

THE MANAGEMENT OF FLOOD EMERGENCIES

Jessie Walsh, BA MSc. MICPEM

Dublin City Council

ABSTRACT

The Framework for Major Emergency Management issued by Government Directive in 2006 is a template for the coordination of the response to Major Emergencies in Ireland. Prior to the issue of the Framework emergency planning in Ireland was concentrated on operational response and resource allocation. The Framework coincided with a worldwide recognition of the need for a more holistic approach to emergencies. This approach involved a five-stage planning cycle and the establishment of a structure for coordination between the three principal response agencies involved in the management of emergencies.

For the purposes of Major Emergency planning Ireland is divided into eight regions. The designated Principal Response Agencies of the East Region, An Garda Siochana, The Health Service Executive and the Local Authorities, have agreed that flooding is one of the top risks, which form the basis for each agency's Major Emergency Plan. The new Emergency Plans based on the National Framework were put in place by 30th September 2008.

The Major Emergency Plans of each agency are written to the same standard and the definition of what constitutes a major emergency is common to all. Generally a historical basis is used for the identification of a hazard and its associated risks and assumptions for planning purposes will be based on this historical evidence. Where floods are concerned assumptions based on historical evidence may not always be valid.

For example the coastal flooding of February 2002 in Dublin City was the catalyst for the establishment of a flood forecasting system and flood maps for the city. Planning assumptions were based on the lessons learned from 2002 and previous coastal and fluvial flood events, however the Pluvial Flooding, which struck the city in August 2008, presented the response agencies with a very different set of circumstances.

This paper provides an overview of the structures for inter-agency coordination described in the Framework and outlines the contents of the Flood Guidance and Protocol issued in support of the Framework. The phases of a flood are described and the stakeholders involved in each phase are identified. The paper examines the lessons learned and the recommendations of the Pitt Review on the floods in the UK in 2007.

Finally the paper considers how the large body of research and the knowledge gained from previous events can be translated into a more comprehensive response to flood incidents. The paper highlights the fact that the degree of disruption experienced by a community from floods can be extremely diverse. Unlike other types/categories of emergencies the management of flood emergencies can be very location specific, therefore the lessons learned from previous events and a standard/generic approach to flood management applied in one administrative area may not be applicable in another.

DEVELOPMENT OF EMERGENCY PLANNING IN IRELAND

The starting point for emergency planning in this country can according to O'Riordan in his book "Emergency Planning in Ireland" be traced back to the formulation of a Major Accident Plan produced by the Southern Health Board in 1974 in response to the Buttevent Rail Crash (Aug. 1980) in which seventeen people were killed and forty-one injured. Following this incident the Department of Health convened a conference on Major Accident Plans at which the

then Minister for Health stated inter alia: that “the Health Boards are expected to play a primary role in preparing plans for Major Accidents”. The author continues by documenting the initiatives undertaken by the Health Boards and outlines the lack of co-operation or consultation with other government departments.

This lack of consultation became apparent when the then Minister at the Department of Environment issued a circular to all local authorities requesting that they prepare emergency plans in accordance with a separate set of guidelines which had been prepared by his Department. This initiative was undertaken as a reaction to the criticisms of the implementation of the Major Accident Plan and the preparedness of the Emergency Services in their response to the Stardust disaster of 1981. There were differences in the definition of the type of event, which would trigger the implementation of the plans. The major accident plans of the Health Board were designed for incidents involving large numbers of casualties whereas the Department of Environment initiative covered plans, which were concerned with a wide range of events including those with no casualty element.

The next government initiative was undertaken following severe blizzards, which closed many roads early in 1982. An Interdepartmental Committee on Emergency Planning was convened under the chairmanship of a representative from the Department of the Taoiseach. This committee included representatives from the Government Departments of Environment, Justice, Health, and Defence. The committee effectively handed a lead role in Emergency Planning in Ireland to the Department of the Environment.

In February of 1985 the Department of the Environment issued a Major Emergency Planning package¹ to all local authorities and they and the other emergency response agencies were invited to compile emergency plans based on this model. Until 2006 this guidance formed the basis for emergency planning in Ireland. Though this model contained much excellent material it was predicated on a site-based response to disasters. According to O’Riordan this is:

“a common mis-conception of disasters as larger versions of normal emergencies” which his research has led him to believe is basically flawed as “It reflects a failure to understand the major off-site organisational management issues which are critical to good emergency planning. One result of this flaw in the framework documentation is that many local authorities and health boards have concentrated much of their attention on the operational services such as the fire service and ambulance service. However, in any disaster situation it is likely that these services will perform well since their disaster role is similar to their everyday role. Organisation and inter-organisation management, on the other hand, are much more likely to be sources of difficulty in the aftermath of any disaster.”

THE FRAMEWORK FOR MAJOR EMERGENCY MANAGEMENT

It took over twenty years before the shortcomings in the model of 1985 were addressed. The main driver behind the review and revision was not the perceived shortcomings but a growing realization that we needed to move with current world trends.

“Clearly the world in which we live is constantly changing and we need to develop our major emergency management architecture to enable us to deal effectively with the possibility of new risks and threats. In the last few years most European Countries have engaged in review and development of their major emergency or civil protection arrangements. The new Framework for Major Emergency Management moves in line with international trends in this field.”

The publication of “A Framework for Major Emergency Management” in 2006 along with the Appendices and subsequent Guidance Documents dealing with a range of issues marked the

culmination of an extensive process of consultation and development. The project was overseen and validated by independent international consultants. The purpose of the new Framework was to establish the structures to enable the three principal response agencies, the local authorities, An Garda Síochána and the Health Service Executive to co-ordinate their efforts whenever a major emergency occurs. It was to be foundation block for the development of a new generation of major emergency plans by the principal response agencies. The document sets out mechanisms for co-ordination at all levels of major emergency management - on site, at local level and at regional level, it defines a common language or terminology to make inter-agency working simpler and it introduces a system to immediately determine a lead agency in every emergency situation. It also provides for linking to national level emergency management.

Unlike the 1985 model the current Major Emergency Management regime is a process which is embedded at all levels and includes structures to enable the National Steering Group to oversee an annual appraisal, review and development programme. This group is chaired and supported by the Department of the Environment, Heritage and Local Government and consists of representatives of:

- The Department of the Environment, Heritage and Local Government
- The Department of Health and Children
- The Department of Justice, Equality and Law Reform
- The Department of Defence
- The Local Authorities
- The Health Service Executive
- An Garda Síochána
- The Defence Forces

The terms of reference of this group are to perform the national level functions set out in the Framework and to:

- oversee the initial development programme for the implementation of the Framework;
- continue to develop, maintain and update the new Framework in light of the experience of its application
- report on these issues to the Government Task Force on Emergency Planning.

Figure 1 below illustrates each level of emergency management from local to national, the National Working Group are supported by the a secretariat in the DoEHLG, Fire and Emergency Planning section. In June of this year the Minister for the Environment, Heritage and Local Government established The National Directorate for Fire and Emergency Management in Ireland. The Directorate operates under the aegis of the Local Government Division of the Department of Environment, Heritage and Local Government and continues to provide a secretariat to the working group.



Figure 1: National Implementation Structure: A Framework for Major Emergency Management

The Framework is based on an “All-Hazards” approach, where the common features of co-ordinated response and the management of common consequences are recognised, regardless of the origin of the emergency/crisis. It advocates a systems approach involving a continuous cycle of activity. The principal elements of the systems approach are:

- Hazard Analysis/ Risk Assessment;
- Mitigation/ Risk Management;
- Planning and Preparedness;
- Co-ordinated Response; and
- Recovery.

The framework defines a major emergency as:

“any event which, usually with little or no warning, causes or threatens death or injury, serious disruption of essential services or damage to property, the environment or infrastructure beyond the normal capabilities of the principal emergency services in the area in which the event occurs, and requires the activation of specific additional procedures and the mobilisation of additional resources to ensure an effective, co-ordinated response”

The hazard analysis and risk assessment methodology advocated in the framework is designed to identify the circumstances to which the definition of a major emergency applies. This generally requires a level of impact and consequences, which are outside the normal response regime.

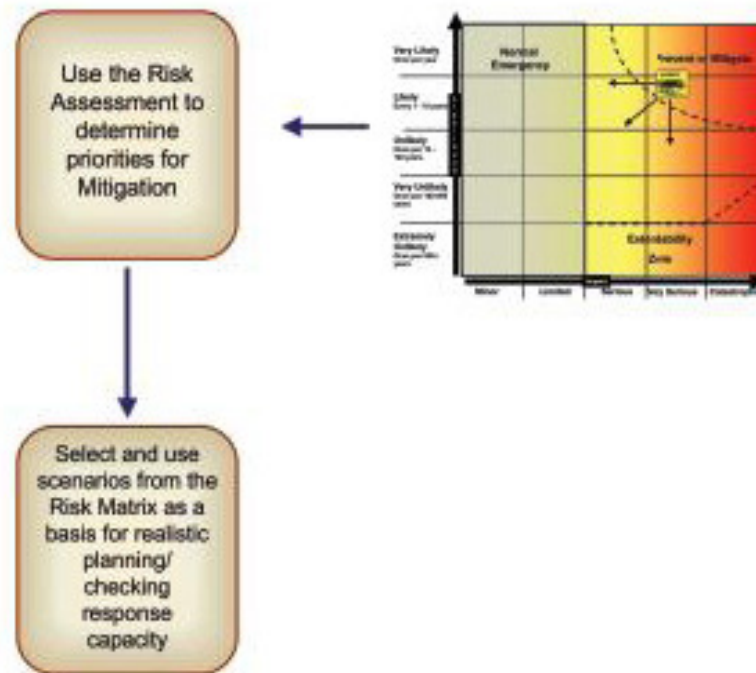


Figure 2: The Risk Assessment Process

There is a perception that unless an incident meets the criteria for a major emergency as outlined in the definition then the structures outlined in the framework for the coordination of an inter-agency response are not required. This view is supported by the Report of the Flood Policy Review:

“Plans for dealing with flood events that might not necessitate activation of a ‘Major Emergency Plan’ would need to be prepared by the local authorities. These would incorporate consideration of issues such as response procedures to initial, interim and final flood warnings (if available), the deployment of resources to mitigate damage (according to previously identified properties at risk), the installation of temporary or demountable defences (if available), emergency housing availability, post-event clear up operations, etc. It is noted that the establishment and operation of an effective emergency response plan is dependent to a considerable degree on the implementation of other programmes discussed most notably flood warning and flood risk identification; it is therefore essential that these programmes be implemented.”

Unfortunately, the definition, criteria and perception of what constitutes a major emergency can have an adverse impact on the management of severe flooding emergencies. A major emergency declaration activates a set of responses, which are also applicable to severe flooding events, mainly because of the complexity of such events.

APPLYING MAJOR EMERGENCY MANAGEMENT STRUCTURES TO THE MANAGEMENT OF FLOOD EMERGENCIES

Since 2002 Dublin City Council has had a team dedicated to developing and implementing measures to combat the effects of flooding in the city. A range of measures have been achieved under the Dublin Flood Initiative (DFI) which has strong links to the OPW and has secured EU

funding through INTERREG for the SAFER (Strategies and Actions for Flood Emergency Risk Management) project and the new Flood ResilienCities Project.

The author has been involved with the SAFER Project, and is currently a member of the EU expert group on the development of a Flood Rescue Module using Boats and is currently engaged in the development and implementation of the Framework for Major Emergency Management in Dublin City Council.

As the Dublin City Council representative the author was part of the team with representation from the Office of Public Works, and the Department of Environment, Heritage and Local Government Major Emergency Management National Office in the preparation of national guidance and a protocol for the management of flood events. The guidance included a template for a flood response plan, and advocated the establishment of a local authority led Flood Emergency Response Plan Working Group (WG). The guidance advocated regular meetings to aid the development of the Local Authority Flood Emergency Plan which incorporates the procedures of other responding agencies. The guidance provides a mechanism to plan for flood incidents utilising the structures advocated in the framework. One of the components of the framework is the utilisation of a common information management system to manage major emergencies.

The operation of such a system is the key to reducing damage and loss of life during a severe flooding incident. The system properly operated by a trained information officer or information management team is capable of managing raw data inputs from a variety of sources, manipulating that data into usable information and presenting it in a manner that will enable decision makers, operational flood fight response units and affected members of the public to undertake timely and appropriate assessments on which to base their decisions and act to mitigate the effects of the floods on their lives and properties.

The current inter-agency training programme for information managers under the auspices of the framework can be utilised for the routine management of information during extreme weather events. The generic information management system and its use during a training session are illustrated in figure 3.

Recognised Current Situation	Key Issues	Strategic Aim / Priorities	Actions



Figure 3: Common Information Management System

THE ELEMENTS OF FLOOD RESPONSE

Any review of the material available on past flood events show there are elements common to all flood emergencies, these include:

- Warning and alerting
- Timely erection of flood defences
- Mobilisation of life saving agencies
- Evacuation
- Provision of emergency shelter
- Provision of humanitarian aid
- Restoration to normality

The difficulty for Local Authorities, the lead agency for severe weather emergencies is that the resources required to deliver on these elements are not routinely available or are lacking in many local authorities.

Adding to the problem is the diversity of cause and impact which results in the resources required for a coastal event differing from those required for a pluvial or fluvial event. There are differences in warning periods, spatial information required, depth and velocity of the floodwaters, pollution present and event duration. In addition the “outrage factor” can result in the deflection of resources towards the current perceived risk rather than a systemic programme of location specific risk assessment. The “outrage factor” is defined as:

‘Outrage factor’

After major flooding events, there is a social amplification of risk. Experts term this the “outrage factor”. This leads to higher expectations from the public and stakeholders as to

what flood risk management levels should be provided now and in the future. Effective dialogue is required to ensure that the public and stakeholders understand the present risks and the increased risks in the future and the options that are available. This should include an appreciation of the costs involved.

An example of the influence of the “outrage factor” is the resources applied to the Coastal study undertaken in the Dublin area as a direct result of the Feb 2002 floods. Dublin now has a comprehensive warning system for coastal flooding and has established flood partnership programmes in the areas affected by coastal floods but still lacks an integrated fluvial and pluvial warning system and the development of flood partnerships in areas likely to be affected by such events in the future.

THE PROVISION OF REAL TIME INFORMATION

Major floods are a spatial phenomenon, which can affect a number of areas concurrently. Continuous visual information (rather than table-based information received by fax or email) makes it much easier to get an understanding of how a flooding event is unfolding especially when a large area is affected. In this respect, the Pitt Review of the 2007 floods in the UK recommends that data provision be less text-based and make use of more model and map-based information:

“... much of the information that needs to be exchanged and used is naturally map based (e.g. maps showing the distribution of key infrastructure and topography, vulnerable communities and assets flood-risk areas, and a real distribution of rainfall and flood extent – both current and forecast) and therefore amenable to be displayed as layers on a GIS (Geographic Information System).”

There has been a significant increase in the incidence of severe weather events in the last decade. In the summer of 2007 the floods in the UK were described as the largest civil emergency in British history:

“The hard facts are even more compelling. 55, 000 properties were flooded. Around 7,000 people were rescued from the floodwaters by the emergency services and 13 people died. We also saw the largest loss of essential services since World War II, with almost half a million people without mains water or electricity. Transport networks failed, a dam breach was narrowly averted and emergency facilities were put out of action. The insurance industry expects to pay out over £3 billion – other substantial costs will be met by central government, local public bodies, businesses and private individuals”.

Such extreme events know no boundaries. In August 2005 Hurricane Katrina devastated the city of New Orleans and while the world watched, a modern society was unable to cope with the destruction wrought by the Hurricane and the subsequent collapse of the flood defences.

There is also evidence that although extreme events may have previously occurred in the same location, such as the forerunner of Katrina, Hurricane Betsy in 1967, there is no guarantee that the impact will be similar. A Katrina survivor when explaining why they ignored the mandatory evacuation of the city on the day before Katrina struck cited their experience of the floods of 1967. At that time they rode out the storm and therefore judged incorrectly that they could stay in their homes for this one as well, this was an almost fatal reliance on lessons learned from past events as they were lucky to escape from Katrina with their lives.

In such circumstances even the most prepared emergency services can be overwhelmed with the magnitude of the task. In the excellent documentary on the impact of Katrina on the people of New Orleans from the director Spike Lee “When the Levees Broke” there were numerous

accounts of the difficulties faced by the emergency services. In the documentary a young girl recounted how she dialled the emergency services and could not get through. She finally managed to contact a news channel who informed her that the emergency services could not take anymore emergency calls and if she stayed where she was there was no one to save her. The young girl survived but her experience serves to illustrate the fact that if the emergency services are not taking calls who is going to respond where lives are in danger. System overload, the collapse of telephonic networks and/or the inadequacy of call answering systems can increase the negative impacts of extreme events and must be taken into account when planning for future events.

Finally as evidenced by the experiences from the UK and the US, floods have had a catastrophic impact on critical infrastructure such as electricity substations, water and sewage treatment works, and road and rail networks. The consequences of the loss of the essential services provided by these sectors can extend well beyond the areas that are flooded and there is a need to pay greater attention to improving the resilience of such infrastructure against flooding. In the past few weeks Dublin City Council have hosted a seminar in City Hall where the difficulties encountered in the large evacuation centre in Houston Texas, miles from the location of the floods were highlighted by a visiting professor who had responsibility for public health at the centre.

CONCLUSION

The aim of this paper was to highlight the difficulties of managing flood emergencies. In contrast to technological, transport and civil emergencies, so called natural emergencies can be complex, involve a large number of stakeholders and require the real-time provision of both spatial and technical data to enable the responders to make timely decisions to deploy always inadequate resources to effectively manage the incident.

Involving at risk communities in self help and awareness programmes and ensuring a continuous campaign of public awareness are essential to assist the response when the flood strikes. Mitigation measures alone will not protect our communities from the risk of future severe weather events.

The Framework for Major Emergency Management can provide the tools for an effective flood emergency management system. The structures for interagency coordination and information management outlined in the framework should be utilised for flood events even if the event does not comply with the definition of a major emergency.

A successful and effective outcome can be achieved with the development of accurate and timely flood hazard information, the transfer of real-time data in a spatial and non-technical format to the relevant stakeholders and on reliable forecasts and decision support systems. If the chain of linked actions is interrupted along the line then the one chance we get of avoiding loss of life, catastrophic infrastructure and property damage will be compromised.

The following illustration from the Pitt Review sums up the elements involved in the management of flood emergencies.



Figure 4: Listening to those affected by flooding

Finally, while this paper deals with a Flood Emergency when it happens, flood management policy - with its resilience planning and defence assets - is no less important. The following is a quotation, recounted by an Engineer in Spike Lees excellent documentary on Katrina “When the Levees Failed”.

“Engineering is a great profession, Engineers build stuff, Politicians may put their names to it, but we cannot deny we did it. Doctors can bury mistakes; Lawyers can blame it on the Judge and try to argue it away. Politicians can blame it on the opponent on the opposite side of the aisle. Architects can hide it with trees and shrubbery. An Engineer makes a mistake he is damned, for his mistake is there for all to see.”

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