



Ministry of Civil Defence & Emergency Management

Te Rākau Whakamarumarū

Level 9, 22 The Terrace | PO Box 5010 | Wellington 6145 | NEW ZEALAND

Tel: +64 4 473 7363 | Fax: +64 4 473 7369 | emergency.management@dia.govt.nz | www.civildefence.govt.nz

4 May 2012

MEM-2408-07

Richard Kempthorne
Group Chair
Nelson/Tasman CDEM Group
Private Bag 4
Richmond 7050



Dear Richard

FIXED SIRENS FOR TSUNAMI WARNING

I am aware that some local authorities have or are in the process of installing sirens for the purpose of tsunami warning. This has prompted calls from these authorities to MCDEM to investigate and advise on aspects such as a standard for sirens and/or a siren tone.

A comparative assessment of sirens (among other public alerting options) was offered in the 2009 MCDEM publication *Public Alerting: Options Assessment - Information for the CDEM Sector* [IS10/09]. While the advice contained in that publication was on the use of sirens as a generic alerting mechanism, it concluded that sirens are not considered to be ideal for short lead-time hazards where there are only minutes of warning time.

We have since learnt significantly more about the use of fixed sirens for specifically tsunami warning and I have asked the Tsunami Working Group (with representation from MCDEM, seven of the 16 CDEM Groups and GNS Science) to consider the requests for guidance in this regard. This working group advises and oversees all projects conducted under the tsunami risk management programme; previous work includes the development of Tsunami Signage Standards, Tsunami Evacuation Zone Guidelines, Tsunami Threat Levels (for warnings) and public education messages on tsunami. The working group discussed the request for work on siren standards at its meeting on 11 April 2012 and concluded as follows:

- The main interest in using sirens for tsunami warning relates to local source events which in most cases also represent the biggest threat. Sirens (tone-only or voice-capable) are not regarded as effective or reliable alerting mechanisms in these events. There are numerous examples in such events where sirens could not be triggered in time given the short travel time of the tsunami to the coast. The time it takes to conduct threat assessment and issue official warnings (which in turn would lead to activation of sirens) will very likely be longer than the time it will take for a local source tsunami to reach the coast. It has also been shown that the existence of fixed sirens can create a false sense of comfort with the public in that they expect to be warned by the siren (rather than making a decision to respond to the earthquake itself). In other cases they have contributed to delayed responses among the public due to frequent false alarms. The earthquake damage itself can also have a limiting effect on sirens making them

inoperable, while there are also issues with regards to the effectiveness of the sirens through audibility (factors such as wind direction, indoor/outdoor, clarity). All these concerns with regards to sirens were evident in the Japan tsunami of March 2011.

- While sirens can be effective for warnings during regional or distant source events, those events are normally of a lesser threat and the time available to alert the public implies that several other communications means can be (and should be) used.
- In view of the above, the use of fixed coastal sirens solely for tsunami warning is not advised. Where utilised, their appropriate role is as a generic alerting mechanism (alerting the public that something is happening or has happened and that they should listen to the radio to establish what to do). However, as a generic alerting mechanism voice-capable sirens have been shown internationally to give more effective response than tone-only sirens across a range of hazards.
- The best and most reliable warning system for local source tsunami in New Zealand remains the natural warning itself (people feeling the earthquake and taking immediate action, and not waiting for an official warning or a siren). This is consistent with the New Zealand public education message which is internationally accepted as best practice. We should focus our emphasis on this message and be mindful of creating distractions from it. The New Zealand message in this regard is:

A tsunami generated in conjunction with a nearby large earthquake or undersea landslide may not provide sufficient time to implement official warning procedures.

Persons in coastal areas who:

- *experience strong earthquakes (hard to stand up);*
- *experience weak earthquakes lasting for a minute or more;*
- *observe strange sea behaviour such as the sea level suddenly rising and falling, or hear the sea making loud and unusual noises or roaring like a jet engine;*

should not wait for an official warning. Instead, let the natural signs be the warning. They must take immediate action to evacuate predetermined evacuation zones, or in the absence of predetermined evacuation zones, go to high ground or go inland.

I accept the above guidance from the Tsunami Working Group as the official position on the matter of using fixed sirens for tsunami warning. On that basis further guidance related to fixed sirens as a tsunami warning mechanism will not be developed at this stage.

Yours sincerely



John Hamilton
Director