Disaster and Emergency Management Systems

Tony Moore
## Contents

**Acknowledgements**  xi

**Introduction**  xiii

1. Outline of the disaster and emergency management system  1
   - Introduction  1
   - Aim  1
     - *Case study 1.1  The London bombings, 7 July 2005*  2
   - Purpose  4
   - The elements
     - *The functional element*  4
     - *The human element*  5
   - The DEMC  7
   - Description of the phases and activities of the DEMC  8
     - *Phases*  8
     - *Activities and functions*  9
     - *Warning*  12
     - *General comments*  12
   - Conclusion  13

2. Key terminology  15
   - Introduction  15
   - Disaster
     - *Natural disaster*  15
     - *Human-made disaster*  16
   - Catastrophic incident or emergency
     - *Emergency*  16
     - *Crisis*  18
     - *Major incident*  19
     - *Major accident*  20
   - Other definitions  21
   - Conclusion  21
3. External factors influencing a DEMS: an overview
   Introduction
   External factors influencing a DEMS
   The natural environment
   Societal factors
   Legal factors
   Government and political factors
   Technological factors
   Commercial factors
   Sources of information
   Conclusion

4. External factors: the law
   Introduction
   Legislation
   Health and Safety at Work etc. Act 1974
   Company Directors Disqualification Act 1986
   The Management of Health and Safety at Work Regulations 1999
   Civil Contingencies Act 2004
   The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005
   Corporate Manslaughter and Corporate Homicide Act 2007
   Specific legislation for specific functions
   Guidance on directors’ responsibilities for health and safety
   Health and Safety Executive Enforcement Policy Statement
   Health and safety investigations and prosecutions
   Conclusion

5. The role of government, the emergency services and the military
   Introduction
   The emergency services
   Local level
   Regional level
   National level
   The government’s concept of operations
   Guiding principles
   Strategic objectives
   Cabinet Office Briefing Room
   Local government
The planning sequence

Step 1 – Identification of the planning authority
Step 2 – Establishing a planning framework
Step 3 – Identify the nature of the tasks
Step 4 – Appreciation and outline plan
Step 5 – Circulation of and consultation on the first draft plan
Step 6 – Identification of problems and critical areas
Step 7 – Circulation of the final draft
Step 8 – Development of specific stakeholder plans
Step 9 – Co-ordination
Step 10 – Finalize plans
Step 11 – Training and practising
Step 12 – Review

Standard operating procedures
Media plan
Conclusion

9. The functional element 2: communications and information

Introduction
The importance of communication
Problems in communication
The physical aspects of communication
On-site emergency operations centre
Communication equipment
ACcess Overload Control (ACCOLC) and the Government Telephone Preference Scheme (GTPS)
Communication processes
Information
Information cycle
Provision of information to external sources
Conclusion

10. The functional element 3: public relations and the media

Introduction
Principles
1. Address your ‘real’ audience, not the media itself
2. Acknowledge that there has been a disaster or emergency and be honest
3. Show concern and be compassionate
4. Be conscious of time
5. Be proactive 96
6. Identifying the right spokesperson 97
Media/public relations department 97
   More than one organization involved 97
Dos and don’ts 98
Conclusion 98

11. The human element 101
   Introduction 101
      Case study 11.1 Piper Alpha oil rig disaster 101
   The difference between command, leadership and management 102
      Case study 11.2 The Hillsborough Disaster, 1989 103
      Flavour of the month management 105
   The importance of decision making 106
      The decision-making process 106
      Experience 108
      Case study 11.3 Stoke Mandeville Hospital – Clostridium difficile 2003–2006 109
      History 110
   Training and exercising 110
      Case study 11.4 Ladbroke Grove Train Crash, 1999 110
   Competencies 112
   Conclusion 113

12. Responding to a disaster or emergency 115
   Introduction 115
   Principles of an effective response 115
      Continuity 115
      Preparedness 116
      Subsidiarity 116
      Direction 116
      Integration 117
      Co-operation 118
      Communication 118
      Anticipation 118
   Command and control 119
      Operational (bronze) level 119
      Tactical (silver) level 119
      Strategic (gold) level 120
      Strategic Co-ordinating Group 121
Disaster and Emergency Management Systems

Levels of incident management or command 122
Incident manager 123
Case study 12.1 Manchester bomb, 1996 125
Conclusion 126

13. Recovering from a disaster or emergency 127

Introduction 127
Principles 128
Some basic considerations 129
Planning for recovery 130
The contents of the disaster recovery plan 131
Implementing the recovery plan 133
Conclusion 136

14. Audit and review 137

Audit 137
Should audits be carried out in-house or rely on external consultants? 137
Review 139
Learning the lessons 140
The ultimate audit 142
Coroner’s inquest 142
Criminal investigation 143
Internal government department inquiry 143
Technical investigation 143
Public inquiries 143
Conclusion 144

15. Conclusions 145

Problem areas 145
Disaster and emergency management checklist 146
Essential elements in dealing with a disaster or an emergency 147
Conclusion 148

References 149
Introduction

Major disasters and emergencies can lead to substantial physical and financial losses, liability claims and severe business continuity impacts, including a loss of reputation. Sometimes, they involve huge risks and will almost certainly involve uncertainty. At worst they can cause death and destruction, and send organizations into liquidation. The psychological trauma following such an event both from an individual and from an organizational standpoint can result in decreased productivity, increased absenteeism and an increase in workers’ compensation claims. On the other hand, if they are managed effectively they can enhance reputations and provide opportunities for future growth and development.

It is often said that there are two forms of disasters and emergencies: those an organization manages and those that manage the organization. In far too many cases, it is the latter that occurs – the organization is managed by the disaster or emergency. A major reason for this is that organizations fail to acknowledge the possibility that such events can and do occur, quite simply because the management of them is still regarded by many as a somewhat negative activity. Whilst the situation has noticeably improved since the tragic events in New York and Washington on 11 September 2001, managers in many organizations are still reluctant to give it the time it requires. Indeed, too many remain of the view that disasters and emergencies happen rarely, involving very few organizations. Therefore, their time is best spent on issues relating to the general purpose of the organization. Whilst there is some evidence that the situation has improved since 11 September 2001, such improvements are for the most part still too limited and, in many cases, suffer from a lack of support at a senior level.

Prior to 7 July 2005, the intelligence services and the police in the UK were consistently warning that, in relation to terrorism, it was not a matter of ‘if’ but ‘when’ an attack would occur. The same can be said of any disaster or emergency. The recent list of emergency situations to which organizations
Disaster and Emergency Management Systems

in the UK have been required to respond is extensive. They include flooding on a number of occasions in different parts of the country, the disruption of fuel supplies, foot and mouth disease, acts of terrorism, financial crises, disruption of power supplies, technological and transportation accidents, and industrial and managerial unrest, the last often resulting in the resignation and replacement of senior executives, including chief executives. Indeed, the list is almost endless, although the UK is fortunate in one respect in that it does not suffer from some of the more extreme natural disasters.

Despite the simultaneous terrorist attacks in London on 7 July 2005 this disturbing position remains, particularly amongst medium-sized and small businesses. The London Business Survey, conducted jointly by the CBI and KPMG in 2006, found that:

- just over half of the small- and medium-sized businesses (53 per cent) were unprepared for disruption;
- only 47 per cent of companies with less than £5 million turnover, which amounts to over 98 per cent of businesses in London, were found to have a contingency plan.

The failure of many organizations to adequately test their plans was also a focus of the survey, which found that:

- some organizations that do have business continuity plans (BCPs) fail to exercise them as often as they should. Only 37 per cent of those who did have plans tested them at least once a year. This is down from 52 per cent when compared with the survey carried out in 2005;
- when they have been exercised, a large majority (79 per cent) have revealed shortcomings in the plan.

The survey pointed out that such complacency probably existed because only 45 per cent of the businesses contacted saw damage caused by acts of terrorism as a major threat to their businesses. Too many organizations remain of a mind that ‘it won’t happen to us’.

Organizations do face problems all the time. Most solve them one way or another. Sometimes, however, these problems become extremely difficult to manage, at least at the time they occur or in the manner in which they unfold, and, often with the help of the media, they become of public interest. When such events do occur, the management of the organization should proceed in a way that guarantees the most effective response in order to recover swiftly from them. The key is to have an integrated and co-ordinated approach.
It follows that all organizations should develop and implement such procedures and protocols in preparation for a disaster or emergency that will enable them to provide for a caring, effective and immediate intervention, followed by a rapid recovery from its effects.

The British Standards Institution (BSI) produces a range of standards, guidance and specifications aimed at assisting organizations, both in the public and private sectors, to comply with legislative and International Organization for Standardization (ISO) requirements, which could assist in developing procedures in certain areas.

Some of the more well-known standards include:

- BS 25999 Parts 1 and 2 – Business continuity management
- BS EN ISO 9001 – Quality management systems — Requirements
- BS EN ISO 14001 – Environmental management systems — Requirements with guidance for use
- BS 8555 – Environmental management systems — Guide to the phased implementation of an environmental management system including the use of environmental performance evaluation
- BS OHSAS 18001 – Occupational health and safety management systems — Requirements
- BS ISO/IEC 27001 – Information technology — Security techniques — Information security management systems — Requirements
- BS EN ISO 22000 – Food safety management systems — Requirements for any organization in the food chain
- ISO/IEC 20000 Parts 1 and 2 – IT service management
- SA 8000 – Social accountability

This book follows the same process logic as the above documents: the Deming Cycle of ‘Plan’, ‘Do’, ‘Check’ and ‘Act’. ISO Guide 72 expanded on these four concepts and stated that a management system consists of elements such as initial status review, policy, plans, implementation and operation, checking and corrective action, management review and the need for continual improvement. The same structure and format as ISO Guide 72 is used, making it more accessible, understandable and useable as a tool by organizations that already operate to BSI or ISO standards.

Chapter 1 outlines a disaster and emergency management system (DEMS) together with the various phases, and general activities or functions attributable to each phase, of the disaster and emergency management cycle (DEMC).
Chapter 2 deals with some of the key definitions, of which there are many, that are used when discussing disaster and emergency management.

An organization cannot develop a DEMS in isolation. Chapter 3 therefore describes the various external factors that need to be considered. Two of these, legislation and the role of government and the emergency services and other key agencies, are described in greater detail in Chapters 4 and 5. Chapter 6 examines the steps that need to be taken and the considerations that need to be taken into account in order to identify and analyse significant risks and threats.

Having identified the risks and threats that an organization faces, senior management needs to formulate a policy that the whole organization will adhere to specifically in relation to disasters and emergencies. Chapter 7 describes what this entails and outlines some of the difficulties that can befall an organization that fails to adhere to its policy.

Chapters 8 to 10 deal, in greater detail, with three important aspects of the functional element of a DEMS: planning, communications and information, and public relations and the media. In the last case, public relations and the media, it is debatable whether it should come under external factors, the functional element or the human element. The media are clearly an external factor but public relations is, arguably, very much internal. Dealing with both requires human interaction but, in this case, it has been taken as a part of communication and information.

Chapter 11 describes what is meant by the human element of the system. Chapters 12 and 13 look at the response and recovery phases of the DEMC. Chapter 14 outlines the need to constantly audit and review the DEMS if it is to be effective. Bringing the book to a conclusion, Chapter 15 highlights some possible problem areas in any DEMS.

The case studies in this book are many and varied, ranging from the crisis at Northern Rock Bank to an industrial dispute at Gate Gourmet that affected British Airways; from a police operation at a football match to an outbreak of *Clostridium difficile* in hospitals; and from an explosion at a BP refinery in Texas to the London bombings of 7 July 2005. It follows that the development and implementation of a DEMS applies to all organizations, whether they be public or private or whether they be manufacturers or service providers.
Table 0.1 summarizes the commonality between DEMS and other BSI documents.

<table>
<thead>
<tr>
<th>BSI documents (BS OHSAS 18001, BS EN ISO 14001, BS 25999, etc.)</th>
<th>DEMS (Chapters in this document)</th>
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</thead>
<tbody>
<tr>
<td>Initial status review</td>
<td>Chapters 3, 4, 5 and 6</td>
</tr>
<tr>
<td>Policy</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Plans</td>
<td>Chapter 8</td>
</tr>
<tr>
<td>Implementation and operation</td>
<td>Chapters 9, 10, 11, 12, 13 and 14</td>
</tr>
<tr>
<td>Checking and corrective action</td>
<td>Chapter 15</td>
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<tr>
<td>Management review</td>
<td>Chapter 15</td>
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<td>Continual improvement</td>
<td>Chapter 15</td>
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In particular, a DEMS has a strong link with:

- **BS 25999-1 and BS 25999-2**: Business continuity is the proactive management of outages when they impact on the organization’s critical function. How does it differ from a DEMS? When a disaster or emergency strikes, one may view business continuity akin to specialist surgery aiming to get core organs of the organization operational and active. A DEMS in contrast is concerned with the entire body corporate – its structure, function and resilience before, during and after the peril (be it a risk, threat or outage).
- **BS OHSAS 18001:2007** makes reference to ‘Emergency Preparedness and Response’. This DEMS guide may be regarded as providing detail to this BS OHSAS clause.
1

Outline of the disaster and emergency management system

Introduction

By following a series of steps, an organization can develop a disaster and emergency management system (DEMS) that will enable it to effectively manage a disaster or emergency. This will assist both senior management and board members to be prepared for any disaster or emergency that could affect their organization.

The aim of this book is to provide a strategic overview of the key steps that organizations can take to ensure the risks of catastrophic failure are minimized through the proactive use of a DEMS. In writing the book, a key objective is to get the target audience to ‘think systems not plans’.

The focus of the book is on minimizing the risks and threats of a major disaster or emergency affecting an organization to the extent that its operations are seriously affected. If that fails, then the organization needs to be in a position to respond effectively to the events in such a way that it is able to recover with the minimum of damage to its operations, its employees and others who are or may be affected by it. The emphasis from the start is on taking an organizational approach so that the user can practically and sequentially not only develop a DEMS but also integrate it into the everyday operations of the organization.

Aim

The primary aim of any chief executive or head of an organization when faced with an actual or potential disaster or emergency must be to take control of
the situation or the events as quickly as possible with the minimum of damage to people, the organization or, indeed, any other people, including the general public, or organizations that might be affected by the situation or events. The principal aim of a DEMS, therefore, is to deal with uncertainty.

CASE STUDY 1.1

The London bombings, 7 July 2005

Circumstances
Between 8.50 and 8.53 on 7 July 2005, suicide bombers exploded three separate improvised explosive devices (IEDs) on underground trains in London. Just under an hour later, a fourth suicide bomber exploded his device on a London Transport double-decker bus. The four explosions killed 52 people. Around 770 people were treated for injuries and hundreds more suffered psychological trauma.

Commentary
The timing of the incidents meant that many people were travelling to work. However, the effects of these four separate incidents were not confined to businesses in London because it also meant that many people from outside the capital had just arrived in London for meetings. The response to the incidents by the emergency services and other key agencies is covered extensively in The Report of the 7 July Review Committee (London Assembly, 2006). Some of the effects that the events of that day had on business in London are contained in two reports:

- Information and Communications Survey Report (British Continuity Institute and Link Associates International).

Mike Osborne, Operations Director of ICM Recovery Services, claimed that ‘coordinated, simultaneous attacks which would cut off transport links, render telecommunications ineffective and cause multiple invocations in the same area’ had not generally been anticipated, although this did not apply to the emergency services and some of the major organisations in London. Clearly, the events of the 7 July 2005 affected a large number of businesses simultaneously and the Link Associates International Report suggests that ‘this imposes a different set of challenges on the business response to that experienced during a single isolated incident, no matter what the scale’ (Link Associates International, 2006).
Many businesses identified one or more of the following problems:

- accounting for employees and knowing their whereabouts; this was compounded due to the number of staff travelling to work or to meetings at the time;
- switchboard operations were overloaded and operators struggled to cope with the enquiries received;
- difficulty in the acquisition of reliable information as to what had happened and what to do.

Uncertainty arises when there is an absence of information about a given situation – which is often a great deal in the event of a disaster or emergency, certainly during the early stages. Uncertainty is the doubt that exists and which can block or threaten to block action. There may be uncertainty about existing conditions – factual information – such as what precisely has occurred. But even when certainty about factual information exists, there will be less certainty about what to infer from those facts. For instance, in London on 7 July 2005, there was considerable uncertainty, particularly in the early stages, as to precisely what had happened. Even when it became clear that bombs had exploded at the four locations, for some time the police did not know whether they had been planted and, therefore, the bombers were still free, or whether more bombs were likely to go off. So, even if reasonable inferences are made from the available facts, those who are required to manage the situation cannot know for some time which of the countless possible eventualities will occur.

It is often thought that a DEMS is distinct and specialized in that it covers communications, plans and procedures. In fact, it is much wider than this. It is the means by which an organization identifies, recognizes and is in a position to carry out what needs to be done.

- Sometimes it takes the form of preconditioned reactions. For instance, an exercise or simulation that requires people to evacuate a building in the event of a fire or terrorist attack; these are practised in advance so that an organization can execute them more effectively in the event of the real thing.
- Or it may involve rule-based procedures (sometimes known as standard operating procedures), as in, for instance, the shutdown of a chemical plant or, perhaps, the action taken when a virus is discovered in an IT program.
- Or the circumstances are such that they require degrees of leadership, judgement and decision making that can only be performed by skilled, experienced people, such as devising the strategy and tactics to deal with a fast-moving fire, particularly where lives might be at risk.
Disaster and Emergency Management Systems

Purpose

The purpose of a DEMS is to enable an organization:

- to prevent a potential disaster or emergency from developing into an actual disaster or emergency; or
- if that is not possible, to bring the disaster or emergency under its control; and
- to permit those who have a responsibility for its control to shape the course of the disaster or emergency through their actions, and thereby to bring about an acceptable and appropriate solution.

An acceptable and appropriate solution is one that returns the situation to normal or brings about a new normalcy, with the least disruption to the organization and all concerned, both internally and externally.

The purpose must, therefore, be to strive to reduce uncertainty to a manageable level by gathering and using information, but it must be accepted that uncertainty can never be eliminated. Why? Since many disasters and emergencies are caused by humans, either accidentally or deliberately, and because humans can be so unpredictable, such events are subjected to all the complexities, inconsistencies and peculiarities that tend to characterize human behaviour.

The elements

A DEMS consists of two broad elements: the functional and the human; see Table 1.1.

The functional element

The functional element includes the physical and procedural elements of the system such as:

- organization:
  - command/management team(s);
  - reporting chain;
- process:
  - planning. Deliberate planning determines aims and objectives, develops a concept of operations, allocates resources and provides for necessary co-ordination;
Outline of the disaster and emergency management system

- procedures, including that for gathering and disseminating information. Without information, no leader, no matter how experienced, can make sound decisions. Without information that conveys an understanding of the situation, subordinates cannot act properly. Without information in the form of a brief that provides an understanding of the situation on the ground, the correct action is unlikely to be taken;
- standard operating procedures;
- responsibilities/functions of authority;
- common terminology;
- facilities:
  - emergency operations centre;
  - integrated communications and other appropriate equipment.

Table 1.1 Two broad elements of a DEMS

<table>
<thead>
<tr>
<th>Disaster and Emergency System</th>
<th>Functional element</th>
<th>Human element</th>
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<tbody>
<tr>
<td></td>
<td>Organization</td>
<td>Identification and selection of key personnel</td>
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<td>(Command teams)</td>
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<td>(Reporting chain)</td>
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<tr>
<td>Process</td>
<td>Process</td>
<td>Ability and skills of key personnel</td>
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<td>(Planning)</td>
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<td>(Procedures)</td>
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<td>(Responsibilities)</td>
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<td>(Common terminology)</td>
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<td>Facilities</td>
<td>Facilities</td>
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<td>(Emergency operations centre)</td>
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<td>Training and exercising</td>
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<td>(Integrated communications)</td>
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The human element

The basis for an effective and efficient DEMS is the authority vested by an organization in those who are required to manage it. The system must allow those in leadership roles to exercise authority over the whole process, particularly the response and recovery, and control feedback about the effects
that any action has caused. The leader leads by directing or influencing the conduct of others.

Therefore the human element includes:

- the identification and selection of key personnel;
- the ability and skills of the personnel selected to handle a disaster or emergency;
- knowledge of the plans, agreements and procedures in place;
- a knowledge of history as it relates to disasters and emergencies;
- training and exercising.

**Requirements and desired effects of a DEMS**

A DEMS is an interactive process involving a number of phases and functions. The result is a mutually supporting system of ‘give and take’, in which all parts of an organization interact to ensure that the organization as a whole can adapt continuously to the changing requirements brought about by the disaster or emergency.

Any DEMS must allow:

- resources, both physical and human, to be brought to bear on the disaster or emergency with maximum effect;
- decisions to be made in good time and communicated to those required to act upon them;
- the conversion of those decisions into orders or instructions that will effectively respond to the situation or events;
- the monitoring and evaluation of the situation or events as they unfold and the actions taken during the response to the disaster or emergency.

In order to ensure this occurs, the system requires:

- sound co-ordination and procedures, which allows the organization to act appropriately during all phases of the disaster and emergency management cycle (DEMC);
- trained and, more importantly, effective leaders and managers, filling appropriate roles, during all phases of the DEMC at all levels of the organization;
- an efficient emergency operations centre;
- reliable and efficient communications that enable an organization to communicate both internally and externally;
sufficient equipment of the right type to enable an organization to respond to the threatened or actual emergency;

well tested contingency plans and standard operating procedures and the flexibility to alter these in a disaster or emergency if the situation demands.

The DEMC

The system must also be capable of covering all phases of the DEMC. Models are often criticized because they tend to oversimplify the reality of what is invariably an extremely complex event. This is especially true in the case of disasters and emergencies because no two incidents are ever the same. However, it is valuable to use a non-specific representation in order to understand the phases, and the functions that are necessary during each phase. This is highlighted in Figure 1.1.


Figure 1.1 The DEMC
Description of the phases and activities of the DEMC

The model shows how the phases neither fit neatly together nor follow an exact sequence. For instance, reconstruction does not wait until restoration has been completed. There is considerable overlap and sometimes it can be difficult to know precisely in which phase a particular activity is assigned.

Phases

Prevention and mitigation

As the word implies, prevention includes those measures aimed at impeding the occurrence of a disaster or emergency. Whilst it is impossible to prevent most natural disasters, other than those that occur through some deliberate act, it should, in theory, be possible to prevent those caused by humans. But history has shown that it is impossible to totally eradicate what is often referred to as human error.

Mitigation comprises all actions designed to reduce the impact of disasters and emergencies. They can be divided into:

- structural or physical measures, e.g. engineering solutions, strengthening of buildings and construction of flood defences; and
- non-structural measures, e.g. control of land use, insurance, legislation and public education.

Preparation

Preparation consists of those measures that can be taken that will enable organizations to rapidly and effectively respond to an impending or actual disaster or emergency and recover from it.

Response

Response relates to those measures that can be taken immediately prior to a disaster or emergency, if there is some kind of warning of the impending event, and/or during and immediately following the actual impact.
Recovery

Recovery is the process by which organizations and communities return

• the people affected by it;
• the location; and
• the functioning of the organization

to their/its level of functioning prior to the disaster or emergency, or, in some cases, it is an opportunity to improve the pre-disaster or pre-emergency situation.

Activities and functions

Within the above phases a number of activities or functions are likely to be required. It should be pointed out that none of the following lists is exhaustive and different organizations may have some alternative or additional requirements.

Assessment and planning

The number of tasks performed by a variety of stakeholders may include:

• risk assessment, which includes the identification of threats and vulnerabilities;
• horizon scanning for potential hazards/threats;
• a review of critical infrastructure in relation to the organization, e.g. power, heating, IT and the communication system;
• identifying and evaluating resources, i.e. capabilities to deal with any disaster or emergency;
• identifying gaps in those resources/capabilities;
• the development and review of contingency plans and procedures for a disaster or emergency, including those for evacuation and recovery;
• mitigation measures, including risk reduction, taking account of land-use planning and existing legislation, etc.;
• providing efficient in-house safety and management standard operating procedures, etc., which will, for example, enable an organization to shut down its operations immediately something goes wrong;
Disaster and Emergency Management Systems

- the designing of buildings, transport and other physical structures in such a way that the effects of any fire, flood, explosion or other accident or deliberate act, are minimized;
- the introduction of both covert and overt security measures;
- a system of inspection that allows an organization to quickly identify breaches of legislation and regulations, and any practice that might eventually lead to a disaster or emergency if not checked;
- if appropriate, planning and implementing a campaign of public/staff awareness.

Pre-impact activities

These activities will include:

- contingency planning;
- training and exercising;
- organizing and obtaining necessary resources.

There are a number of other activities that may occur during the immediate pre-impact stage if there is some warning of an impending disaster or emergency; otherwise they will take place during the initial stages of the emergency. These include:

- alerting and mobilizing the selected personnel;
- distributing appropriate equipment;
- if appropriate, implementing the early warning systems;
- evacuation.

Emergency

These operations may include:

- the implementation of plans;
- the survey and assessment of the immediate impact and identification of the emergency response needed;
- possible search and rescue, firefighting, decontamination, etc.;
- evacuation;
- if appropriate, particularly if incoming agencies such as police, fire, medical services are involved, the organization and co-ordination of activities, e.g. setting up of rendezvous points and triage;
Outline of the disaster and emergency management system

- the investigation and collection of evidence;
- forecasting on the medium- and long-term development of the disaster or emergency;
- the management of resources, and assessment of financial resources and needs;
- the immediate restoration of critical services;
- communication with staff;
- a proactive response to the media.

Restoration

These activities are likely to include:

- the survey and assessment of damage, including the economic and, if appropriate, environmental impact;
- an assessment of personnel and equipment required to recover from the disaster or emergency, together with a projection of costs;
- the provision of temporary essential services, facilities and infrastructure that are key to the operations of the organization;
- the management of resources, and assessment of financial requirements and needs;
- planning for reconstruction;
- counselling, as a result of the psychological impact on victims and responders;
- an information programme to rebuild public confidence if this has been affected by the disaster or emergency;
- continuing communication with staff;
- a continuing proactive response to the media.

Clearly, some of these actions span both the restoration and reconstruction activities.

Reconstruction

These actions may include:

- the reconstruction of physical structures damaged or destroyed by the disaster or emergency;
- the full restoration and/or replacement of all services, infrastructure and facilities;
a complete resumption of the pre-disaster state and development; 
planning for future development; 
a post-disaster/post-emergency review.

Warning

Depending on the nature of the disaster or emergency, there may be a warning that it will occur. The length of time between the warning and the actual occurrence will vary, again depending on its nature.

Warning – slow onset

A slow-onset disaster or emergency is one that is invariably insidious in nature and of such slow progress that it is not recognized as such until damage and suffering reach such proportions that it generally requires a massive emergency response. The foot and mouth crisis of 2001 was a typical example although there are others that have a much greater lead-in time.

Warning – some rapid onset

Most rapid-onset disasters and emergencies occur suddenly with no warning, e.g. the London bombings of 7 July 2005. Therefore, the response comes post-impact. However, occasionally, there are warnings albeit of minimum time frame. For instance, in the Manchester bomb of 1996, there was a warning of 1 hour 20 minutes, which enabled the police to evacuate most people before the explosion occurred.

General comments

It is important to note that, depending on the type of event:

• some phases and activities may take place simultaneously;
• the moment of impact can sometimes be difficult to identify; some slow-onset emergencies for instance do not readily have a moment in time that can be referred to as the trigger incident or impact incident;
• some activities or functions may be required in each of the phases, e.g. assessment and planning. However, the above lists indicate where the main part of each activity is likely to take place.
DEMS

The sequence to be followed in a DEMS is outlined in Figure 1.2.

![Figure 1.2 Sequence to be followed in a DEMS]

**Conclusion**

In summary, a DEMS consists of two broad elements, functional and human. Organizations must also recognize the various phases of the DEMC and be in a position to take appropriate action both before any disaster or emergency occurs, in terms of preventing it, mitigating the possible effects and preparing for it, and, after the event, be in a position to respond to and recover from it.