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Building Organisational Resilience:

A Summary of Key Research Findings

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Abstract

This paper presents findings from a six-year research programme underway in New Zealand to develop strategies for improving the resilience of organisations to major crisis events. The research takes a systems view of organisations, recognising that there are multiple interdependencies within and between different organisations that influence their abilities to respond and recover. This means that effective resilience management for any one organisation must look beyond that single organisation and consider the resilience of other organisations that it depends on.

Particular aspects of organisational resilience focused on by the research team include: how individual organisations are positioned to respond and recover from major crises; their ability to communicate and share information in order to direct resources effectively during crises; and the legal and contractual frameworks within which they will need to operate during crisis response and recovery. None of these issues can be resolved by a single organisation acting unilaterally. Organisations are required to work together towards system resilience.

1.0 Introduction

Over the past ten years, New Zealand, like many other countries, has experienced the impacts of critical infrastructure failure. In 1998, the central business district (CBD) of Auckland, our largest city, suffered a power failure that lasted for five weeks. Earlier this year the whole of the CBD again lost electricity, this time for four hours, trapping people in lifts, creating traffic chaos, and closing businesses for much of the day. Westport on the West Coast of the South Island nearly ran out of water for its town supply when it experienced its 'best'/driest summer in recorded history. Recent snow storms in the South Island pulled down power lines and trapped rural families in their homes with no road access, telephone, electricity, or even running water where electricity was required for pumps. Some of these rural families did not get their electricity restored for three weeks.

With this background, increasingly in New Zealand there is ongoing public discussion around the need for more resilient infrastructure, and how it might be achieved. In this paper we discuss a research programme underway in New Zealand aimed at making not only our infrastructure, but also the organisations involved in owning, operating and maintaining that infrastructure more resilient.

Resilience is not something that can be achieved by any one organisation or infrastructure system acting in isolation. In the same way that the telecommunications network relies on the electricity network to continue functioning, so too does an organisation critically depend on its key suppliers and customers for continued survival. Getting organisations to recognise these interdependencies and achieving the commitment required to actively manage resilience issues which have collective rather than individual ownership remains a significant challenge. It is this aspect of resilience management that this paper will specifically address.

With New Zealand's small size, we have an ideal environment for bringing together researchers and broad cross sections of industry to address issues that cross organisational boundaries. This paper will review the successes and ongoing challenges for these initiatives and key lessons that other countries might take from the New Zealand experience.

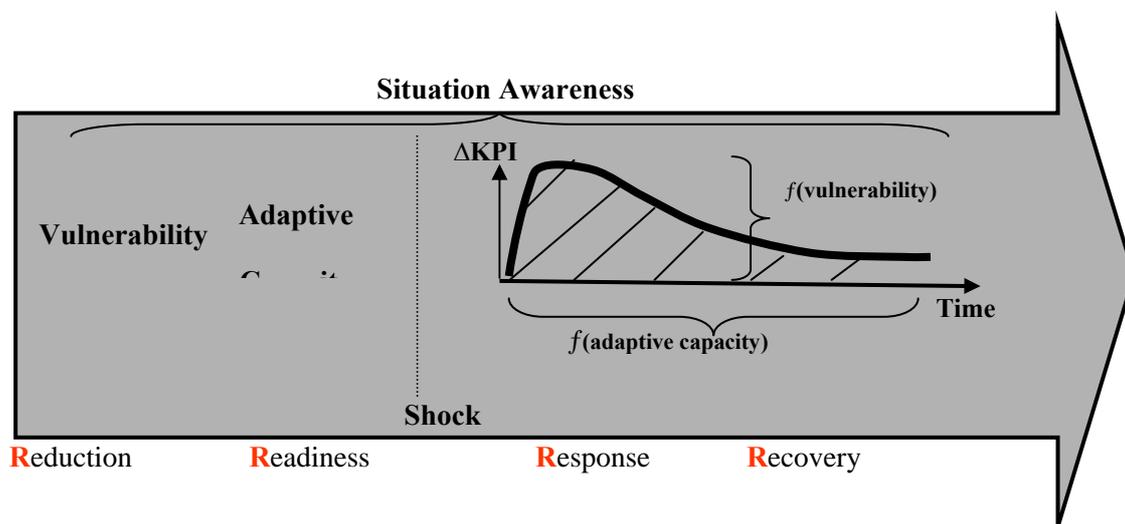
2.0 The Resilience of Organisations

An organisation's ability to survive a major crisis depends on their organisational structure, the management and operational systems they have in place, and the resilience of these. Organisations deal with uncertainties and unexpected events all the time, and managing these presents both opportunities and risks for the organisation. Above a certain scale however, crisis events differ from day-to-day management, in that organisations have to operate out of their comfort zone, interact with organisations they do not normally work alongside, and have to make and share strategic decisions quickly and effectively. Being able to respond effectively to crisis events is a real test of what makes an organisation 'tick'.

'What is a resilient organisation?' and, more importantly 'how can we make our organisations more resilient?' are two questions being addressed as part of a six year research programme, 'Resilient Organisations' (www.resorgs.org.nz) funded by the Foundation of Research Science and Technology (FRST) of New Zealand.

One of the first tasks for this research programme was to understand what aspects of an organisation drive its ability to survive, and potentially even thrive, in times of crisis. There are many different definitions of resilience in the literature, with definitions often as varied as the disciplines from which they were developed. A thorough review of these definitions highlighted the need to translate concepts of resilience into tangible working constructs for organisations (McManus et al, in press). From this work, the following definition of organisational resilience was developed:

Organisational resilience is a function of the overall vulnerability, situation awareness and adaptive capacity of an organisation in a complex, dynamic and interdependent system.
(McManus et al, in press)



Severity and duration of impact on performance (key performance indicators –KPI's) as a measure of an organisation's resilience, where resilience is inversely proportional to the area under the curve.

A resilient organisation is one that is still able to achieve its core objectives in the face of adversity. This means not only reducing the size and frequency of crises (vulnerability), but also improving the ability and speed of the organisation to manage crises effectively (adaptive capacity). To effectively manage crises, organisations also need to recognise and evolve in response to the complex system within which the organisation operates (situation awareness) and to seek out new opportunities even in times of crisis.

3.0 The New Zealand Context

New Zealand is a remote island nation with mountain ranges, river valleys prone to flooding and landsliding, and flat alluvial coastal plains. New Zealand sits astride the boundaries of the Pacific and Australian Plates, and also has an active volcanic region. The seismic hazard in the central part of New Zealand is high, and comparable to California. Since European colonisation in the mid-1800s, there have however been relatively few damaging earthquakes and volcanic eruptions. The devastating Hawke's Bay earthquake of 1931 caused the death of 256 people, and represents the last earthquake to have affected a major metropolitan area in New Zealand. As with all modern societies, New Zealand also faces a range of human and technological hazards. The current threat of an influenza pandemic has initiated a whole-of-government led planning phase that is, of necessity, involving a wide range of organisations. Significant disruptions to metropolitan power supplies in Auckland in 1998 and again recently have also made people realise the physical and economic dependency on key lifeline utility services. Nevertheless, emergency planners within New Zealand are only too aware that our highly dynamic natural environment, coupled with relative inexperience in managing the effects of major disaster, creates vulnerabilities as the perceived need and subsequent investment in planning and preparing for potential disaster is lowered.

The Civil Defence Emergency Management (CDEM) Act 2002 is the legislative driver of emergency management in New Zealand. Based on the 4Rs of comprehensive emergency management (Reduction, Readiness, Response and Recovery), the Act establishes a framework for CDEM aimed at building resilient NZ communities. The CDEM Act is supported by the National CDEM Strategy, the National CDEM Plan and Guide, and regionally-based CDEM Group Plans. While the CDEM Act is an enabling piece of legislation rather than being prescriptive, it sets out clear requirements and expectations for key agencies such as government departments, local authorities and lifeline utilities. The Act imposes a legislative requirement for these agencies to ensure they are able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency.

Organisations across most sectors in New Zealand today can be characterised as being more independent than in previous decades, with a greater number of organisations in any given sector. This context derives from two decades of restructuring in the quest for economic accountability and independence. The focus across both the public and private sectors has been to produce smaller business units with an emphasis on autonomy and self-reliance in order to produce economically efficient organisations and competitive sectors (Brunsdon and Dalziell, 2005)

This is a double-edged situation; while having a large number of small organisations is conducive to resilience, the need for collaboration in order to bridge across 'silo' mentalities is more self-evident. There are two prime examples of multi-organisation initiatives in New Zealand to attempt to bridge these silos:

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- Engineering Lifeline Groups have developed over the past two decades as a means of involving all key lifeline providers in a region working together to review the utility and transportation network vulnerability to major hazards. These collaborative and largely voluntary groups have shown that by working together, and with the involvement of key emergency management agencies, individual infrastructure managers gain a much clearer view of their vulnerabilities to disaster events than just their internal agency perspective. Working together emphasises the interdependencies – the many ways in which infrastructure service providers depend on each other in a disaster.
 - A welfare cluster has been established involving various national agencies with a direct role in physical and financial support for people adversely affected by civil defence emergencies. Regional clusters involving the same agencies have also been formed, with the aim of providing a ‘one stop shop’ for affected people and families. The cluster also actively works together on an ongoing basis separate to delivering a service in an emergency situation.

In New Zealand there is a growing recognition of the need for research that focuses on organisations and the systems within which they operate. Organisations manage, maintain and operate our infrastructure, create our economy and contribute to our society. The ability of organisations to respond effectively following a hazard event has a large influence on the length of time that essential services are unavailable. Therefore, enhancing organisational resilience is a critical step towards creating more resilient communities. It is with this background that the Resilient Organisations research initiative was conceived, to develop strategies that can be applied by organisations to improve their resilience to major crises.

4.0 Research Initiatives to Build Shared Awareness of Resilience Issues

The Resilient Organisations programme has three separate but interconnected objectives. Objective One explores how and why organisations plan for hazard events and explores how investment is prioritised, both within organisations and from a wider perspective by identifying critical interdependencies and the relationship between organisational and community resilience. Objective One also aims to develop strategies for organisational planning that link resilience for crises with day-to-day operations. Finally, Objective One looks at ways to provide a platform for inter-organisational hazard planning both within and across industry sector boundaries.

Objective Two of the research programme looks at the prioritisation and deployment of physical and human resources for recovery after a hazard event. The aim is to develop a support tool that will assist real-time decision making for physical response and recovery of the State Highway road network in New Zealand. Roading infrastructure has been selected as the focus of this research because of its role as a key lifeline service in the aftermath of many physical hazard events. This objective critically evaluates how communications function in a crisis situation, the information flow between different stakeholders, and how resource prioritisation decisions are made across different organisations.

Objective Three investigates the legal and contractual environment in that organisations will be required to operate within in the aftermath of a major disaster. In particular, Objective 3 focuses on post-disaster reconstruction disaster, examining relationships between organisations and capability to

manage reconstruction. There is a concern that the current normal legal and contractual arrangements will not adequately function following a large scale physical crisis in New Zealand and may actually hamper the speed and effectiveness of the recovery effort. This objective seeks to better understand the governing legislation and how it may operate in a crisis, concentrating on the physical recovery. Therefore, the focus is on the construction industry and its interconnectedness with other organisations.

4.1 Resilience of Individual Organisations

Various strategies have been used across these objectives to develop awareness of shared resilience. At an individual organisation level, the introduction of a 5-step process for improving organisational resilience has been very effective for highlighting critical dependencies on other organisations (such as along supply chains) and the need to develop strategies for managing resilience across organisational boundaries.

A series of case studies has been undertaken involving 11 New Zealand organisations with the objectives of:

- Identifying the key elements of organisations in New Zealand that make them more or less resilient in the face of crisis situations,
- Using these findings to develop strategies for improving organisational resilience across business sectors as well as for individual organisations

This research initiative is approximately 70% complete. A wide range of organisations have participated in these case studies, including: public and private, for-profit and not-for-profit, large and small, lifeline and non-lifeline organisations. These case studies have involved:

- In-depth interviews with a cross section of staff in each organisation to gain insight into the readiness/preparedness, and perceived vulnerabilities of the organisation.
- Draft feedback to the organisation highlighting issues arising in the interviews.
- A team workshop involving those interviewed earlier and using a five step process. The purpose of the workshop is to confirm the insights from the interviews, to build shared awareness amongst the participants on the state of the organisation's resilience, and to conduct a readiness exercise designed to move the organisation up the resilience learning curve in the context of a disaster scenario.
- Delivery of a final report summarising the outcomes of the various stages of the case study thus providing a bridge for further action to build resilience in the organisation over time

Early outcomes from these case studies have shown that many organisations have an inaccurate view of the organisation's importance to overall community resilience with a similar lack on the part of individuals within the organisation. Furthermore the lack of integration across departments within an organisation mean that the resulting 'silos' inhibit effective understanding of their existing dependencies on one another. This has a resulting negative impact on the organisation's resilience in the face of major change or crisis. All of the organisations have some type of emergency management planning in place, some with reasonably sophisticated risk identification and management strategies or business continuity plans. However none of the organisations studied had identified the need to test their planning or build day-to-day resilience into the culture. A major outcome has been feedback that the case study process has significantly heightened the organisations' awareness of resilience issues and the need for improved organisational processes.

4.2 Resilience between Interconnected Organisations

At a sector level, the research team have been working closely with a cluster of organisations that together manage an infrastructure network to understand how these organisations share and communicate with each other during crises and how those interactions might be enhanced to facilitate more effective shared decision-making.

As part of this research programme, we are developing a tool to help multiple roading organisations collect, collate and communicate data and information that support the deployment of resources during response and recovery activities. The tool (Dynamic Geographical Information System-DGIS) will provide access to information characterising the disaster's intensity, location and related damages, as well as the availability of human and physical resources. In addition to supporting our main end user (Transit NZ, the government authority managing state highway roading assets) and its regional consultants and contractors, DGIS has also been developed to facilitate the sharing of information with coordinating authorities such as Civil Defence Emergency Management (CDEM) agencies and other key responding organisations such as the emergency services, lifeline utilities and local and national government etc. Furthermore, intra-organisational exchange of data and information may occur according to several layers of responsibilities and territorial jurisdictions.

There have been three main research challenges in developing DGIS as an initiative to raise awareness of resilience issues, namely:

- (a) *Understanding organisations' needs;*
- (b) *Designing according to the end-user's needs; and*
- (c) *Developing a participatory feedback and implementation process.*

Our first step in *Understanding organisations' needs* was to set up a series of site visits to establish linkages with end users to better understand their current operations and requirements. In the initial months of our research, the research team spent a considerable amount of time visiting regional offices of our main end-users (Transit NZ and its Consultants and Contractors). After obtaining and reading emergency procedures and reports on response activities, we interviewed those that had been involved in managing recent emergency response and recovery operations. These interviews had the intention to gather tactic (or experience based) knowledge from the interviewees, who expressed the chronological order of the events and respective actions as well as their view on the critical issues (e.g. communication, resources, information, etc) and potential areas (e.g. inter-agency coordination, technology, personnel training, etc) for improvements. In addition to the visits/interviews, we have observed and gathered *in situ* information on and how response teams react to road closure events (e.g. accidents, snow, flooding, wind, etc). For example, we spent a total of 3 days with response crew in a flooding event in a seaside village (Matata) of the North Island of New Zealand. All these activities contributed to improve the research team's understanding of what our end-users really need in terms of information sharing (Gohil, 2005), because all our research efforts could be inaccurately implemented without comprehensive knowledge about the complexities of emergency response that comes from our end-users experience. The key issue in facing this challenge was to learn about the organisation's needs without judging what and how they respond to emergency events.

Building up from these findings, the research team concentrated in *Designing according to the end-user's needs*, which was the technical development of the information sharing framework (DGIS) and a desktop case study exercise to assess its benefits (Dantas and Seville, 2005). The framework comprises several data/information exchange procedures using Geographical Information Systems

(GIS) combined with computer network and communication technologies to allow multiple users to increase the efficiency of response activities by reducing required time, human and physical resources. The results of the desktop case study exercise show that a potential reduction in time and cost of emergency response activities could be reached (Gohil, 2005). The key issue in facing this challenge was to develop DGIS in a way that solutions were reached balancing perceived needs, achievable goals and available technology. This has been an intricate exercise of the designing and visioning of potential standards, procedures and technology.

The third challenge (*Developing a participatory feedback and implementation process*) comprised various initiatives encouraging the end users organisations (Transit NZ and its Consultants and Contractors) to participate and contribute to refine and assimilate the research findings. Initially, an end-user oriented report was compiled in order to review and summarise the critical issues involved in implementing electronic data and information sharing frameworks. The report (Dantas *et al*, 2006) written in a non-academic style, highlighted challenges, barriers and opportunities in the implementation of the information sharing framework. Copies of the report have been distributed and gradually feedback has been obtained from the end-users organisations. We have also had return visits to the Transit NZ regional offices. During these meetings, the research team presented the DGIS vision, which was expressed in a series of ‘cartoon’ presentations that graphically showed how DGIS would be employed in different emergency response scenarios. These presentations allowed the end-users to visualise and comment on the research findings. The key issue in facing this challenge was to adapt the research team’s reporting and presentation approach in order to reach and communicate according to end-users expectations and background.

The research team has tackled these challenges based on an implementation science focused approach. We have developed a research method that relies on constant interaction with the research end-users and this guides the conception and design of technical solutions. Due to the multiple-organisations (Transit NZ, Consultants, Contractors) nature of the problem, the end-users are allowed to interact and express their views amongst themselves and with the research team. In this process, the interaction and feedback with the end-users are instrumental in rapidly sharing knowledge and experience, which would not be easily acquired through standard observation and data collection. More importantly, it is verified that the research outcomes are applicable, feasible and according to the end-users reality and needs.

4.3 Resilience across Diverse Stakeholder Groups

At an issue level, the research team have been working to bring together stakeholders from a variety of different sectors to discuss the vast and complex issue of post-disaster reconstruction. In New Zealand this issue has been debated many times, but resources and ownership for resolving issues is traditionally lacking. By bringing together key stakeholders to develop priorities for future effort according to both criticality and our abilities to develop and implement credible solutions it is hoped to reinvigorate this process.

As part of the research programme, we are examining post-disaster reconstruction under four main themes. These themes are: legislation and regulations for post-disaster reconstruction; contractual relationships for reconstruction; resourcing for post-disaster reconstruction and reconstruction coordination. All these themes will add to a greater understanding of the country’s ability to build resilience. Resilience can be found in the ways in which construction organisations will quickly be able to recover and reconstruct post-disaster.

For legislation and regulations for post-disaster reconstruction, the key issue is one of adaptability in disaster situations. The various regulations that apply to routine construction provide for the safe development of infrastructure, capital improvements and land use, ensuring preservation and environmental protection. If the legislation and regulatory processes are well formulated they should not only be an effective means of reducing vulnerability to disasters, but also a means of facilitating reconstruction projects. However, legislation cannot be used for purposes other than those for which it is intended and where there is no provision in relevant legislation for post-disaster situations it can provide a barrier to reconstruction. For example, if all the routine construction regulatory and legislative processes are followed after a major disaster, it is unlikely that regulatory bodies would be able to cope with the volume of work. The research is examining the extent of liability for reconstruction and where it lies, and the simplification of consenting process for reconstruction. There are gaps in legislation, where reconstruction post-disaster is not covered that could place constraints on recovery. This research is examining legislation and making recommendations for its adaptability for post-disaster situations.

Under contractual relationships, the particular issues being covered are to do with how contracts are structured, the relationships formed during contracts and new contractual forms. In addition, financing of contracts is being studied. A variety of contractual relationships to procure construction projects are used in New Zealand. Procurement is critical as it determines the overall framework for construction, embracing the structure of responsibilities, risks, and authorities of the stakeholders; these issues are especially important for smooth delivery of post-disaster reconstruction. New forms of procurement such as partnering and alliancing are proving beneficial in improving the time, cost and quality performance in project delivery during normal circumstances, and the research team are investigating their applicability to post-disaster reconstruction works. The complexity of funding arrangements for any post disaster reconstruction also influences the types of contracts that might be employed, and complicates efforts to co-ordinate reconstruction programmes, with national and local government, insurance companies and private organisations and individuals all involved in funding parts of the reconstruction effort.

Inherently linked to contract types is the resourcing of the post-disaster reconstruction. Resources will need to be paid for, which can see costs increase at a time when resources are urgently needed. New Zealand is resource constrained generally. There have been various studies carried out into resource requirements in post-disaster situations. The issue is highlighted in the new National Civil Defence Emergency Management Plan (July, 2006) which states that: *'effective response and recovery may necessitate mobilisation of all (New Zealand's) available resources'*. Cataloguing requirements and current availability of the full range of resource for reconstruction, then reflecting on sequencing/critical path/bottlenecks for their mobilisation is crucial to understanding the effects on resourcing post-disaster and is something the research project is attempting to undertake. The ability New Zealand has to get offshore/national resources into a disaster zone is also in question and needs to be better understood.

Finally, responsibility for response and early recovery post disaster is well defined in the National Civil Defence Emergency Management Plan (MCDEM, 2006). However, responsibility for coordination and management of a major programme of reconstruction of housing and other infrastructure is not clear in the legislation and guidance and this lack of clarity have been proven to create barriers to reconstruction following previous disasters. The management and coordination of reconstruction following recent disaster events has fallen to insurance companies, the Earthquake Commission and local authorities; however not all of these entities has a specific remit to work outside of their own interests. The research is trying to establish criteria for assessing capability to coordinate reconstruction and examining the potential impacts of jurisdictional boundaries in post-disaster situations.

5.0 Observations and lessons learned thus far

Although the Resilient Organisations research programme is only two years into a six year research programme, already there are key learnings emerging from the research programme. The following section summarises particular highlights that are relevant to any country embarking on initiatives to improve organisational resilience.

5.1 Finding a balance between ‘what is possible’ and ‘what is practical’

During the course of this research programme, we frequently faced the task of compromising between ‘blue skies’ versus ‘pragmatic’ thinking. ‘Compromising’ is the key word to express this process in which we (the research team) has to take advantage of current and future (potential) technology, but we also have to be pragmatic in developing tools that realistically could assist end-users in improving response efficiency.

Since the beginning of the research activities in 2002, we have noticed that the research end-users have concentrated in solving current operational problems rather than expanding their solution horizons. End-users are very keen in sharing their knowledge and experience as well as contributing to the development of procedural and technical (e.g. DGIS) solutions, but found it more difficult to envisage potential future solutions and how they should be conceived and implemented. For example, during the visits to Transit NZ regional offices, we asked consultants and regional managers if they had any specific idea on how and what would be the tool to help in response activities. Their feedback was mostly focused on improving existing communication capabilities, especially by telephone (land and mobile lines). Nevertheless, upon the presentation of the DGIS vision, it was observed that end users understood and realised the potential of the tool, with very clear concerns about the implementation issues (e.g. costs, compatibility with existing systems, training, etc).

On the other hand, the research team also had to compromise in conceiving a DGIS vision that evolves from the current understanding and technology employed by the end-users organisations. For example, DGIS has been conceived to run based on the Rooding Asset Management and Maintenance (RAMM) platform, which is extensively and daily employed by all involved parties. In the academic world, this decision would not be necessarily the best option because the existing system was not originally developed for emergency management purposes. However, the research team has acknowledged that combining RAMM with DGIS would increase the chances of achieving implementation in practice, because the end-users would be receptive to an innovation that comes within the currently known technological platform.

5.2 Painting a shared vision of what needs to be achieved

During the research a common theme that has emerged is the need to communicate and get buy-in from key decision makers as to where the organisation is trying to go, or what it is that should be achieved. On first reading, this statement seems self evident. However during our research we have found that very often, the goals or the objectives have not been clearly defined and communicated, making the prospect of ever achieving them very remote!

During simulated crises exercises with individual organisations, we have seen a number of management teams floundering to identify what is most critical to the organisation and therefore what the priorities for that organisation should be in managing the crisis. Organisations that had a clear vision and goals, which were well understood and communicated throughout the organisation, found it much easier to approach a crisis situation and manage it in a coordinated way that was compatible with the organisation's overarching ethos. In contrast, organisations that even in the day-to-day struggle with reconciling disparate and sometimes even competing strands of the business, were observed to have these internal silo's emphasised, significantly hampering the organisation's ability to pull together in times of crisis.

When looking across different organisations, the need for a shared vision and goals is again critical to getting these organisations to work effectively together. In many ways it can be likened to the need to knowing where one is going, before being able to define the pathway to getting there. Once people can visualise what the end goal might 'look like' it is far easier to get them to really buy-in and commit to making it happen. This requires spending far more effort than is normally committed to defining the scope and context of the issues and developing a shared overarching vision or strategy for how they might be overcome. Particularly in New Zealand, as highlighted in the previous section, there can be a tendency to focus on what is achievable and implementable in the near future, sometimes to the detriment of establishing a longer term vision of, what might not be achievable immediately, but where ultimately we want to go.

5.3 Overcoming differences in paradigms and motivations

A crucial step towards building a shared vision of what could be achieved is to first understand the starting point, or context from which all of the participants are coming to the problem. The situation arising following a significant natural disaster illustrates how differences in motivations and assumptions can arise.

When reconstruction of damaged buildings and infrastructure is required in a post disaster situation, statutory powers may be available for a limited period of time. When a 'state of emergency' is in place the controller or coordinator can make decisions without the regulatory impediments and extensive consultation that would be required for similar routine construction. This may be at odds with the wishes of certain sectors of the affected community. Funding may be available to carry out emergency works up to a certain point in time. For example in the US up to 100% federal funding is available for reconstruction works during the 6 months following a disaster and restrictions on contracting arrangements can also be relaxed during this 6-month period (Le Masurier, 2005). Such deadlines create strong incentives to carry out work rapidly but may not be the best use of the available resources or lead to the most satisfactory long term solutions

Policy on response and recovery has a tendency to be aspirational, which can create a divide between those who set policy and those who actually take responsibility for the practicalities of recovery. For example, the New Zealand 'Recovery Management: Director's guidelines for CDEM groups' (MCDEM, 2005) proposes a management structure for coordinating recovery and recommends the setting up of various task groups. Under the 'Built Environment Task Group' are sub-task groups for various parts of the built environment. The guidelines suggest that, 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 Group to take on, given the concerns that people with post-disaster recovery experience have expressed over these issues and does not appear to concur with what has happened in practice following recent disasters.

Obtaining fast track building consents depends firstly on there being sufficient human resources in the regulatory organisations available to process the flood of extra consents in a post-disaster situation and secondly the existing legislation being flexible enough to allow consents to be fast-tracked. Obtaining sufficient builders and materials assumes that there will be an adequate labour force and resources available unaffected by the disaster and able to be mobilised to the disaster zone, either from within the country or from overseas. Coordinating trades and their work standards assumes that the Task Group has the necessary skills and is willing to take on the responsibility with the associated liability, which, as observed by AELG (2005), is a task for which CDEM agencies are not skilled, and therefore would not take on lightly.

Up to a certain scale of disaster it is generally agreed that lifeline utilities should coordinate their own response and recovery works since they are experienced in managing such projects. However, beyond a certain scale of disaster there is a need for higher level coordination otherwise conflicts may arise over the prioritisation of reconstruction. Rolfe and Britton (1995) emphasize that recovery should be coordinated at an appropriate level of government; that level should correspond to the scale of the event and the size of the community affected. In New Zealand the primary responsibility is with local government and many local authorities have developed recovery procedures, which have been sufficient to deal with the low-magnitude events of recent times. However, Rolfe and Britton (1995) point out that for a major event, past practices are unlikely to be of much assistance and central government will need to take more of a lead role, raising the challenge of competition between levels of government for control of the process.

For reconstruction of damaged infrastructure, incorrect assumptions may be made regarding the availability of resources. In a recent survey in New Zealand (AELG, 2005) it was found that of the 90% of all lifeline utilities that engage contractors to deliver components of their critical services, over half said they have a priority service included in their contracts, however of the contractors responding to the survey two thirds reported they did not have priority arrangements built into their contracts with lifeline utilities. Therefore in a post-disaster situation, many contractors may be over committed and there would be conflicts between these contractors and the utilities that assumed they had priority service.

There is a common perception that the construction sector views post-disaster reconstruction as a building boom to be responded to after a disaster occurs, rather than to be planned for in advance. This attitude may be sufficient up to a certain scale of disaster, but in a small country like New Zealand where there could be a need for all nationally available resources to be mobilized for post-disaster reconstruction (MCDEM, 2006) more proactive preparation is required. Developing a shared awareness of the potential implications of not being prepared across the diverse group of stakeholders involved in a potential reconstruction effort is a potentially significant barrier to getting real forward progress on this issue.

5.4 Difficulty in ensuring ongoing commitment

Improving organisational resilience requires an ongoing programme of work to be established and resourced. One of the key obstacles in establishing an enduring and effective a programme is typically the challenge of securing high-level and ongoing commitment from senior management within an organisation, or between organisations with a shared responsibility for managing resilience issues.

Almost invariably this stems from the lack of understanding of the need to resource such a programme in the face of many other competing priorities. In turn, this is usually due to the lack of any compelling economic drivers with which to build a sustainable business case. This applies more or less equally in private company, local authority and government settings. The first (and usually elusive) step towards obtaining commitment is engagement, from which comes understanding.

Also, for many organisational leaders, the major risk events requiring specific resilience planning are often perceived as being outside the time frame that the individual(s) will be leading the organisation (i.e. the ‘this won’t happen on my watch’ syndrome). In New Zealand, the good fortune that has seen a lack of significant events affecting widespread communities has also acted as a significant disincentive to engage in resilience planning. The connection with an enhanced ‘business as usual’ function that comprehensive resilience planning can bring about is also not often made.

5.5 The influence of organisational culture

Related to the above points, one of the interesting aspects to come out of this research is that underlying resilience issues often relate more to the softer, less tangible aspects of an organisation such as its culture, leadership, and vision. For example, qualities such as good communication and relationships within the organisation and with key customers and stakeholders, trust, and a shared vision and priorities across the organisation are all fundamental to enabling different parts of the organisation to work together to achieve a common objective. This is particularly true at times of crisis when it is often the informal networks and relationships that count. Building resilience is therefore also about reviewing the culture of the organisation and recognising the strengths and weaknesses that culture brings to the organisation in times of crisis.

Some organisations that we reviewed as case studies had very comprehensive risk management, business continuity and crisis management planning in place. However, resilience depends not only on how well these plans can be applied, but also on the ability of the organisation to establish clear leadership and act on shared priorities during crises. We found that the transition phase between response and recovery is a critical time for any organisation during a crisis. Not only does it typically signify a shift in management styles (from being directive to a more inclusive decision making process), but it is also the first opportunity the organisation really has to stand back from ‘fire fighting’ the event, and make strategic decisions about what its recovery trajectory might look like. At this time, leadership and a shared vision of where the organisation’s priorities lie are critical to retaining confidence, trust and commitment from staff and key stakeholders in supporting the organisation’s recovery.

Whilst having comprehensive business continuity plans in place is crucial for response and recovery, unless they are able to be applied intuitively during fast-moving crises they may not be effective. Real crises are inevitably complex, often don’t match with planning assumptions, and require strategic decisions to be made quickly and often without all the information available. Ultimately, during a crisis an organisation is relying on its people to perform under pressure, to understand and be able to apply the *principles* behind response and recovery planning, and to work as a co-ordinated team,

making and communicating strategic decisions. Following from this, there is a need for organisations to invest in the people side of the equation, developing coping strategies and building capacity within teams for managing crises effectively.

Crisis scenarios are often used as an effective way of testing crisis management plans. From a resilience perspective however, their value also comes from the opportunity to explore the ideas and value systems within the organisation that are likely to emerge during times of stress. They highlight the importance for all members of the team of effective communication, the need to share information even during periods of intense pressure, and for embedding common principles and practicing strategies for managing real crises. Scenario exercises offer significant value for networked organisations, particularly if they involve participants from across a number of internal divisions and/or external interconnected enterprises. They provide an opportunity to raise situation awareness of critical dependencies and to validate or otherwise service delivery expectations during a crisis.

In resilience terms, crisis simulation exercises are effective because they:

- highlight vulnerabilities (and create the motivation for reducing them),
- improve the adaptive capacity of the organisation through experience in working together during times of stress to solve unique problems,
- and enhance awareness of critical dependencies and functions within the organisation, plus give the confidence to seek out opportunities even in times of crisis.

5.6 Reputation and privacy issues

During the research two recurring themes have come up when considering reputation and privacy issues in disaster and resilience management: (1) the need to protect individual organisation's reputations in the midst of a disaster and (2) resistance to inter-organisational cooperation caused by reputation and privacy concerns.

A recent survey conducted by the Economist Intelligence Unit (EIU 2005) reports that senior risk managers' greatest concern is the risk to organisation reputation. Our research has confirmed that this is of major concern to organisations, with chemical spills, poor product performance, illicit behaviour by an employee or responsiveness to public safety all featuring as potential reputational earthquakes for organisations studied. Weak crisis management was a key area for many organisations, including:

- Lack of an effective crisis team with clear roles and specified spokespersons determined in advance and tested for effectiveness
- An attitude that that the media represented a threat to the organisation's reputation and privacy rather than seeing media attention as an opportunity to get a clear message to stakeholders
- An inability to quickly execute responsible operational action during a crisis due to the above lack of planning

The second area of shared concern amongst some organisations in our study was that any publicity is bad publicity when it comes to disaster management. Although many organisations in the study did have a current disaster management plan in place, concerns about reputation and the resulting desire to keep disaster planning and resilience management private appeared to inhibit open discussion and inter-organisational cooperation. The likely outcome is lower organisation, community and systemic resilience.

A key challenge in developing greater systemic resilience seems to be creating an environment in which there can be open dialogue on disaster and resilience management, unhindered by concerns that organisation reputation may be undermined. The effectiveness of current initiatives to foster multi-organisational collaboration noted in Section 3 provides a model that could be replicated across other industry groupings to support more effective communication and information sharing. This would result in improved dialogue during the planning and testing processes of reduction and readiness and in turn improve the effective use of industry and system resources during and crises.

6.0 Conclusions

A resilient organisation is one that is still able to achieve its core objectives in the face of adversity. Resilience however is not something that can be achieved by any one organisation acting in isolation. The Resilient Organisations research programme has been working with New Zealand organisations to develop strategies for improving organisational resilience and to highlight the need to work together to manage resilience across traditional boundaries. Through an implementation science approach, the research has shown that there are significant opportunities for engaging organisations in the need to become more resilient to major crises. The ongoing challenge remains however to achieve the sustained commitment required to actively manage resilience issues which have collective rather than individual ownership.

7.0 References

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