defining ever-increasing communities based on location.
- Community can also be defined by *shared experience*. Particular-interest groups, ethnic groups, professional groups, language groups, age groupings, those exposed to a particular

hazard are all ways of defining different groupings of individuals based on commonalities other than location.

- Community can be defined in other ways including *sector-based* groups.
- It is also possible to define community in terms of all three—'farmers in the Little Desert area in the age group 50 to 60 years'.

'Community' can be used to refer to groupings that are both affected by and can assist in the mitigation of hazards. The reason for the existence of emergency management is to minimise the adverse effects of hazards on the community.

Risk

Risk is a concept. It is quite intangible, yet it is something that most people understand intuitively. Risk couples a consequence or an outcome that we may be able to imagine, with a set of circumstances that may assist in the development of the consequence.

For example, most people acknowledge that there is a risk associated with flying in an aircraft. The consequence is death because of a crash, and the hazard may be a set of circumstances that give rise to the crash. These may include pilot error, mechanical malfunction, traffic control error, extreme weather conditions, terrorist activity, administrative errors e.g. asking for the wrong quantity or type of fuel etc.

The risk of dying in a 'plane crash is remarkably low, but the risk gives meaning to the likelihood that the dreaded consequence will happen.

| Generic management term | Risk management term (from AS4360) | Emergency risk management term (from Guidelines) |
|-------------------------|------------------------------------|---|
| Problem definition | Establish context | Establish emergency risk management context. |
| Analysis | Identify risks | Characterise hazards, community and environment. Determine evaluation criteria. |
| Decision making | Analyse risks Evaluate risks | Analyse risk. Evaluate and rank risks. |
| Implementation | Treat risks | Identify, evaluate and implement interventions. |

Table 1: Management and risk management terms

Risk is a concept used to describe the likelihood of a consequence arising from a set of circumstances.

This concept is central to emergency risk management. In applying emergency risk management, we are trying to change our environment to reduce the likelihood of an undesirable consequence for a community.

Risk then represents an interaction between a *hazard* that has the potential to do some damage, a *community* that may be damaged and an *environment* that may make the hazard more serious, or in other circumstances, less serious in order to produce a given consequence. *Figure 1* illustrates the elements.

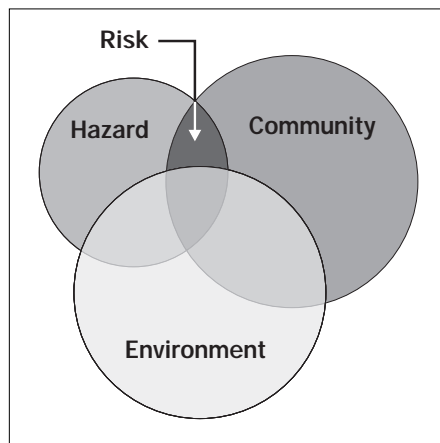


Figure 1: Elements of risk

Emergency risk management

The emergency risk management process is illustrated in *Figure 2*.

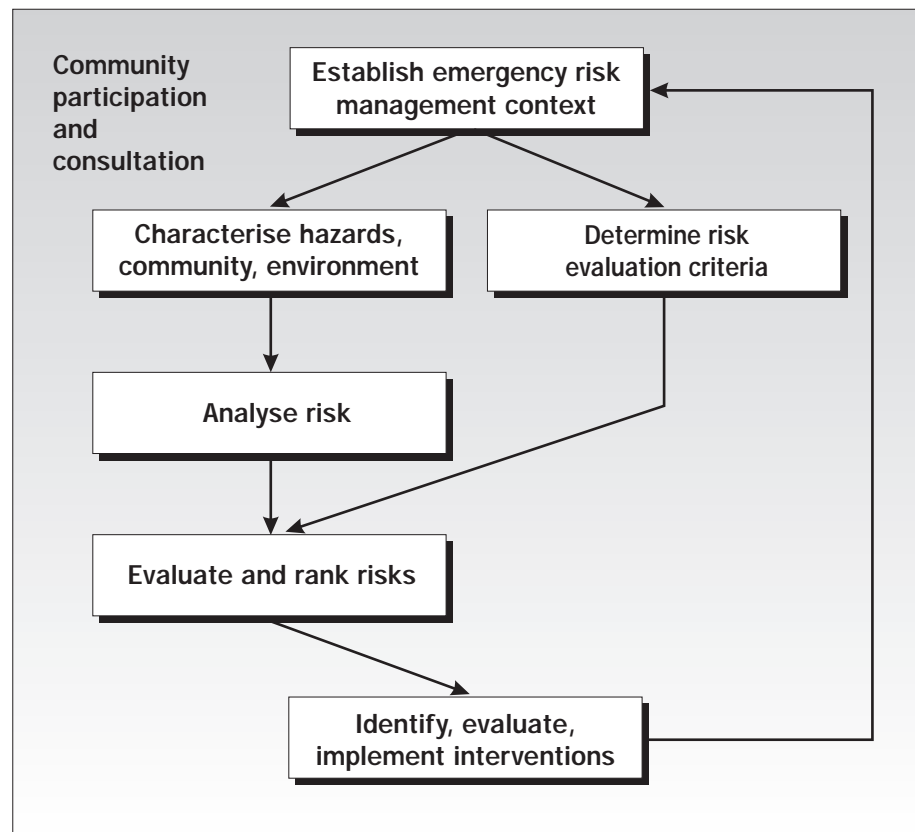


Figure 2: Emergency risk management process

Emergency risk management enables emergency managers to:

- make predictions about the likelihood of disruption or damage in a community
- rank outcomes from emergencies in terms of likelihood,
- try various intervention strategies to determine effectiveness,
- monitor the effectiveness of emergency plans as circumstances change.

'Establish the emergency risk management context'

The problem is defined including the detail of the scope and constraints. The Emergency Risk Management structure is defined—the operating rules and policies in which the solution will be sought. The stakeholders will be identified and invited to participate.

The outcome of this process will be a clearly defined brief for the Emergency Risk Management Model. It will list the boundaries, note and describe the constraints and give detail on the environment in which the Emergency Risk Management model will have to operate.

This is the first stage of the process and in the identification of the stakeholders, the community will have been involved. The community has stake in the solution, as the possible consequences involves the community as potential victims. As well, any intervention to be

implemented will inevitably affect the life and function of the community in some way. Many interventions will require the community to implement the plan.

In establishing the emergency risk management context, the community should have been identified, invited to participate, and had some input to the structure in which a solution will be sought. (It is their problem—the emergency risk management process is assisting them to solve it!)

'Characterise hazards, community, and environment'

While the previous step defined the boundaries and the nature of the problem, this step focuses on the main elements of the risk analysis itself:

- hazard
- community and the potential consequences
- environment.

The outcome of this process will be clear definitions of the hazards used in the risk analysis process and the anticipated consequences. The affected community will have been defined and the environment in which the consequence may arise is also defined and described.

A *hazard* is any situation, condition or thing that has the potential to disrupt, damage or bring loss to things that people value.

This is a very wide definition of hazard and includes:

- *natural hazards* — bushfire, storm, flood, cyclone, earthquake etc.
- *technological hazards* — dam failure, systems failure, food contamination, industrial accidents, transportation accidents etc.
- *biological hazards* — spread of disease among plants, animals, people etc.
- *civil and political hazards* including war, terrorism, sabotage.

The *community* has already been defined earlier in this article.

The *environment* comprises conditions or influences that surround or interact with a community, including social, physical (natural) and built elements.

This definition includes much more than just the natural environment.

- *built environment* — buildings, infrastructure, systems for transporting people, goods and services
- *natural environment* — topographical features, ecosystems, vegetation, climate, water

- *social environment* — politics, economics, commerce, culture.

Funding cuts can dramatically influence a community's ability to prepare for and cope with a potential hazard. The economic environment can have a significant influence on the risk that communities have to bear. This environment can change rapidly and somewhat arbitrarily. It needs particularly careful monitoring.

The community will have a strong involvement in this step as well. It is their perception of the *hazard* that is important. The community is uniquely positioned to assist in characterisation of the *environment*.

It is the community's environment, and the people in it often understand it and the processes very well. The range of expertise in the community can often make a useful contribution to the characterisation of hazards, community and the environment.

'Determine risk evaluation criteria'

The risk evaluation criteria is a measure of the risk that could be accepted by the community. It is impossible to envisage performing this step without the assistance of the affected community.

Perceptions of acceptable losses change with time. They are complex functions of legal, technical, economic, social and humanitarian issues.

It is vital that the risk evaluation criteria are those that are put forward by the community. If the community do not own the criteria against which a solution is found to be good, then they will not own the solution either.

'Analyse risk'

Analysis of risk is the step of modelling the linkage between a hazard and consequence. It can be done using many different types of modelling:

- *physical model* — a scaled replica is used for prediction
- *mathematical model* — a mathematical relationship between cause and effect is used
- *intuitive modelling* — an intuitive understanding of the behaviour is used.

The modelling processes is used wherever we make predictions. It does not have to be mathematically based, in fact we most often use an intuitive modelling of the problems we solve. Risk analysis can produce:

- *quantitative results* — the answer will be a number or probability
- *qualitative results* — the answer will be relative e.g. low or high.

In modelling the whole of the process (from *hazard* which may consist of a number of different situations that interact with a complex *environment*) a number of steps must be taken:

- the likelihood of the hazards arising must be assessed
- the likelihood of the hazards occurring simultaneously with the environment that will cause it to become a serious situation must then be found
- finally, the processes that will lead to the consequences must be modelled to derive the likelihood of the consequences arising.

The modelling steps used in the analysis require expertise, which in some cases must be brought in from external sources. In many cases the expertise, experience of similar situations in the past and the intuitive understanding of the processes can be found in the community. If nothing else, the community will have the experience to calibrate any model used and hence validate the analysis step.

'Evaluate and rank risk'

After the risk has been determined, it must be compared with the evaluation criteria previously identified by the community.

Where the risk is within the evaluation criteria, then clearly the community is prepared to accept its current risks, and no further action is required.

Where the risk exceeds the evaluation criteria, then the model indicates that the performance is not satisfactory and some changes will have to be made.

The extent of the problem that must be addressed is given by the shortfall between the risk obtained in the analysis and the level that was the basis of the evaluation criteria. In cases where the risk is much higher than the risk that

the community had identified as acceptable, then the problem is more serious than in cases where the discrepancy between risk and the criteria was small.

This gives the community a basis for ranking their risks. As the concept of risk is associated with perception of exposure, the ranking process must involve the stakeholders.

Only the affected parties can really rank the risks, as so much of risk is associated with perceptions, dread and worry. It is often hard to describe what worries us and why. It is nearly impossible to describe what worries someone else. Let the community rank its own risks.

'Identify, evaluate and implement interventions'

Figure 1 showed that risk is a function of the properties of the hazard and the way they interact with the community. It can be modified by varying the properties of the hazard, or in some cases, the characteristics of the community. These changes in the basic elements of risk are known as interventions. However the most common intervention is the modification of the environment to reduce the impact of a hazard on the community. *Figure 3* illustrates the concept of using intervention to change the environment and reduce the risk.

Intervention is a systematic change with the potential to reduce risk. The process of identifying and refining interventions is one that draws on experience, creativity and understanding of the principles underpinning the problem. It presents great opportunities for innovation, and for community involvement.

In this step

- Interventions that have the potential to reduce the risk are identified.

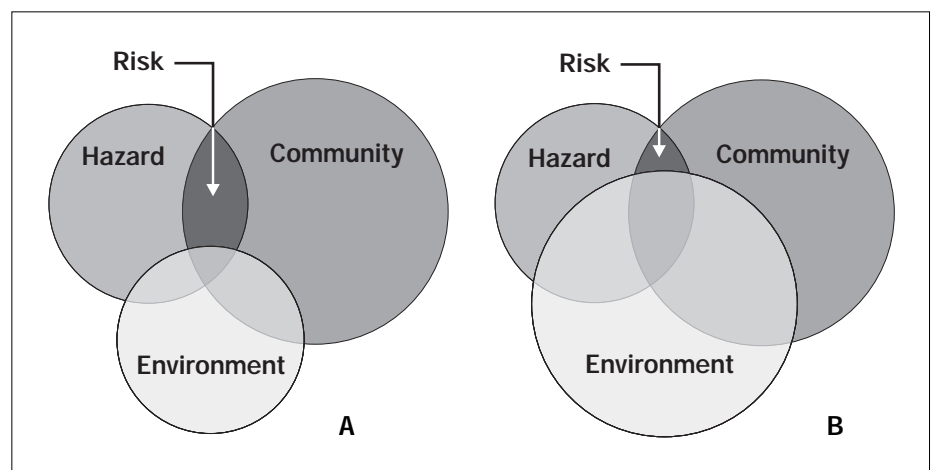


Figure 3: Intervention to reduce risk
A: large risk before intervention B: smaller risk with changed environment.

- Potential interventions are evaluated for their effectiveness in reducing the risk. The easiest way of achieving this is to run the risk analysis again, but this time with the changed conditions that represent the intervention.
- Interventions may have to be refined. This involves tailoring the intervention to fit the particular problem being addressed. Any solution should be robust. Small changes in the environment should not make radical changes to the effectiveness of the intervention. This part of the refinement of the intervention is known as a sensitivity analysis. In this, random changes in some aspect of the environment are made, and the risk analysis with the intervention is run again. Where the random changes to the environment have little effect on the risk, then the intervention is robust. Where the intervention is only successful under very particular combinations of environmental factors, then the intervention is unacceptably sensitive to the environment and will need further refinement.
- Interventions are put forward for funding and adoption.

- Finally interventions are adopted and implemented.

Because the environment and the community are continually changing, the Emergency Risk Management process should be repeated to ensure that the current interventions are still relevant and effective in producing acceptable risks for the community.

In this step, community involvement will assist in the development of interventions that are specifically directed to local circumstances. The community that develops their own solutions will also have ownership of the solutions and be very supportive in their implementation. The interventions that are put together by the people who are most affected by the problem will be the ones that will be most fiercely defended and vigorously implemented.

Conclusions

Emergency risk management is a powerful tool for reducing risk. It uses well-established generic management processes, that have been incorporated in the Australian Risk Management Standard, and interpreted in an emergency risk management context in the Emergency Risk Management Guidelines.

An under-pinning principle of emergency risk management is that the solution to a problem that affects a community will be found with their active participation at all stages of the process. Communities should be involved in:

- the establishment of the scope of the problem
- the characterisation of hazards, community and particularly environment
- the analysis of the processes that cause the consequences
- the ranking of the risks that affect themselves
- the identification and refinement of interventions
- the implementation of the selected interventions.

Not only does this participation make the solution one that the community will own, but they will also own and defend the process by which the decision was made. As well, the expertise and experience of the community has been harnessed to find the solution, and this has the potential to make the solutions better than those selected by individuals or organisations acting in isolation.

Emergency Expo '98

**Werribee Racecourse, Victoria,
October 2nd-3rd, 1998
'Bigger and better in '98'**

Emergency Expo '98 will be held on Friday 2nd and Saturday 3rd of October 1998 at the Werribee Racecourse, Victoria.

Organisers say the event promises to be the 'biggest, best and most comprehensive trade and emergency services expo ever held in Australasia'.

It is expected that over 150 trade exhibitors will be attending, displaying and demonstrating some of the latest equipment for emergency service operations.

An extensive range of workplace safety equipment, fire protection and suppression equipment will also be displayed. In addition, emergency services and others incorporated under the Victorian Emergency Management Plan will be participating. The defence forces will also be attending.

The two-day event commences with a 'trade day' on the Friday, followed by a 'family day' on Saturday. Both days will feature continual displays, a carnival and an array of interactive activities.

For exhibitor or emergency service information contact the expo organisers:

Hoppers Crossing Fire Brigade

Tel (03) 9748 0829

Fax (03) 9748 8341.

E-mail: hcrossing.fs@cfa.vic.gov.au

Further information can be accessed on the Emergency Expo '98 web page:

www.vicnet.net/~hxfb

Correspondence can be made to PO Box 1126, Hoppers Crossing, Victoria, 3029, Australia.

