Copyright is owned by the Author of the thesis. Permission is given for
a copy to be downloaded by an individual for the purpose of research and
private study only. The thesis may not be reproduced elsewhere without
the permission of the Author.
Organisational responses to warnings of impending hazards: What can be learned from the September 2009 and February 2010 warnings in New Zealand?

Belinda Yvette Beets

A thesis submitted in partial fulfilment of the requirements for the degree of

Master of Philosophy in Emergency Management

130.899

2012

Massey University
Wellington, New Zealand
Abstract

Organisational responses to warnings of impending hazards: What can be learned from the September 2009 and February 2010 warnings in New Zealand?

The purpose of this study was to investigate organisational response to two tsunami warnings issued for New Zealand in September 2009 and February 2010 following off-shore earthquakes: Samoa and Chile respectfully. Communication was at the forefront of the investigation with the aim to discover how communication could potentially affect response, coordination and planning.

Four methods were applied using semi-structured questionnaires to obtain qualitative and quantitative information, literature reviews and reviews of technical and debriefing reports. Seventy nine organisations were approached to participate. Twenty five questionnaires were sent out to six organisations in various regions for staff to complete with 18 returned. Interviews were organised and were conducted, with 5 completed. One debriefing report provided relevant information and was treated as an interview.

The results of the study indicated the majority of respondents (71%) considered their organisational response to the tsunami warnings in 2009 were effective (53%) and very effective (18%). The majority did encounter problems during the September 2009 tsunami warning with 29% indicating a less than effective response. In 2010, improvements were seen with 44% indicating the response was effective and 38% thought is was very effective and 19% indicating it was less than effective.

Interagency communication was very effective for 14% in 2009; slightly increasing to 19% in 2010. In 2009 it was effective for 29%; increasing to 56% in 2010. Interagency communication was somewhat ineffective for 43% in 2009 reducing to 19% in 2010. Terminology was one issue raised by all respondents as this did cause confusion amongst response agencies.
Intra-agency communication was believed to be very effective (12%) and effective (41%) in 2009; improving in 2010 (31% and 50% respectively). Some (41%) who did believed intra-agency communication was somewhat ineffective in 2009; reducing to 13% in 2010. Some indicated it was ineffective in 2009 (6%) and 2010 (6%).

Planning issues were identified in 2009 by 71% of respondents and in 2010 this reduced to 64%. Others indicated no issues (28%) with planning in 2009. In 2010, 36% indicated no planning issues. The roles and responsibilities of the EOC and primary emergency services communication centres indicated more planning and transparency was required.

Coordinated incident management was required with 81% indicating it was fully utilised and 19% did not fully utilise or use coordinated incident management (CIMS) in 2009. There was little change in 2010 with only 80% fully utilising CIMS and 20% either not utilising it fully or not using it at all.

In 2009, 72% believed the warning to be a good reminder of New Zealand’s vulnerability to natural disasters; dropping to 53% in 2010. In 2009, 39% believed it to be a good training exercise; increasing to 47% in 2010.

Interviewees indicated lateral and vertical communication pathways were not always implemented. Coordination was not always functional. The results also revealed that the warnings sufficed as a good training exercise due to the urgency and requirement to respond. This allowed organisations to test their procedures and identify gaps in knowledge and plans.

The principle conclusion was that communication can affect response, coordination and planning. Communication has to work in its entirety. When gaps appear in communication pathways, this has an effect on planning, response and coordination. All response organisations need to re-evaluate the current CIMS structure, training, terminology used, and communication pathways to improve response.
# TABLE OF CONTENTS

List of Figures ................................................................. iv  
List of Tables ................................................................. v  
List of Acronyms ......................................................... vi  
Acknowledgements ....................................................... vii  
Glossary ........................................................................ viii  
Chapter 1: Overview and Research Project ..................... 1  
1.1 Background and Justification ................................. 1  
1.2 Professional Context of Author ............................ 1  
1.3 Objectives of Study ................................................. 3  
1.3.1 Research Questions .......................................... 4  
1.4 Structure of Thesis ............................................... 5  
1.5 Introduction to the Events .................................... 6  
1.6 Comprehensive Emergency Management ............. 6  
1.6.1 Definitions ..................................................... 7  
1.6.2 The 4R’s: The Basis Comprehensive Emergency Management... 10  
Chapter 2: Literature Review ....................................... 12  
2.1 Introduction ....................................................... 12  
2.2 System Failures ..................................................... 14  
2.3 Disaster Response Structure: How it may affect response .... 16  
2.4 Risk Communication ............................................ 19  
2.5 Emergency Operations Centre ............................ 21  
2.6 Theoretical Approaches to Disaster Response ......... 29  
2.7 Methodologies in Past Research and Future Considerations ...... 31  
2.8 Synthesis of the Research .................................... 32  
2.9 Critical Analysis .................................................... 34  
2.10 Linking Past Research to This Study .................... 35  
Chapter 3: Materials and Methods ............................... 38  
3.1 Introduction ....................................................... 38  
3.2 Purpose and Focus of this Study ............................ 39  
3.3 Research Approach and Methodology .................... 39  
3.4 Ethical Considerations ......................................... 41  
3.5 Research Methods ................................................. 42
### LIST OF FIGURES

<table>
<thead>
<tr>
<th>Number</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>60</td>
</tr>
<tr>
<td>2.</td>
<td>63</td>
</tr>
<tr>
<td>3.</td>
<td>64</td>
</tr>
<tr>
<td>4.</td>
<td>66</td>
</tr>
<tr>
<td>5.</td>
<td>69</td>
</tr>
<tr>
<td>6.</td>
<td>72</td>
</tr>
<tr>
<td>7.</td>
<td>75</td>
</tr>
<tr>
<td>8.</td>
<td>76</td>
</tr>
<tr>
<td>9.</td>
<td>79</td>
</tr>
<tr>
<td>10.</td>
<td>100</td>
</tr>
</tbody>
</table>

1. The Perceptions of the Tsunami Warnings in September 2009 and February 2010
2. The Level of Effective Communication Between and Within Response Organisations 30th September 2009
3. Level of Effectiveness for Communication Between and Within Organisations 28th February 2010
4. Organisations Response to the Tsunami Warnings in September 2009 and February 2010
5. Fully Utilising CIMS for the Two Tsunami Warnings in 2009 and 2010
6. Planning Issues for the Tsunami Warnings in September 2009 and February 2010
7. Role and Responsibilities of the EOC
8. Role of the Emergency Services Communication Centres
9. Sea Receding from the Shoreline with Visible Discolouration Caused by Tsunami Wave Action in Gisborne, February 2010
10. Diagramatic View of Coordinated Incident Management System for Multi-agency Incidents From the Emergency Operations Centre Perspective
# List of Tables

<table>
<thead>
<tr>
<th>Table Number</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>51</td>
</tr>
<tr>
<td>2.</td>
<td>61</td>
</tr>
<tr>
<td>3.</td>
<td>63</td>
</tr>
<tr>
<td>4.</td>
<td>65</td>
</tr>
<tr>
<td>5.</td>
<td>68</td>
</tr>
<tr>
<td>6.</td>
<td>70</td>
</tr>
<tr>
<td>7.</td>
<td>73</td>
</tr>
</tbody>
</table>

1. Four Elements for Rigour in Qualitative Research and Their Counterparts in Quantitative Research

2. Interview Responses to Overall Perception of the September 2009 and February 2010 Tsunami Warnings

3. Comments Made by Interviewees Regarding Inter- and Intra-agency Communication 30th September 2009

4. Inter- and Intra-Organisational Communication: Comments Made by Interviewees for the Tsunami Warnings 28th February 2010

5. Organisational Response Following the September 2009 and February 2010 Tsunami Warnings

6. The Responses by all Participants that Indicate Understanding of CIMS

7. Planning Issues Identified by Participants for Both Tsunami Warnings in 2009 and 2010
LIST OF ACRONYMS

CDEM: Civil Defence and Emergency Management.

CDEMA: Civil Defence and Emergency Management Act 2002

CDEMG: Civil Defence and Emergency Management Groups.

ECC: Emergency Coordination Centre (see GEOC).

CEG: Coordinating Executive Group

CIMS: Coordinated incident management system.

EMO: Emergency management officer employed by the regional, district, or local council.

EOC: Emergency Operations Centre.

GEOC: Group Emergency Operations Centre

IAP: Incident action plan

ICP: Incident control point

IMT: Incident management team

InterCad: Computer method of sharing information between Fire, Police and Ambulance also known as I/Cad.

L.A.: Local Authority (a regional council or territorial authority - includes regional, city and district councils, and unitary authorities).

LESLP: London Emergency Services Liaison Panel

MCDEM: Ministry of Civil Defence and Emergency Management

NCMC: National Crisis Management Centre

Sitrep: Situation report

SOP’s: Standard operating procedures

4R’s: Reduction, Readiness, Response, Recovery
ACKNOWLEDGMENTS

This thesis is the final requirement of two years part-time study for completion of the Master of Philosophy in Emergency Management. The author wishes to express sincere appreciation to Professor David Johnston and Dr. Graeme Leonard for their assistance in their guidance and preparation of this manuscript. In addition, special thanks to Dr Emma Doyle whose familiarity with the needs and ideas of this thesis was helpful during this undertaking. Thanks also to the all members of the faculty for their valuable input. Special thanks go to the library staff for their support and assistance.

A special thanks to all the organisations including government and non-government departments who supported the author, thus allowing her to pursue her thesis research during 2010 and throughout 2011, particularly as many organisations were busy with the earthquake that struck Canterbury in early September, 2010 and then again in February 2011; then severe weather conditions in the central region of the North Island. This did not deter some organisations participating in answering the questions posed for this research. The author expresses sincere appreciation during this stressful and trying period for emergency managers and organisations involved in the response and recovery of these adverse events.

On a personal level my sincere thanks to Professor David Johnston and Dr. Graeme Leonard, my thesis supervisors at Massey University who have provided the guidance and support for this study. A special thanks to the staff at Geological and Nuclear Science who also provided the author with guidance and provision of research journals. A special thank you goes to my son, Daniel. Daniel helped me through after I had surgery. He assisted me with computer work, mailing consent letters and printing questionnaires. He also kept in touch with my supervisors to give them updates on my progress. This was a huge undertaking for him and it was very much appreciated. His assistance helped me to keep moving ahead, albeit slowly, with my work.
GLOSSARY

**Adaptability.** The ability to adjust easily to new or changing environmental conditions.

**Auditability.** A systematic assessment, especially of the efficiency of effectiveness of an organisation or process, typically carried out by an independent assessor.

**Communication.** Exchanging information between people or organisations by means of speaking, writing, or other common systems including technological devices such as paging, phone texting, public announcement warning systems.

**Confirmability.** Similar findings have been confirmed in previous studies.

**Creditability.** Bringing credit or worthiness to the research field.

**Emergency Service Communication Centre.** Also known as control rooms or dispatch centres where emergency calls are received and appropriate resources are dispatched to emergency incidents.

**Intercad.** A software programme used to provide incident reports to New Zealand Police, Fire and Ambulance services. These incidents can be updated informing each agency of updates to a situation where multiple agency events occur.

**MCDEM.** Ministry of Civil Defence and Emergency Management

**Primary Emergency Services.** For this thesis, primary emergency services include New Zealand Fire Service, New Zealand Police and Ambulance Service.

**Risk.** The chance of something going wrong and will result in loss occurring.

**Risk Communication.** The ability to exchange information pertaining to the risk to provide communities and organisations with the ability to make appropriate decisions appropriate to their situation, including when and where to evacuate.
**System.** A method or set of procedures for achieving inter- and intra-agency goals during multi-agency incidents.

**Transparency.** An honest way of doing things that allows other people to know exactly what you are doing.

**Tsunami.** A very large wave, or series of waves, caused by something such as an earthquake moving a large quantity of water typically in the ocean.