

# **A COMPARISON BETWEEN ROUTINE CONSTRUCTION AND POST-DISASTER RECONSTRUCTION WITH CASE STUDIES FROM NEW ZEALAND**

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Abstract

Legislation that applies to routine construction provides for the safe development of infrastructure, capital improvements and land use, ensuring preservation and environmental protection, however there is often little provision in legislation to facilitate reconstruction projects. Much existing legislation was not drafted to cope with an emergency situation and was not developed to operate under the conditions that will inevitably prevail in the aftermath of a severe disaster. If well articulated and implemented, the regulations should not only provide an effective means of reducing and containing vulnerabilities (disaster mitigation), but also a means of facilitating reconstruction projects.

The purpose of this work is to examine how reconstruction differs from routine construction, focussing on the interrelated reconstruction challenges of allocation of responsibility for coordination, scarcity of resources and the application of legislation and regulations that were written for routine construction rather than post-disaster reconstruction.

Case studies of reconstruction following recent small scale disasters in New Zealand are presented to support the points raised. Extrapolation of the main issues to larger scale disasters identifies some significant challenges which, if not addressed in advance, are likely to hinder the reconstruction process.

The paper concludes that whilst routine construction processes have proved adequate for small-scale disasters, the greater degree of coordination required for programmes of reconstruction following a larger disaster has not been adequately addressed in policy and legislation.

Keywords: Reconstruction; Coordination; Legislation; Regulation

## **INTRODUCTION**

Disaster management and the need to develop a resilient community capable of recovering from disasters is of increasing concern in many countries. The recovery process may present an opportunity for improvement in the functioning of the community, so that risks from future events can be reduced while the community becomes more resilient. The effectiveness of the process will depend on how much planning has been carried out and what contingencies are put in place prior to the disaster.

In preparation for disasters there is often an emphasis on readiness and response, with poor understanding and little consideration given to the implications of recovery (Angus 2005). Experience has shown that recovery is often carried out by modifying routine construction processes on an ad hoc basis following a disaster. Whilst this can work reasonably well for small scale disasters, the effectiveness of reconstruction could be improved by modifying the legislative and regulatory framework in advance of a disaster. For larger scale disasters there is a greater imperative to have appropriate systems in place in advance, to allow effective coordination and delivery of reconstruction works.

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This paper defines reconstruction within the overall disaster management context and explores the issues of reconstruction frameworks through case studies of recent flood events in New Zealand.

## RECONSTRUCTION IN A POST-DISASTER SITUATION

Two stages can be identified in reconstruction activity following a disaster, generally referred to as response and recovery. The response stage is concerned, among other things, with clearing debris, making damaged structures safe, erecting temporary structures and restoring basic levels of transportation, sanitation, communication and power. The response stage tends to receive the most attention, both prior to an event in terms of planning, preparation and research of the processes; and after an event in terms of media and general public interest and expediency of regulatory processes.

Recovery is an integral part of the comprehensive emergency management process (Sullivan 2003). It refers to all activities that are carried out immediately after the initial response to a disaster situation. This will usually extend until the community's capacity for self-help has been restored. In other words, the end-state is when the assisted community reaches a level of functioning where it is able to sustain itself in the absence of further external intervention (Sullivan 2003). The components of recovery as defined by the Ministry of Civil Defence and Emergency Management (MCDEM, 2005a) are shown in Figure 1. This paper is concerned principally with the built environment.

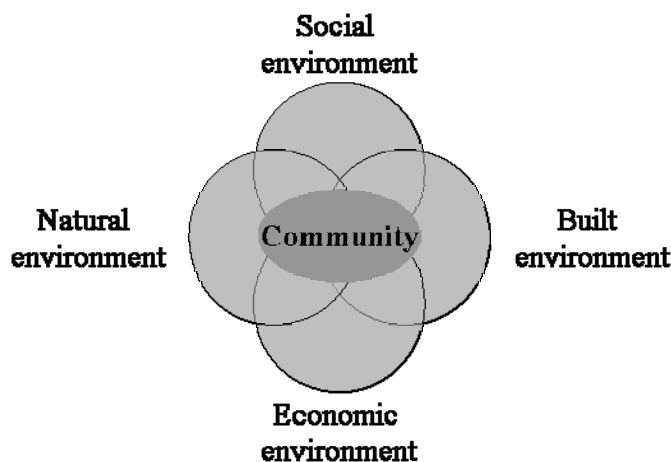


Figure 1. Components of recovery (Ministry of Civil Defence and Emergency Management, 2005a)

Recovery is defined as “the coordinated efforts and processes to effect the immediate, medium and long-term holistic regeneration of a community following a disaster” (MCDEM 2005). Recovery requires a concerted approach that will support the foundations of

community sustainability and capacity building and which will eventually reduce risks and vulnerabilities to future disasters. Jigyasu, (2004) describes an increase in vulnerability of local communities after the Latur earthquake in India, where sustainable recovery interventions were poorly planned and implemented.

## **REGULATORY AND LEGISLATIVE FRAMEWORK FOR RECOVERY**

In comparison to routine construction, there is often little provision in legislation to cater for post-disaster reconstruction processes as part of recovery. When an official state of emergency is declared following a major disaster special powers become available and routine statutory processes can be circumvented. However, once the state of emergency has been lifted the routine statutory processes become applicable, which can create sluggishness in the recovery process. The recovery stage can last several years and eventually transitions back to the point when construction processes can be considered routine.

To ensure robustness in the process, the rational starting point is the setting up of an institutional infrastructure for emergency management, which will formulate public policies for mitigation, response and recovery (Comerio 2004). These recovery policies should then be integrated into other emergency management areas as well as policies of sustainability and community capacity building (Coghlan 2004). The Ministry of Civil Defence and Emergency Management (MCDEM) in New Zealand encourages a holistic approach to the issue of recovery planning and believes this will be most effective if it is integrated with the remaining 3Rs of reduction, readiness and response (MCDEM, 2005a).

New Zealand's recovery planning and management arrangements are contained in the National Civil Defence Emergency Management Strategy (MCDEM, 2004). Recovery is delivered through a continuum of central, regional, community and personal structures (Angus, 2004).

Responsibility for coordination of recovery will be determined by a number of factors including the scale of the disaster. The MCDEM, together with cluster groups of agencies, coordinate planning at the central level. Regional and Territorial authorities are encouraged to produce group plans that will suit peculiar conditions of their local areas. However, unless lines of responsibility are made clear, management of recovery may involve an element of competition between central, regional and local levels of government for control of the process (Rolfe and Britton, 1995).

Unless provision is made for recovery in regulations and legislation that apply to routine construction, then the coordination and management of a major programme of reconstruction could become cumbersome and inefficient. For example it is unlikely that coordinating authorities and regulatory bodies would be able to cope with the volume of work, due to shortfalls in experienced personnel.

## **EXPERIENCES IN RECENT NATURAL DISASTERS**

In recent years there have been two locally significant disasters due to flooding events, at Manawatu in 2004 and Matata in 2005. The circumstances of these events are described briefly and some lessons learnt are summarised below.

### **The Manawatu Flood**

Flooding in Manawatu was caused by heavy rain and gale force winds from the 14<sup>th</sup> to 23<sup>rd</sup> of February 2004. A Regional State of Civil Emergency was declared on 17<sup>th</sup> February. The flooding caused over 2,000 people to be evacuated from their homes at the height of the event. Many rivers breached their banks and considerable areas of farmland were inundated by silt and floodwaters. There was significant damage to infrastructure with damage to roads, bridges, and railways. In addition, there were telecommunication, power, gas and water supply outages to tens of thousands of people. Remarkably no lives were lost as a direct result of the event.

Recovery costs are estimated at \$160-180million for the rural sector and \$120million for roads and council infrastructure. In addition \$29.5 million and \$3.5 million will be required to stop future flooding of the lower Manawatu and Rangitikei rivers respectively.

### **The Matata Debris Flow**

A debris flow occurred on the 18<sup>th</sup> of May 2005 when a band of intense rain fell in the catchments behind Matata in the Bay of Plenty region. This triggered floods and several large debris flows.

The highly erosive debris flows cleaned out the valley bottoms and destabilised the slopes along the channel, causing secondary landslides. The debris flows were structurally damaging to all buildings and bridges in their paths and at several locations the associated debris floods also were structurally damaging.

In response to the Matata disaster a Civil Defence Emergency was declared on 18<sup>th</sup> May 2005 and this remained in place until the end of May. Total government valuation including land value and capital value of properties affected along the flood path hazard was estimated to be \$9,740,000 for unsafe buildings and \$2,937,000 for buildings subject to restricted use.

### **Reconstruction following the floods**

Reconstruction was carried out through collaboration between CDEM agencies, local authorities, utility companies and insurance companies during recovery in the two cases. For the Manawatu-Wanganui region recovery was coordinated through the regional council's new CDEM Group arrangements under the provisions of the Civil Defence Emergency Management Act (CDEM Act) 2002. For the other territorial authorities the event was managed through their Civil Defence Act 1983 arrangements. The CDEM Act provides a structure appropriate for dealing with events such as the floods and did not introduce any structures or procedures that hindered authorities in dealing with the event. In Matata the state of emergency was extended to allow work to be completed on critical road access routes but still only lasted two weeks.

The roading authorities did not diverge from normal legislation and regulations and building consents were sought and granted as usual. Road users were consulted and kept updated on reconstruction issues.

A source of frustration for utility companies in the Manawatu flood event according to AELG (2005) was the time taken to develop an understanding with the Regional Council about emergency actions that would cover all situations under the Resource Management Act, rather than require a formal process for each activity. A particular issue arose when the Regional Council initially required that slip material should be disposed of in a designated landfill; subsequently they allowed a more pragmatic approach which meant that slip material could be moved and redeposited locally.

The road funding authority, Transfund, should ideally become involved as early as possible following a disaster since Transfund has direct access to government funds. However this was not the case following the Manawatu floods and it is likely that more could have been done to secure certainty over funding in the early stages of recovery which would have helped with the physical works prioritisation process.

Recovery at Matata relied heavily on Central Government funding since the local council had a small number of rate payers and insufficient funds to cover the recovery costs itself. Funding took some time to come through whilst government requested and were awaiting details of the costs. This frustrated the local population.

Overall there was little difference between the routine construction process and the reconstruction process, due to the fact that the disasters were of a relatively small scale. The parties normally involved during routine construction projects were also involved during the reconstruction and using existing relationships eased the process. During the initial recovery stage local contractors volunteered their time, but this needed careful management. National scale contractors were a valuable source of resources, since they were able to use their networks to mobilise resources from the whole country.

## **CHALLENGES FOR LARGER SCALE DISASTERS**

### **Coordination of reconstruction**

Whilst relying on routine processes proved adequate in many ways for these small-scale disasters, a higher level of coordination and management would be needed for programmes of reconstruction following a larger disaster. CDEM agencies are provided with certain powers under the CDEM Act to direct reconstruction, however, these powers can only be exercised in a declared emergency situation. When a declaration is lifted, the designated Recovery Manager has no statutory power to direct resources for recovery. If they were to direct activities using powers under the Act the agency would become responsible for the oversight and management of those activities; since CDEM agencies do not generally have the resources and skills for these tasks, they are reluctant to take on such responsibility (AELG, 2005). Clearly there is still a need for coordination once a state of emergency ceases, and this role may be beyond the capacity of local authorities and insurance companies who have generally taken on this responsibly for smaller scale disasters.

EQC provides statutory funds to cover losses incurred by individual property owners as a result of natural disasters. This arrangement is clearly inefficient in a large-scale disaster and it has been suggested by Page (2005) for example, that bulk reconstruction contracts should be awarded by the EQC so as to relieve house owners from sourcing and managing the process. The EQC trialled a coordinated response to the Te Anau earthquake of 2003, using a large single contractor to coordinate and manage the recovery works on its behalf. The relatively small scale damage of this particular event did not allow definitive conclusions to be drawn on the benefits of such a coordinated approach, but coordination was clearly an improvement on the situation where individual property owners competed for the services of a limited number of building contractors.

MCDEM Director's Guidelines (2005b) proposes a management structure for coordinating recovery and it recommends the setting up of various task groups to achieve recovery objectives. Under the 'Built Environment Task Group' are sub-task groups for various parts of the built environment. For example, the 'Residential Housing Subtask Group' would be responsible to:

*'repair, reconstruct or relocate buildings – obtaining fast-track building and other consents, sufficient builders and materials, coordinating skilled trades and their work standards'*

This is a very challenging responsibility for the task force to take on and does not appear to concur with what has happened in practice following recent disasters.

### **Reconstruction resources**

The processing of building consents at the early stages of reconstruction and recovery after an event has been identified as a potential bottleneck. Access to normal resource levels will be unlikely and inevitably there will be shortages of qualified people to handle impact assessments and consent processing. A more flexible approach to the standard consent process would be necessary to expedite the process and help cope with the high volume of consent applications after a major disaster.

In terms of overall human resources Page (2004) suggests that the construction industry could cope effectively with a medium sized disaster if the base work load was at an average level, but a large scale disaster coinciding with a high base load could require up to 180,000 additional construction industry workers (this is based on an event causing \$10billion worth of damage in the Wellington region and with a base work load 7% higher than current levels). Hopkins, (2004) in a similar study estimates a combined resource requirement for reinstatement to be about \$7.73 billion. The National Civil Defence Emergency Management Plan, due to come into force in July 2006, acknowledges New Zealand may need to mobilise all nationally available resources because it has finite capacity and capability for response and recovery.

### **Hazard and risk assessment**

The need for a focussed assessment of potential hazards after an event cannot be overemphasised as it will enable the determination of risk levels and put in place the

mechanism for avoiding any increase in those risks by limiting future developments in those areas.

The new Building Act (2004) requires that Territorial Authorities must not grant building consents on land subjected to natural hazards unless they can be protected from the hazard and, where waivers are granted, it requires that notices be placed on the land to indicate the risk of natural hazards they are exposed to. Implementing this Act will have far reaching implications on insurance claims as the Earthquake Commission Act indicates that the EQC is not liable to settle any claim where there is an identified large risk. Current revisions to the mapping of vulnerable natural disaster zones may prevent existing properties from being compensated at all.

The CDEM Act is the only piece of legislation that requires specific identification of hazards by councils. However, the scope of this identification is limited to the hazards already identified through the Resource Management Act (RMA) process and for which building works have been undertaken in hazard zones. Hazard identification can only be inferred from other pieces of legislation such as the Building Act and RMA where in the course of discharging council duties, information concerning natural hazards is deemed collected.

The implication of council's inability to gather information on hazards is that development control outside recognised hazard zones are limited, thus the provisions of the various acts concerning land use cannot be effectively applied. For the incident at Matata, the extents of the flood and debris flow were outside known hazard zones.

## **CONCLUSION**

The task of reconstruction after a major event can be an onerous challenge. It requires deliberate and coordinated efforts of all stakeholders for effective and efficient recovery of the affected community. The paper has shown that the issues surrounding the implementation of the pieces of legislation concerning reconstruction after a major disaster are complex and interrelated. Though the existing regulatory framework seems to point to the right direction, more issues have to be addressed in practice.

Legislation cannot be used for purposes other than those for which it is intended and there appears to be little provision in several areas of legislation for post-disaster situations. These polices need to be revised before hand as hasty revisions during the course of reconstruction works do not provide the best solution to major disaster problems.

Should the routine regulatory and legislative processes be followed after a major disaster it is unlikely that regulatory bodies would be able to cope with the volume of work. The conflicts in the interpretation of the different pieces of legislation need to be harmonised, whilst the roles and responsibilities of the various CDEM agencies and other stakeholders need to be made clear. The apparent division between those who, in practice, take responsibility for reconstruction and those who set policy and legislation create barriers that need to be overcome. Failing this, implementation of reconstruction works will be cumbersome in the event of a major disaster.

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