NATURAL DISASTER: Finding, managing and sharing people and information

Summary of a seminar held in Wellington, 13 November 1996

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INTRODUCTION

The theme of the seminar, panel discussion and open forum, organised by the EQC and the Insurance Council, was *Natural Disaster: Finding, managing, and sharing people and information*. Emphasis was placed on the recovery and reconstruction phases, beginning about 10 days after the disaster occurred. To provide a focus for discussion, the scenario chosen was the Great Wellington Earthquake, for which fairly detailed modelling has been done, most notably for the *Wellington after the Quake* Conference, 1995.⁽¹⁾ The seminar was, in fact, a follow-up to that conference, at which various recommendations for action had been made, such as:

- raising public awareness of the recovery aspects of disasters;
- planning for rebuilding, restoration, or relocation in advance of the disaster occurring so that the stress of immediacy and its effects on decision making are reduced;
- ensuring that homeowners, the insurance and building industries, and owners of businesses and buildings have procedures in place to improve the effectiveness of efforts to restore normalcy to disaster-affected areas.⁽²⁾

The seminar was attended by about 100 participants, representing the insurance industry, territorial local authorities, emergency management/civil defence organisations (both local and central), the building industry, the engineering industry and professional engineering societies, and research organisations.

THE PROBLEM

The problem was described by David Middleton (EQC), David Sargeant (Insurance Council), and Bruce Shephard (Works Consultancy Ltd, now Opus International Consultants Ltd).

The basic problem is to begin the process of finding and sharing information now, and planning for sharing and managing people *before* a large disaster occurs. Although the Insurance Emergency Plan (3) has been used effectively in disasters such as 1988 Cyclone Bola and the 1987 Edgecumbe Earthquake, there has not been a disaster of the magnitude envisaged in New Zealand in the last 50 years, and the only recent experience available is from overseas, for example in the 1994 Northridge Earthquake in Los Angeles.

The scenario envisages the situation 10 days after a magnitude 7.5 shallow earthquake centred in Wellington, in which surface rupture with up to 5 m horizontal displacement over a distance of 75 km and ground motion accelerations over twice those prescribed by building standards has caused extensive casualties and destruction. At this stage, aftershocks are dying down. Almost everyone has been accounted for, and casualties have been evacuated to outside medical facilities. Displaced people have been evacuated or are in temporary shelter. Some basic services have been restored in the city, but access is still restricted, being only by road and helicopter. Although damage has occurred predominantly in Wellington and the Hutt Valley, effects have extended as far south as Marlborough and as far north as the Manawatu.

According to the model presented by Bruce Shephard, there are likely to be over 17 000 displaced households, representing some 53 000 people. Nearly 400 residences and 350 000 m² (about 2%) of commercial properties have been destroyed by fire. About 140 000 residences and 9 000 commercial properties require safety inspections. Reinstatement of lifelines, likely to cost of the order of 7 % of the total asset value of \$16 billion, has to be assessed. The mean damage ratio for commercial and industrial buildings is about 21%, with about 5000 buildings with damage at about 10% replacement cost and nearly 4000 with damage at over 30% replacement cost; this all has to be assessed. The EQC expects about 172 000 claims for residential property damage, of which about 94 000 are for moderate to extensive

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damage, and some 40 000 are for structural damage requiring inspection by both assessor and engineer.

Technical people - architects, engineers, valuers, quantity surveyors, loss adjusters, claims clerks - will be needed throughout the period of recovery and reconstruction. The total resources of technical people required to assess damage in this period are estimated to be 700 safety inspectors, 700 assessors, and 1 100 engineers. In addition, as pointed out by Ian McLean in his summation of the seminar, a further 2000 technical people for design and contract maintenance and 1000 for processing of building consents will be required at any one time over the probable 2.5 years of reconstruction.

Many territorial local authorities will be involved. Their resource and information needs will be related to those of EQC and insurance companies.

Insurers will need to know:

- who will coordinate recovery;
- how will assessment and settlement of claims be handled,
- how will TAs cope with building permits,
- what will be the status of the Building Act and Resource Management Act,
- will district schemes be changed, e.g. in areas that have become uninhabitable, who will make decisions about this, and who will be responsible for relocation costs,
- what priorities will be given to infrastructure repair as between residential and commercial areas?

Efforts will be hampered unless there are standard protocols and practices for:

- labelling unsafe buildings,
- inspecting for reconstruction,
- issuing building permits.

There will be a huge influx of money, particularly from the insurance industry, and of resources into the region. It will provide an unprecedented opportunity to regional and local authorities to demonstrate their worth to the communities they serve.

It will benefit everybody for resources to be managed to an overall plan of coordination and sharing.

The seminar was arranged to:

- define areas of common interest and purpose,
- establish communication channels,
- find ways of providing mutual assistance and making constructive joint use of scarce technical resources.

OVERSEAS EXPERIENCE

The seminar was given detailed practical information by Nick Delli Quadri, Chief of the City of Los Angeles Training and Emergency Management Division, about how the 1994 Northridge Earthquake and its aftermath was handled by the City of Los Angeles. This was a shallow earthquake of magnitude 6.7 with its epicentre in a residential area of about 1.2 million people. Casualties included 57 fatalities, and total costs have exceeded US\$30 billion.

Information with a bearing on the recovery phase of the disaster could be grouped under various categories, as follows:

Framework of operation

Successful response depends on:

- mobilising a field centre and key staff,
- allocating and deploying resources.

In an emergency, the City of Los Angeles immediately mobilises its Emergency Operations Center, which coordinates and allocates resources, and liaises with County, State, and Federal emergency agencies for additional resources when necessary. The Emergency Operations Organization consists of the Mayor and the general managers of key City departments. The Department of Building and Safety itself is temporarily reorganised into 4 main functions: Operations, Planning, Finance, and Logistics and supplies.

Resources of technical staff

The Department of Building and Safety has 550 inspectors, 200 engineers, and 300 administrative and clerical staff. It was also able to use 500 engineers and technical people from other departments, e.g. Public Works. These were all trained for disasters, and were coordinated and managed by their own organisations. However, some City staff lived in the affected region and had to devote some time to attend to their personal affairs.

Los Angeles County had its own disaster problems which taxed its limited technical resources.

The State Office of Emergency Services (OES) provided engineers and inspectors, through mutual aid agreements. This involved the Structural Engineers Association of Southern California (SEAOSC), the American Institute of Architects, and other professional bodies. They were pretrained, and were resourced by the OES, but were usually available for only 3 day stints.

The OES also supplied Army Corps of Engineers staff through its access via the Federal Emergency Management Agency (FEMA). They came as a managed and resourced unit and stayed for 30 days at a time. They required training, but were able to be teamed up with City staff.

Spontaneous volunteers were plentiful, but needed to be registered, verified, housed, fed, and transported, and trained, and they stayed for only a limited time.

Costs

Mutual aid involved pre-arrangements on cost recovery and careful record keeping, and the logistics of recording expenses and timesheets were considerable.

FEMA picked up a large proportion of the costs of response and also recovery (e.g. "no fee" repair permit system and free debris removal).

Communication

The communications system initially was unusable because of overloading, but cellphone companies donated 300 phones and free unlimited air time, lasting for a year after the event.

As a result of the disaster, the hand-held radio system was improved, including new relay towers throughout the city to replace the single one, which had been both overloaded and damaged in the emergency.

The news media were very demanding, seeking information that was often unavailable and also sources of blame, but were helpful in getting information to the public, e.g. about the placard system of building damage assessment, and in giving time for explanations of what was being done and why.

Data gathering

Data reporting, entry, and communication is a critical activity. The manual data collection and entry system caused bottlenecks, alleviated by arrival of faster monitors. Damage assessment reports were demanded in increasing detail and numbers of copies. Use of geographic information systems (GIS) to map data, global positioning satellite (GPS) to locate sites, and digital cameras and other currently available technology would have improved speed and accuracy of data gathering.

Damage and safety assessment

The placard system of damage assessment following ATC-20 (4) was an important standard, although non-standard use was made of it by some groups. In addition, the system was reluctantly expanded to include assessment of damage costs.

The main objectives were to:

- keep people out of damaged buildings where necessary,
- get people back into residences and workplaces where possible.

The Housing Department made unanticipated and unplanned use of this for providing housing assistance. Requests to re-enter buildings to retrieve belongings grew. Some owners of placarded buildings challenged the tagging. This required re-inspections. Special teams of inspectors and engineers had to be provided specifically to handle these problems.

After a few months, more inspections had to be done because of aftershocks.

Free demolition was offered to owners of greater than 50% damaged buildings, with a 15 day notice of hearing. Free debris removal was also offered, which enabled sorting and recycling and re-use of 90% of debris.

Evaluation

Some buildings constructed under current codes had suffered unexpected damage, so 12 task force committees were set up within a month of the event to survey different classes of structures and develop emergency building code changes. These were applied immediately. The committees involved both departmental staff and SEAOSC engineers.

New and retrofit standards were devised for unreinforced masonry buildings (URM), cripple walls, concrete tilt-up buildings, wood-frame apartment buildings, hillside buildings, base-isolated buildings, and non-structural hazards, but references for these were not provided.

LEGAL UNCERTAINTIES

John Upton QC discussed some of the as-yet untested legal aspects of recovery activities that might arise from application of the Building Act 1991,(5) in particular, and other recent legislation.

Civil Defence Act 1983

This provides very wide powers to civil defence authorities where a state of emergency has been declared, but it is designed to be short-term, lasting no more than 7 days unless extended. Powers include clearing roads and removing dangerous structures.

There is legal uncertainty over the transition to the recovery phase, which conceivably might affect fulfilment of a demolition order, say. In discussion, it was suggested that the current review of this Act should incorporate provision for the recovery phase.

Building Act 1991

There is no statutory obligation on TAs to do damage assessments and demolition after an earthquake, although society will expect it.

There is potential for legal challenge over:

- emergency use of normally inappropriately qualified damage assessors,
- implied tacit approval of buildings not specifically marked as unsafe.

Temporary shoring probably would not require a building consent. Otherwise, consent should be assumed to be required in all except minor maintenance repairs. Consent requires any alterations to conform to the Building Code (6) and the rest of the building to conform to modern fire escape and disability access requirements. The extra cost is recognised as a proper insurance claim.

Section 47 allows TAs to waive normal requirements in a post-earthquake situation, giving them flexibility to circumvent lengthy procedures to facilitate rapid reconstruction.

Privacy Act 1993

Use of personal details collected by one agency could probably be used under Principle 11 in a central database by other agencies working on disaster recovery, but it would be sensible to obtain some form of assent at the time of collection of the information. In discussion, it was suggested that personal records should be destroyed after the recovery phase.

CURRENT INITIATIVES

Among the initiatives discussed was the draft *Post-earthquake building safety evaluation procedures*, (7) drawn up by a study group of the New Zealand National Society for Earthquake Engineering and presented by its Convener, Andrew Charleson. This draws heavily on the ATC-20 procedures, but has a different approach to placard use. It is designed for TAs, in the hope that all will adopt it.

It contains guidance for preparing a building safety evaluation response plan, and a sample generic response plan for TAs to use.

It also contains suggested standard safety assessment forms for:

- rapid evaluation, done to obtain an initial indication of safety,
- detailed evaluation, needed where there are concerns arising from the findings of the rapid assessment.

Resources still to be developed included:

- a building evaluation database system,
- placards, assessment forms, etc.,
- lists of available inspectors,
- annual training for inspectors.

Issues still to be addressed include:

- the standard for damaged building repair,
- methods for streamlining resource consents,
- standard repair techniques,
- a forum for technical dispute resolution.

In the panel discussion, Peter Beddek, President of the NZ Institute of Quantity Surveyors (NZIQS), outlined the activities of the Quantification Task Group reporting to EQC. Their task was to look at the resources and processes needed after a major earthquake, particularly with regard to damage assessment and quantification, and to advise on effective procedures for quantification and methods of claims settlement.

The Group was still working on:

- compiling a register of resources, particularly loss adjusters, assessors, engineers;
- devising systems for processing claims;
- working out methodologies, combining paper-based approaches for use by anyone in the field with ready input to electronic media for efficient processing; and
- implementation processes, including education, training, induction processes, and auditing.

They were compiling procedural flowcharts showing what they did and how it fitted in with what other organisations were doing.

DISCUSSION

The seminar raised a number of issues affecting the supply of people and information in the first weeks following a major

disaster. The focus was particularly on those people who are qualified to enable the work of reconstructing the afflicted society to proceed, for example damage assessors, who can categorise what needs to be done; claims assessors, who can provide access to the financial resources for reconstruction; and planning authorities, who can give the necessary approvals to proceed.

Framework of operation

A repeated concern was the need for organisations to know in advance who would be expected to do what, and who would coordinate activities. Pat Helm's panel presentation made it clear that the Government favoured a scaled approach, coordinated at the closest possible level to the workforce. The attached chart (Figure 1) is based on what was drawn on the whiteboard during the open forum. It has several similarities to the coordination structure described for Los Angeles.

The issue of how insurance claims are to be coordinated was not addressed, although Figure 1 incorporates insurance resource networks.

Data gathering and management was another important aspect, but the provision of technologically effective systems was not specifically addressed, despite the acknowledged need for efficient processing and exchange of information. Coordination of this would seem to be most effectively managed on a national scale, and it might be part of the integrated emergency management systems that the Government envisages in its review of emergency management in New Zealand. Although the insurance industry may have suitable networks, it is not clear whether TAs do.

There was interest in the suggestion of Emergency Management Groups among TAs, involving also local sections of the Police, Fire, and other services.

Prior arrangements

Arising from the value of having a clearly prescribed operational framework is the usefulness and efficiency of having prior arrangements for mutual aid, and supply of technical and physical resources (including costing and reimbursement procedures). Some professional organisations, notably the NZNSEE and the NZIQS, are taking initiatives in drawing up registers of professional resources. It is important to plan for the supplies and facilities needed to keep the imported professional people operational.

Mention was made of the need to bring in expertise from overseas, but only EQC appeared to have made any provision for this.

It is also necessary to identify in advance buildings and lifelines that will be used in a disaster, together with suitable alternatives.

Training/dry runs

The lack of appropriately trained people was mentioned by several speakers. On the spot training is the most valuable.

The NZNSEE is one of the few organisations that has a policy of sending its members to disasters overseas to gain such experience, but it may not be possible for other professional societies to do this.

TAs could gain some expertise of this sort by sending staff to help other TAs where there is an emergency. The Tauranga initiative in setting up a building certification company, as described by panellist Wayne Wellington, was noteworthy in this respect.

Assessment procedures

Some progress is being made towards standardisation of procedures.

Copies of the draft NZNSEE *Post-earthquake building safety evaluation procedures* (7) were circulated for comment at the end of October, and it was hoped that the document would be finalised by 30 April 1997 after comments have been received from TAs and other interested parties; the amended document is due to be published by the end of 1997. The NZNSEE has earlier published *Guidelines for assessing and strengthening earthquake-risk buildings* (8) (commonly known as the "Red Book"). An updated version is soon to be published.(9)

The usefulness of incorporating rough cost estimates in damage assessments was discussed, although there were misgivings about the ability of engineers to do this, the problem of hidden damage, and the difficulties of standardisation.

Prompt restoration of lifelines is an integral part of all recovery operations, and some mention was made of the possible need for guidelines to supplement the burgeoning work on lifelines being done around the country.

The Insurance Council has its own "red book" for its Insurance Emergency Plan,(1) designed to assist insurance assessors inspecting damage for insurance claims.

The NZIQS is involved in devising recommended procedures for quantification and claims settlement.

At some stage, training in the use of these procedures will be required.

Building consents/town planning

Concern was expressed that reconstruction after the quake would be impossible unless some mechanism was used to circumvent normal time-consuming building consent procedures under the Building Act.

One solution considered to be quite feasible under the Building Act was to subcontract officers from other TAs or from the private sector, e.g. the Tauranga building certification company.

It appeared that section 47 of the Act gave TAs considerable flexibility to adapt or even waive normal requirements.

There was some mention of the possible need for relocation. Although not specifically discussed, the opportunity of redesigning/relocating a badly damaged area should not be overlooked.

People aspects

The ultimate aim of all organisations involved in the recovery of a region after a disaster is to restore the community to normalcy as quickly as possible. This received scant mention at the seminar, but the following topics concern interaction with the public and should be planned for.

A part of the assessor's job in practice in Los Angeles was dealing with people who were possibly homeless, certainly stressed, and possibly frightened and confused. All field officials need to be prepared for this.

Also in Los Angeles, the media responded to the public's wish for explanations of what was being done and why. The emergency coordination people should be prepared to anticipate and meet this demand.

Assessment inevitably entails judgements, which are likely to be questioned by some of the people affected. There needs to be provision for training and deployment of special groups to handle dispute resolution.

ACKNOWLEDGEMENTS

The permission of the Earthquake Commission to publish this report is gratefully acknowledged. The perceptions recorded are mine and are not necessarily shared by the Earthquake Commission.

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Figure 1. Post-earthquake deployment of personnel resources