

# East Cape earthquake and tsunami:

2 September 2016

Post Event Report (MCDEM response)



# Contents

---

<b>1</b>	<b>Executive Summary</b> .....	<b>3</b>
<b>2</b>	<b>Overview of the response</b> .....	<b>4</b>
2.1	The response.....	4
2.2	Summary of response actions .....	4
<b>3</b>	<b>Evaluation</b> .....	<b>6</b>
3.1	What went well.....	6
<b>4</b>	<b>Conclusions</b> .....	<b>8</b>
	<b>Appendix 1: Corrective Actions Plan</b> .....	<b>9</b>

# 1 EXECUTIVE SUMMARY

---

At 0438 NZST on Friday 2 September 2016, a magnitude 7.1 earthquake occurred near the coast of the East Cape of the North Island resulting in small tsunami waves reaching the East Coast of New Zealand.

The Ministry of Civil Defence & Emergency Management (MCDEM) activated the National Crisis Management Centre (at Mode 2) to manage the tsunami warning and to support the Civil Defence Emergency Management (CDEM) Groups' response to the earthquake and tsunami threat. The response lasted nearly 12 hours with the National Crisis Management Centre standing down at 1530 hours on Friday 2 September 2016.

Overall, the response was appropriate, with the practice offered by Exercise Tangaroa only two days earlier proving valuable. MCDEM staff and CDEM Groups were generally satisfied with the communication and support they received. A number of coastal communities did not wait for official warnings and instead self-evacuated upon recognising the natural warnings signs, which is exactly the right action to take. This suggests that public education messages have been getting through.

However, the complexity of the earthquake had an impact on the initial threat assessment. While the earthquake magnitude did not warrant a default warning, a small tsunami was generated which gave cause for re-assessment.

The event highlighted once again the importance of disseminating effective messages to CDEM Groups, media and the public in a timely fashion; subsequently, thresholds and corresponding default action as well as message content will be reviewed.

MCDEM's dual responsibility as the national warning agency for tsunami events and for the coordination of the emergency response raised resourcing capacity issues.

This report contains a Corrective Actions Plan addressing issues raised during the response.

## 2 OVERVIEW OF THE RESPONSE

### 2.1 The response

The Ministry of Civil Defence & Emergency Management (MCDEM) was advised of a severe earthquake occurring off the East Cape of the North Island at 0440 NZST on Friday 2 September 2016 via an initial GeoNet earthquake email alert. This was followed up with a pager message to the Duty Team.

The Duty Team initially instructed the New Zealand Fire Service Northern Communications Centre to issue a National Advisory: Earthquake message. This decision was based on the earthquake's initial magnitude (as per GeoNet's information) which was below the set thresholds for issuing a tsunami warning, as well as the first Pacific Tsunami Warning Centre indicating a depth of 159km which would also be too deep to have generated a tsunami.

GeoNet and the Pacific Tsunami Warning Centre soon revised their initial earthquake estimates of magnitude and depth. While the new estimates still did not meet the tsunami warning threshold, GeoNet advised the MCDEM Duty Team they were re-assessing the tsunami threat against the observation of small tsunami waves at East Cape.

The subsequent difficulty in quickly determining an accurate magnitude and depth of the earthquake by both GeoNet and Pacific Tsunami Warning Centre had a direct bearing on decision-making around if, and what type of, tsunami threat message should be issued by MCDEM<sup>1</sup>. Awaiting GeoNet's advice, the MCDEM Duty Team issued a National Advisory: Potential Tsunami Threat message at 0533 NZST. After receiving the GeoNet advice this was upgraded to a National Tsunami Warning at 0558. National Warning messages were then sent every hour until a Cancellation message was issued at 0830 NZST on 2 September.

The National Crisis Management Centre was activated at Mode 2 by the Duty Team and supporting MCDEM staff who offered to help with the activation and response. A 'Yellow' (stand-by) activation message was sent to staff via the National Warning System at 0612 NZST. Three Situation Reports were issued by the National Crisis Management Centre during the response, at 1000, 1200 and 1520. The National Crisis Management Centre remained active throughout the day until standing down at 1530 NZST on Friday 2 September.

### 2.2 Summary of response actions

Friday 2 September	
0438	Earthquake occurs off the coast of Te Araroa.
0440	Preliminary Earthquake Report received from GeoNet via email. Magnitude 6.3 earthquake, 34km deep, 5km south-west of Te Araroa.
0443	Pacific Tsunami Warning Centre issue Tsunami Information Statement 1 with the following preliminary earthquake parameters: Magnitude: 7.2 Depth 159km. "Based on all available data there is no tsunami threat because the earthquake is located too deep inside the earth."

<sup>1</sup> GNS Science later indicated the trigger of a tsunami by this earthquake, albeit small, was extra-ordinary.

<b>0500</b>	MCDEM issue a National Advisory: Earthquake message, with the following earthquake parameters: Magnitude: 7.1 Depth: 55km Location: 130km north-east of Te Araroa.
<b>0513</b>	Pacific Tsunami Warning Centre issue Tsunami Information Statement 2. The earthquake parameters were amended as follows: Magnitude: 7.0 Depth: 31km It was noted that small tsunami waves have been observed.
<b>0525</b>	The first MCDEM staff arrive in the National Crisis Management Centre to start the activation process.
<b>0533</b>	MCDEM issue a National Advisory: Potential Tsunami Threat with the following earthquake parameters: Magnitude: 7.0 Depth: 31km.
<b>0558</b>	Memorandum of Understanding activated – Request for the broadcast of an emergency announcement – tsunami warning
<b>0558</b>	MCDEM issue National Warning: Tsunami Threat #2 for the East Coast of the North Island (including Auckland, Waikato and Bay of Plenty) and Upper South Island.
<b>0612</b>	MCDEM Staff Activation Yellow issued.
<b>0632</b>	Ministerial Briefing 1 issued.
<b>0635</b>	National Warning #3 – Threat to Marine and Beach Areas issued. Tsunami Threat Map attached.
<b>0645</b>	Group Controllers Teleconference held.
<b>0729</b>	Ministerial Briefing 2 issued.
<b>0735</b>	National Warning #4 – Threat to Marine and Beach Areas issued.
<b>0830</b>	National Warning: Tsunami Marine and Beach Threat cancelled.
<b>0900</b>	MOU – Request for termination of an emergency announcement sent.
<b>0908</b>	Ministerial Briefing 3 issued.
<b>0946</b>	National Crisis Management Centre staff activation yellow (stand-by) message cancelled.
<b>1000</b>	National Crisis Management Centre Situation Report 1 issued.
<b>1200</b>	National Crisis Management Centre Situation Report 2 issued.
<b>1520</b>	National Crisis Management Centre Situation Report 3 issued.
<b>1530</b>	National Crisis Management Centre stood down.

## 3 EVALUATION

---

A hot debrief was held at the end of the event on 2 September in order to capture immediate feedback from National Crisis Management Centre staff. This was followed by a cold debrief for all MCDEM staff involved in the response on 12 September 2016. Feedback on what went well is outlined below in section 3.1. Aspects that can be improved have been incorporated into a Corrective Actions Plan (see [Appendix 1: Corrective Actions Plan](#)).

### 3.1 What went well

---

#### Staff capability and capacity

- Really positive team effort.
- We seemed to communicate and work well. It was a smallish team which helped. Easier to get/keep situational awareness with a small team and good communication.
- Useful trial of the Director and the National Controller differentiating roles.
- Well-supported by other duty/response team staff as well as those external (i.e. MCDEM staff doing business as usual work able to put 'out of office' messages on).
- Regular exercises created a supportive team. Teamwork was good.
- Staff were supported during the response.

#### Media and public information

- The Public Information Management team was happy to have other staff pitch in and help.
- Very clear public messaging.
- The Director was great in interviews. When interviewed on radio, she came across as well-prepared, confident and authoritative.
- Public education - messages to self-evacuate have got through to some communities.
- Media published MCDEM and local Group messages without sensationalising.
- Was able to do initial social media postings from home.
- Once everyone was on-board, the Public Information Management messaging was consistent, clear messaging.
- The Public Information Management team worked well together.
- Excellent support from the off-duty webmaster.

#### Internal communications

- All National Warning System messages received with ease.
- National Warning System messages with changed/updated information highlighted in red were successful.
- Early on an email went out with anticipated National Crisis Management Centre activation times. It was good to have an idea when people would be back in the office.
- People that were unavailable had their 'out of offices' on which was helpful.

- Use of text messages to update multiple people in the Minister's office worked well.
- Rapid briefing to Prime Minister/ Minister of Civil Defence seemed to work well.

#### **National Crisis Management Centre processes**

- Having GNS Science in the National Crisis Management Centre worked well.
- The activation checklist and supporting Standard Operating Procedures went well (and showed the benefit of exercising this weekly).
- Standard Operating Procedures were followed and improvised where required.
- Having a liaison officer to go between the Operations/Public Information Management rooms was useful.
- The Duty Team had practised and were effective and efficient
- Systems worked – staff, activation, processes, IT.

#### **Public awareness**

- People self-evacuating and community evacuations undertaken in good spirits – public messaging seem to be a success.
- Positive media coverage of the evacuees – they were praised.
- Gisborne people evacuated on natural warning signs (self and local evacuations).

## 4 CONCLUSIONS

---

The practice offered by Exercise Tangaroa only two days earlier, MCDEM's weekly activation practice and the strength of its relationship with GNS Science proved valuable. Overall, the response went well with CDEM Groups generally satisfied with the communication and support they received.

However, there were some challenges identified with science engagement and assessment processes involving the complexity of the earthquake. While the earthquake magnitude did not warrant a default warning, a small tsunami was generated which gave cause for re-assessment. This led to commentary in the media about a perceived delay in issuing an official notification. Although MCDEM's procedures were followed correctly for this event, it highlighted once again the importance of disseminating effective messages to CDEM Groups and the public in a timely fashion. Subsequently, ways to enhance the assessment and warning process were identified for consideration.

It was noted that had the earthquake been larger i.e. meeting the tsunami warning thresholds, the warning process would have been more simple and faster.

It was also noted that the resulting demand of the media to respond to criticism while the response was still underway was a distraction to key response priorities. There would be merit in further emphasising to the public and media that for local source tsunami, there is unlikely to be time to issue official warnings in time as the first waves could arrive in minutes, and that therefore the best warning continues to be recognising the natural signs of a tsunami. A better understanding in this regard will assist with promulgating those vital public safety messages while also mitigating against expectations that are not realistic for local source tsunami.

Notwithstanding, it is encouraging that a number of coastal communities did not wait for official warnings and self-evacuated upon recognising the natural warning signs. This is a positive sign, and indicates that public education messages and local tsunami arrangements about local source tsunami events have been effective.

A resourcing capacity issue was evident in giving simultaneous effect to MCDEM's responsibility as the national warning agency for tsunami, and its responsibility for the coordination of emergency response. Considering the life-safety context of the tsunami warning responsibility, the accuracy and timeliness of threat information has to take priority while the warning is in effect; however, resourcing this comes at the cost of sufficient simultaneous attention to the response coordination role (which in other responses would be MCDEM's primary or only focus).

Aspects for attention are tabulated in *Appendix 1: Corrective Actions Plan*.



# APPENDIX 1: CORRECTIVE ACTIONS PLAN

Issues and remedial actions have been grouped in the following sections:

1. National Crisis Management Centre activation and Duty Team, including staff capability, National Crisis Management Centre equipment, and the Tsunami Warning Plan and procedures.
2. Communications, including correspondence with staff, national warning system messages, and interaction with CDEM Groups.
3. Public Information Management, including media engagement.
4. Science engagement and information.
5. Information Technology, including Emergency Management Information System.
6. National Crisis Management Centre functions and layout.

#	Issue	Root cause (if known)	Remedy	Action
<b>1. National Crisis Management Centre activation and Duty Team, including staff capability, and the Tsunami Warning Plan and procedures.</b>				
1	MCDEM's dual responsibility as the national warning agency for tsunami and for the coordination of emergency response raised resourcing capacity issues.	The life-safety context of tsunami warnings means it has to take resourcing priority, which impacts on the response coordination responsibility.	Additional resources with appropriate qualifications or moving the responsibility for warnings	Consider where the responsibility for tsunami warnings best fit, and the implications and process for change. If applicable, establish a roadmap for change.
2	Should staff volunteer to help after an after-hours 'Yellow' staff activation notice?	Expectations of staff in this type of event are unclear.	Check Standard Operating Procedures are clear and modify as required.	Check Activation & Operations Standard Operating Procedure.
3	Clear and prompt direction is needed on what MCDEM Regional Emergency Management Advisors should do, especially if they are responsible for more than one Group. Any actions undertaken then need to be communicated to the Regional Coordinators.	If an event affects more than one CDEM Group, the immediate actions for Regional Emergency Management Advisors are not clear.	Regional Emergency Management Advisors are to connect with all affected Groups without waiting for instructions and advise the Duty Manager of where they are needed most.	Regional Emergency Management Advisors to note

#	Issue	Root cause (if known)	Remedy	Action
4	Not all Policy staff have knowledge of CDEM which impacts on their duty role.	Not enough Policy staff that understand CDEM.	Train more staff to undertake the duty policy role.	Link into review of National Crisis Management Centre training needs
5	More Operations Function staff are needed for a Mode 2 National Crisis Management Centre activation. These staff need to have clear roles and responsibilities.		Ensure all MCDEM staff are able to fulfil a role on the Operations Function. Further develop the Operations SOP to provide role descriptions and checklists for all the roles the function is required to fulfil.	<ol style="list-style-type: none"> <li>1. Include Operations Function processes in regular National Crisis Management Centre training sessions.</li> <li>2. Check the Operations Function Standard Operating Procedure.</li> </ol>
6	The Duty roles and the National Crisis Management Centre function roles need to be better delineated.	It is difficult to continue to fulfil a Duty role at the same time as performing a National Crisis Management Centre functional role.	Clarify the expectations on duty staff once the National Crisis Management Centre has been activated – do they continue with their duty role, or should they be relieved by staff not needed in the National Crisis Management Centre?	<ol style="list-style-type: none"> <li>1. Review the expectations on duty staff when the National Crisis Management Centre is activated.</li> <li>2. Amend the Duty Standard Operating Procedure to make expected actions for staff clear.</li> </ol>
7	There is a need for clarification of the expected timeframes around staffing the National Crisis Management Centre, including the: <ul style="list-style-type: none"> <li>- 30 mins to National Crisis Management Centre timeframe</li> <li>- Staffing requirements to be met within 2 hours</li> <li>- 30 min timeframe for issue of MOU.</li> </ul>	These are performance targets set out in the Tsunami Advisory and Warning Plan.	Specify these are performance targets that we use as guidelines, but they are not measured formally.	Review the time-related performance measures set out in the Tsunami Advisory and Warning Plan, and clarify their intent.

#	Issue	Root cause (if known)	Remedy	Action
8	The National Crisis Management Centre activation message to agencies sent via the National Warning System needs amendments to include Support Agency messaging.	Actions for Support Agencies on receipt of this message are not clear.	Review and amend the National Crisis Management Centre activation message to indicate actions for support agencies, e.g. they are not required to undertake any action at this time/will be requested by phone to support the National Crisis Management Centre response.	Amend the National Crisis Management Centre activation message.
<b>2. Communications, including correspondence with staff, national warning system messages, and interaction with CDEM Groups.</b>				
9	Don't leave voicemails during a response – call again, call someone else or text.	Voicemails can be easily missed when someone is busy on the phone.	Ensure all staff are aware of who to escalate calls to if original person is not available.	Include phone protocol to use during a response in training.
10	Controller teleconference times need to be communicated to all Function Managers.		Ensure all Functions are informed about Controller teleconference times when these are set.	Add to the Operations Standard Operating Procedure as part of the process for setting up a Controller's teleconference.
11	National Warning System messages need to go to all National Crisis Management Centre function mailboxes and/or be announced within the National Crisis Management Centre.	All functions need to be aware of the latest information.	Ensure all functions receive the National Warning System messages directly. Ensure any significant developments are announced to staff in the National Crisis Management Centre via the sound system.	1. Add National Crisis Management Centre function email addresses to the National Warning System list. 2. Add to the Operations Standard Operating Procedure.

#	Issue	Root cause (if known)	Remedy	Action
12	The description of regions in the messages was confusing and changed in messages.	There was a lack of consistency in the wording in the National Warning System messages.	Consider standard wording to describe regions affected and provide the ones applicable to the Tsunami Experts Panel during an event.	<p>1. Discuss standard wording for regions with GNS Duty Team and add to National Warning System Standard Operating Procedure.</p> <p>2. Intelligence function to note checking for consistency</p>
13	A potential tsunami threat message for a local source event is unhelpful for decision making.	For a local source event a clear threat indication will be more helpful.	Consider issuing a National Warning message straight away when there is doubt in a local source event, and then cancel it if confirmation is received of no threat.	For discussion and decision by the Tsunami Working Group.
<b>3. Public Information Management, including media engagement.</b>				
14	Having to respond to media criticism during the event distracted the response focus.	<p>Operational staff are not shielded from this while they are in response.</p> <p>Media education on local source tsunami and warning is needed.</p>	<p>There needs to be clear delineation between the developing and dissemination of public safety information, and reacting to criticism. These need to be prioritised, with the former taking precedence.</p> <p>Consider best way to communicate with media about tsunami warnings - before and during events</p>	<p>Consider who and how to respond to criticism while still in a response.</p> <p>Update Public Information Management Standard Operating Procedure as required.</p> <p>In the interests of public safety, it would be helpful in future for media to emphasise the fact that this was a local source tsunami and natural warning signs are more important than waiting for official messages.</p>

#	Issue	Root cause (if known)	Remedy	Action
15	It is important to publicise at an early stage that we are aware of the hazard and are assessing it.	Holding messages need to go out faster.	Develop templated holding messages that can be quickly adapted depending on the event. (New National Warning System will assist with faster, automated holding messages)	Draft messages and include in the Public Information Management and Webmaster Standard Operating Procedures.
16	Having Public Information Management in a separate room added challenges. Made situational awareness difficult.	No Public Information Management presence in the Operations Room.	The Public Information Management team need to be able to see the same information that is displayed in the Operations Room. Longer-term, space should be made to have Public Information Management situated in the main Operations Room.	<ol style="list-style-type: none"> <li>1. Investigate linking relevant information boards displayed in the Operations Room to be replicated in the Public Information Management Room.</li> <li>2. Have a Public Information Management member sitting at the Intelligence desk.</li> </ol>
17	Need new Public Information Management Standard Operating Procedures and training to support these. Public Information Management training needs to include Emergency Management Information System/National Warning System/MOU/monitoring roles. Non-communications staff webmasters also require regular training/testing.	Public Information Management Standard Operating Procedures had recently been redeveloped but not yet tested.	Continue to develop the Public Information Management and webmaster Standard Operating Procedures, alongside a more structured training programme for Public Information Management/webmaster and non-communications staff.	<ol style="list-style-type: none"> <li>1. Review and redraft the Public Information Management and webmaster Standard Operating Procedures.</li> <li>2. Develop and implement a structured Public Information Management and webmaster training programme.</li> </ol>
18	Media monitoring seems cumbersome and resource intensive.	We do not have an electronic tool to support this	A tool is required for media monitoring, preferably something that can look across multiple social media and websites and collate results for Public Information Management staff.	Investigate tools for media monitoring.

#	Issue	Root cause (if known)	Remedy	Action
19	The webmaster computer in the National Crisis Management Centre must have two screens.		Ensure the webmaster computer in the National Crisis Management Centre has two screens.	Install an additional screen for the webmaster computer in the Public Information Management room in the National Crisis Management Centre.
20	The public and media do not see the distinction between MCDEM and CDEM Groups, they see us as 'Civil Defence Emergency Management'. Therefore if something is perceived negatively anywhere (national or local) it reflects on 'Civil Defence Emergency Management' as a whole.	There is variance across regions in terms of the public alerting systems used.	Consideration should be given on a collective approach for alerting channels where appropriate, and that allow for such an approach.	A small working group among Controllers to be established to consider this and other applicable matters.
<b>3. Science engagement and information</b>				
21	The time that the Tsunami Experts Panel (TEP) requires for threat assessment does not match the timeframes for local source tsunami warning.	It takes up to an hour to convene the TEP and for them to provide an assessment.	The role of the TEP must be re-considered, especially for local and regional source events when time is critical.  Default action for local and regional source events to be considered.  Strong engagement and formalisation of the relationship between the MCDEM and GNS duty teams is needed to ensure swift assessment and response.	<ol style="list-style-type: none"> <li>1. Discuss the issue around the TEP and a different arrangement for local and regional source events with GeoNet.</li> <li>2. Tsunami Working Group to consider and agree default actions for local and regional source events.</li> <li>3. MCDEM and GNS Duty Teams to discuss outcomes in joint meeting.</li> </ol>
22	Some CDEM Groups were using information from the Pacific Tsunami Warning Centre to make decisions, not GeoNet/MCDEM advice.		Ensure all CDEM Groups are aware that MCDEM represents the only official source of information for tsunami warnings in NZ. Pacific Tsunami Warning Centre messages do not represent the official warning status for New Zealand.	<ol style="list-style-type: none"> <li>1. To be discussed by the Controllers working group (see # 20)</li> <li>2. Regional Emergency Management Advisors to reinforce with all CDEM Groups that MCDEM is the only official source of tsunami warning information for New Zealand.</li> </ol>

#	Issue	Root cause (if known)	Remedy	Action
23	The tsunami threshold table needs review.	The earthquake did not reach the threshold for a local source tsunami threat even though it did generate a small tsunami.	Review the tsunami threshold table and update the National Tsunami Advisory and Warning Plan.	<ol style="list-style-type: none"> <li>1. With GNS, review the tsunami thresholds table with regards to the thresholds for local source tsunami.</li> <li>2. Discuss change at tsunami Working group</li> <li>3. Adjust Tsunami Advisory &amp; Warning Plan and align the Decision Support Tool with the changes</li> </ol>
24	The tsunami threat maps didn't include an explanation table and need to be produced and distributed faster.	Developing the tsunami threat maps depends on receiving information from GNS and is a labour-intensive process. They can therefore be rushed when the information is eventually available.	<p>Ensure the template used for developing the tsunami threat maps contains all the appropriate information and explanations.</p> <p>Review how the maps are published and distributed.</p>	<ol style="list-style-type: none"> <li>1. Review the tsunami threat level map template and save appropriately.</li> <li>2. Investigate with GNS options for publishing threat level maps directly to a joint webpage.</li> </ol>
<b>4. Information Technology</b>				
25	All available information is not centralised in one consistent place.	Absence of a clear information management guideline for response.	<p>An Information Management Standard Operating Procedure should be developed to document the process for managing all information that is received during a response.</p> <p>Policy need to better understand where information goes and how policy can most effectively access it.</p>	<ol style="list-style-type: none"> <li>1. Assign the development of an Information Management Standard Operating Procedure.</li> <li>2. Engage with the Policy Manager on what information Policy needs and how this can be accessed.</li> </ol>

#	Issue	Root cause (if known)	Remedy	Action
26	Emergency Management Information System support staff are called regardless of their on-call status.	The Emergency Management Information System out-of-hours Standard Operating Procedure needs work and there is concern that Central Agencies Shared Services do not have the capacity to support this Standard Operating Procedure.	Further develop the Emergency Management Information System out-of-hours Standard Operating Procedure in conjunction with Central Agencies Shared Services.	Review and update the Emergency Management Information System out-of-hours Standard Operating Procedure. Ensure all staff are aware of the actions to be taken with Emergency Management Information System issues outside business hours.
27	The completed and saved Situation Report did not display on the right hand side quick launch area in Emergency Management Information System.			Confirm the process for displaying completed Situation Reports in Emergency Management Information System is working correctly.
<b>5. National Crisis Management Centre functions and facilities.</b>				
28	All staff need to understand the basics of Emergency Management Information System messaging (not just Operations Function staff).		National Crisis Management Centre training needs to be process-based and hands on, for example, filling in forms, etc.	Incorporate messaging into the 2017 National Crisis Management Centre training programme.
29	The Logistics function was not activated when facilities, catering, rostering and reception support would have been useful.	There is a need to rethink what functions are required at the onset of an event.	Review what functions are to be activated at different modes of activation	Review and update the National Crisis Management Centre Concept of Operations.
30	There is a need for clear instructions for turning on and off the email rule on the Operations inbox.		Develop instructions for the Operations inbox email rule and train staff in the procedure.	Develop instructions and train Operations staff.
31	The Word version of the Situation Report needs to have formatting checked and aligned.			Review and update the National Crisis Management Centre Situation Report word template.