

Technical Standard [TS01/08]

National Tsunami Signage





National Tsunami Signage Technical Standard for the CDEM Sector [TS 01/08]

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Authority

This technical standard has been issued by the Director of the Ministry of Civil Defence & Emergency Management pursuant to s9(3) of the Civil Defence Emergency Management (CDEM) Act 2002. It provides guidance to CDEM Groups in the development of plans. CDEM Groups are required to take account of this guideline in their planning (s53(2)).

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Technical Standard for the Civil Defence Emergency Management (CDEM) Sector (TS 01/08)

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Foreword

The considerable loss of life during the 2004 Asian Tsunami highlighted the potential threat posed to New Zealand by tsunamis. In the 2007 National Hazardscape Report, the tsunami hazard was noted to be comparable to or larger than the risk posed by earthquakes.

As a result, the civil defence emergency management (CDEM) sector has directed greater effort over recent years to increasing resilience against the tsunami threat to New Zealand. The Tsunami Working Group was established in 2007 to provide a body to coordinate and support effort at a national level in the development of a comprehensive tsunami risk management system. Over the last year, the Tsunami Working Group has investigated international and domestic practice on tsunami signage in order to establish a national standard. The outcome of that work is now produced for the sector in this technical standard.

The tsunami warning signage is the first technical standard to be produced by the Ministry of Civil Defence & Emergency Management (MCDEM). As with other publications produced by MCDEM, the primary audience for this document is the CDEM sector and the document will be of particular relevance to emergency management practitioners and planners seeking to reduce the risk posed by tsunamis to local communities. The information included in the standard will also be drawn on for public education activities.

The objective of the Technical Standard is to provide consistency in the signs and their placement across New Zealand, and to make our tsunami signage compliant with those used overseas. Compliance by CDEM Groups with this Technical Standard will not only provide a consistent approach across New Zealand, but it will also contribute to public awareness of the risks posed by tsunamis and better understanding of what should be done by communities in response to an event. Together these measures will enhance New Zealand's resilience to the tsunami hazard.



John Hamilton

Director

Ministry of Civil Defence & Emergency Management

Background

Awareness of the potential threat posed by tsunamis to the New Zealand public has increased since the Indian Ocean Tsunami on 26 December 2004. At the request of the Minister of Civil Defence, the MCDEM commissioned a national tsunami risk and preparedness review. The resulting reports prepared by GNS on Tsunami Hazard and Risk in New Zealand (Berryman, 2005) and New Zealand Preparedness for Tsunami Hazard (Webb, 2005) highlighted both the level of risk posed by tsunamis to New Zealand and the potential improvements in the country's resilience to the risk.

One area identified for possible action was the development of a national standard for tsunami signage. Recommendation 4.3 of the Webb report called for the development of support for an effective warning system at the national level through the provision of resource material, including signage methodology. Recommendation 7.1 also called for CDEM Groups to identify where national standards would be beneficial. In March 2007 the CDEM Group Managers' Forum identified the development of a national standard for tsunami signage as a high priority.

In response to the findings of the review of national tsunami risk and preparedness, the Minister of Civil Defence directed MCDEM to work with the CDEM sector in developing greater preparedness. In March 2007 the Tsunami Working Group was established with representatives from CDEM Groups, the New Zealand Fire Service, New Zealand Police, and MCDEM to identify the components of a comprehensive warning system and select areas of work to address any current gaps.

One area of work identified was the development of a national standard for tsunami signage. A multi-agency sub-committee was established to research domestic and international standards for tsunami signs and develop an agreed standard for the CDEM sector. The GNS Science-Massey University Joint Centre for Disaster Research was commissioned to support the sub-committee and make recommendations for a national standard for tsunami signage. The findings of this work have provided the basis for the material included in this technical standard.

Land Transport New Zealand and Transit New Zealand also assisted in the development of this technical standard.

A National Standard for tsunami signage

Signage is an integral part of a tsunami risk management system. Signage is an effective mechanism for public education on the risk posed by tsunamis and the appropriate response to a tsunami event. Appropriate signage will be a significant contribution to the management of the risk posed by tsunamis by assisting the execution of evacuation plans. As a consequence, tsunami risk management is strengthened by the alignment of signage, public education, and response planning.

Development of a national standard towards tsunami signage is intended to support both public education and preparation. Maximisation of commonality of signage across the community will assist recognition and understanding of the signage by tourists and travellers. A national standard would enable public education at the national level to provide examples of tsunami signage.

Categories of signs

Five categories of signs are established in this technical standard to support public education and the response to tsunamis:

- Evacuation zone
- Information board
- Evacuation route
- Evacuation safe-location
- Previous event (impact/elevation)

The evacuation zone, information board, and evacuation route signs are considered essential to achieve effective tsunami education. Evacuation safe locations and previous event signage provide additional means to assist public education.

Colour specification

Reflecting the common practice in the design of tsunami signs across the Pacific Rim countries and in New Zealand, the evacuation zone, evacuation route, evacuation safe-locations, and previous events signs will use a white and blue colouring.

The blue colouring used is that approved by Standards New Zealand for use on traffic signs as defined in AS/NZS 1906.

The sheetings approved for use on traffic signs are described in Traffic Note 12 at www.landtransport.govt.nz/roads/traffic-notes/index.html.

The information boards can use the colours appropriate to illustrate the information contained.

Traffic sign regulations

Several tsunami evacuation route signs will be permanently installed alongside roadsides and be directed towards motor vehicles. As such, their installation must comply with the Land Transport Rule: Traffic Control Devices (TCD Rule) and Manual of Traffic Signs and Markings (MOTSAM) issued by Land Transport New Zealand and Transit New Zealand respectively.

The current versions of these documents can be accessed at the following addresses:

TCD Rule:

www.landtransport.govt.nz/rules/traffic-control-devices-2004.html

2005 Amendments to TCD Rule:

www.landtransport.govt.nz/rules/traffic-control-devices-amendment-2005.html

2006 Amendments to TCD Rule:

www.landtransport.govt.nz/rules/traffic-control-devices-amendment-2006.html

MOTSAM:

http://transit.govt.nz/technical/view_manual.jsp?content_type=manual&=edit&primary_key=1&action=edit#download

From 1 July 2008 Land Transport NZ and Transit NZ will combine to form NZ Transport Agency - www.nzta.govt.nz. If signs are to be placed on road reserve, these must be designed in partnership with district consenting agencies (district roads) and Transit (State Highways). A 'traffic sign' on a road reserve may only be installed by the road controlling authority.

Those signs that may be used alongside roads that must comply with the regulations outlined above are stated in the tsunami evacuation sign section below. Other signs will be guided by the regulations on the placement of non-traffic signs in proximity to roads and are therefore subject to the normal criteria for any billboards or signs covered by local body or Transit NZ bylaws or other controls on their installation.

Evacuation zone signs

Evacuation zone signs indicate areas at possible risk from tsunamis and establish awareness of the need to evacuate in the event of a natural or official warning. There are two types of tsunami evacuation zone signs: generic signs; and those that refer to specific evacuation zones.

(1) Generic tsunami evacuation zone sign

The generic tsunami evacuation zone signs will include four components: (1) Title of 'tsunami evacuation zone'; (2) the tsunami evacuation zone symbol; (3) direction to public on steps to take for evacuation; and (4) the Civil Defence logo and the logo of the local emergency management agency that is maintaining the signs (e.g. district council, regional council or CDEM Group).

The symbol for the tsunami evacuation zone is drawn for the tsunami hazard zone signs agreed at the 19th session of the ITSU in 2003. See http://ioc3.unesco.org/itic/categories.php?category_no=168

The direction to the public on the warnings of tsunamis and steps to take is recommended as "In case of strong earthquake shaking, unusual ocean behaviour or noise, move to high ground and/or inland following evacuation routes where present. Wait for official all clear."

For local authorities where long duration earthquake generated tsunamis pose a threat, the direction to the public on the sign can be "In case of strong or prolonged earthquake shaking, unusual ocean behaviour or noise, move to high ground and/or inland following evacuation routes where present. Wait for official all clear."

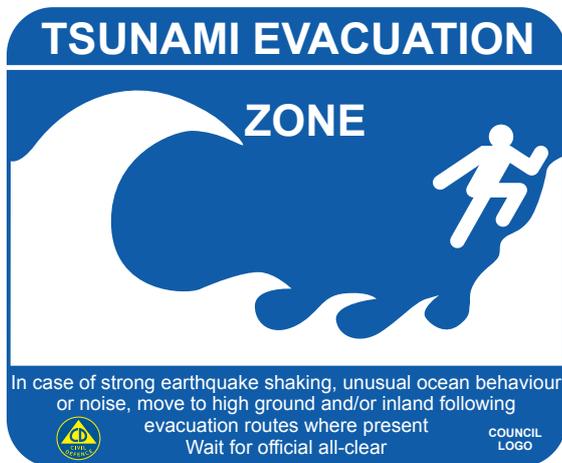


Figure 1: Generic tsunami evacuation sign

TitleWhite
SymbolWhite
BackgroundBlue
BorderBlue
Civil Defence logo ...Yellow on blue background
Council logoAs required

Width400mm
Height350mm
LocationEvacuation zone signs should be established within threatened areas with sufficient coverage to ensure that public awareness of the risk is heightened and that the area at risk is delineated.

(2) Tsunami evacuation zone signs with reference to specific zones

Some evacuation zone signs will include a reference to an evacuation zone to conform with evacuation planning and public education efforts that provide more specific guidance on the response to warnings. Tsunami evacuation signs with reference to a specific evacuation zone will include the four components of the generic sign. In addition, they will include a description of the evacuation zone immediately and directly below the title 'Tsunami Evacuation Zone'. The description of the zone will be dependent of the local plans. The example below uses 'Orange' as the description of the evacuation zone.

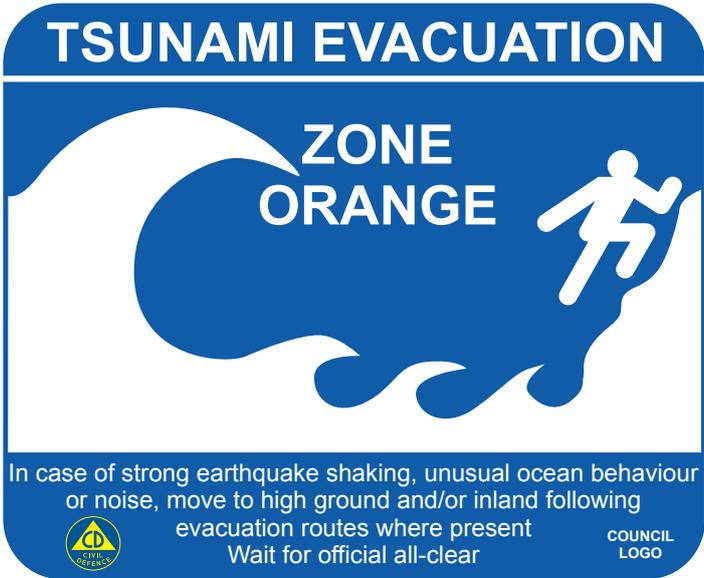


Figure two: tsunami evacuation sign - zone specific

- Title and zone**White
- Symbol**.....White
- Background**Blue
- Border**.....Blue
- Civil Defence logo**Yellow on blue background
- Council logo**.....As required

- Width**400mm
- Height**.....350mm
- Location**Evacuation zone signs that refer to specific zones should be placed in a manner consistent with the generic versions as well as providing sufficient coverage to ensure there is a clear understanding of the boundaries between the different zones.

Information board signs

Tsunami information boards assist community understanding of the risk and appropriate response to enable an effective response to a tsunami warning or a tsunami event.

Information boards should be placed at locations of public access to the beach. Ideally, the information contained in public education pamphlets and posters will use the same content as information boards. There should be regular review of the content of information boards every few years to allow for changing recommendations and local conditions.

It is recommended that tsunami information boards have the following content:

1. Tsunami hazard characteristics
2. Tsunami evacuation guidance
3. Warning and response information
4. Local information and images or local tsunami histories (if available) or comment on risk (plain language)
5. Evacuation map showing zones of likely inundation and evacuation routes

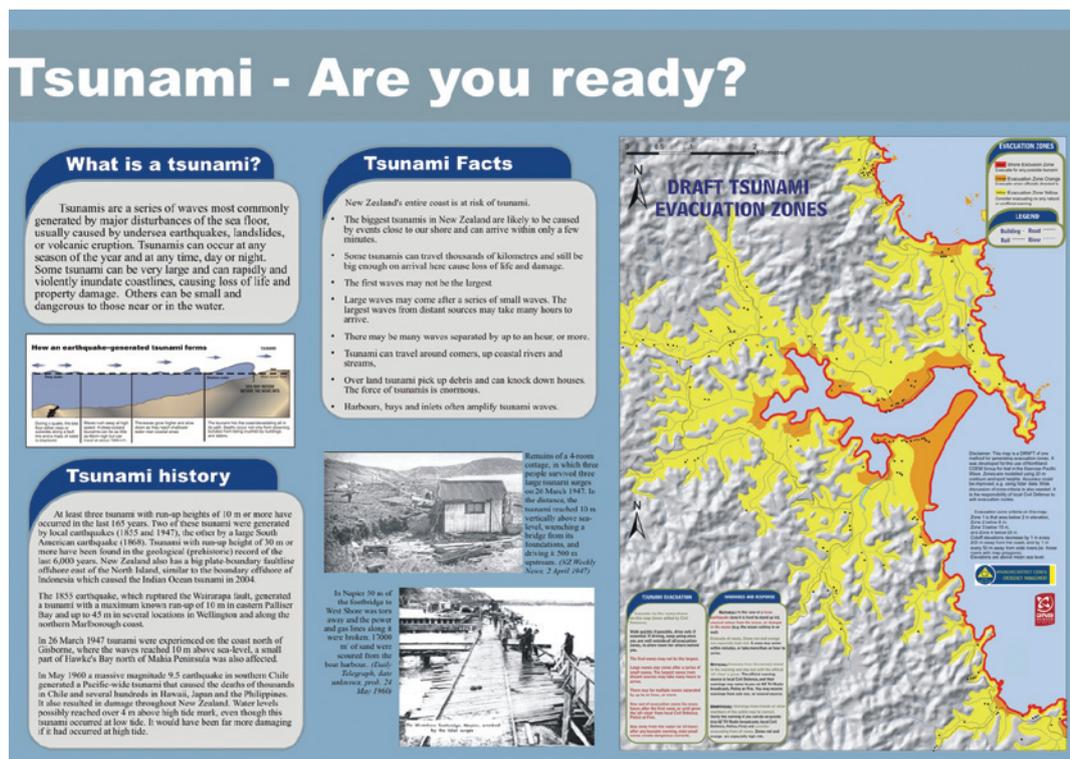


Figure 3: An example of an Information Board

The colour and size of Information Boards are left to the discretion of the agency deploying the signs. All of the information boards should include the civil defence logo, the logo of the agency deploying the board, and contact details for information on tsunami preparedness.

Location: The Information Boards should be placed in public areas to ensure that the opportunity to educate the public to the risk of tsunami is maximised and that the reach includes transitory public.

Evacuation route signs

Evacuation route signs direct people along a pre-defined 'best' route out of the evacuation zone(s). There are four versions of evacuation route signs:

1. a generic version
2. a walking evacuation route
3. a driving evacuation route
4. in place vertical evacuation routes

The evacuation route signs will include two or three components. All of the evacuation route signs include a 'tsunami evacuation route' symbol and an arrow indicating the direction of the evacuation route. Some of the signs will include an additional symbol indicating the recommended means for evacuation: pedestrian for evacuation route on foot, a car for evacuation route by vehicle, and a pedestrian and stairs for vertical evacuation in place).

The 'tsunami evacuation route' symbol used on all evacuation route signs is drawn from the format agreed for signs at the 19th session of the ITSU in 2003. See http://ioc3.unesco.org/itic/categories.php?category_no=168. The symbol is 300 mm in diameter.

The arrow directions used in evacuation route signs will be one of five outlined in figure 4 below: left, right, veer left, veer right, and ahead. The arrow shape is Type A, as used on traffic signs. When the arrow is placed alongside a symbol of a vehicle or pedestrian, the arrow should be on the left hand side if it is pointing left or veer left and on the right hand side if it is pointing ahead, right veer, or right (see figures 6 and 7).

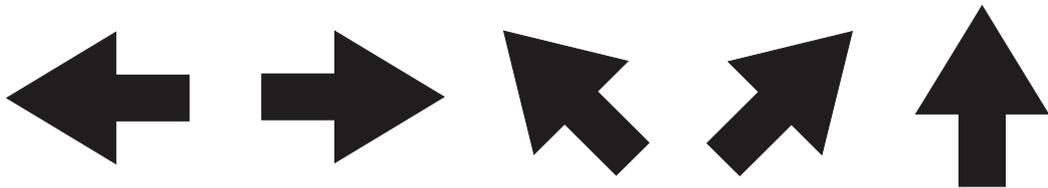


Figure 4: Arrow directions; left, right, veer left, veer right, ahead.

The generic evacuation route sign and the driving evacuation route sign are both considered traffic signs. A review of MOTSAM expected to be completed in July 2009 is anticipated to include the generic evacuation sign and the driving evacuation sign. In the meanwhile, these signs have been approved by the Director of Land Transport by notice in the NZ Gazette.

(1) Generic tsunami evacuation route signage

The generic tsunami evacuation route sign can be employed to guide both pedestrian and vehicle evacuation although the sign is considered a traffic sign and is designed to meet the requirements of those regulations and be easily understood by travelling vehicles.

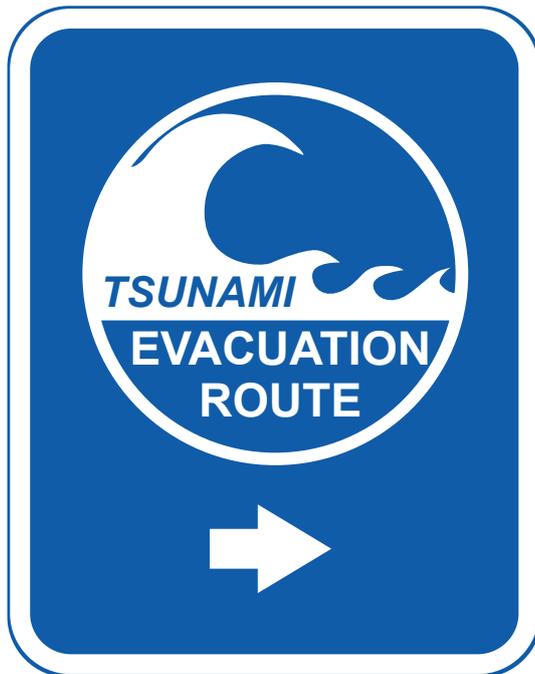


Figure 5: Generic tsunami evacuation route sign

Legend.....White

Symbol and textWhite and Blue

BackgroundBlue

Border.....White

Width400mm

Height.....500mm

LocationSign placement should be along the planned evacuation route at sufficient intervals to ensure that the route can easily be followed and that an awareness of the existence of the route will be well established. The sign should be located in order to be visible for drivers, have an uninterrupted view of it over a distance of 120m in rural areas and at least 60m in urban areas.

(2) Tsunami evacuation walking route sign

The walking tsunami evacuation route sign is employed for routes either suitable only for travel by foot or that provide a route where travel by foot is the most appropriate means to leave the threatened area.



Figure 6: tsunami evacuation walking route sign

Legend.....White
Symbol and textWhite and Blue
BackgroundBlue
Border.....White

Width280mm
Height350mm
LocationPlaced alongside walkways or other tracks where evacuation by foot either inland and/or to a higher elevation is the recommended response to a warning of a tsunami.

(3) Tsunami evacuation driving route sign

The driving tsunami evacuation route sign is employed for routes where evacuation by vehicle is the most appropriate means of leaving the threatened area in the time available.

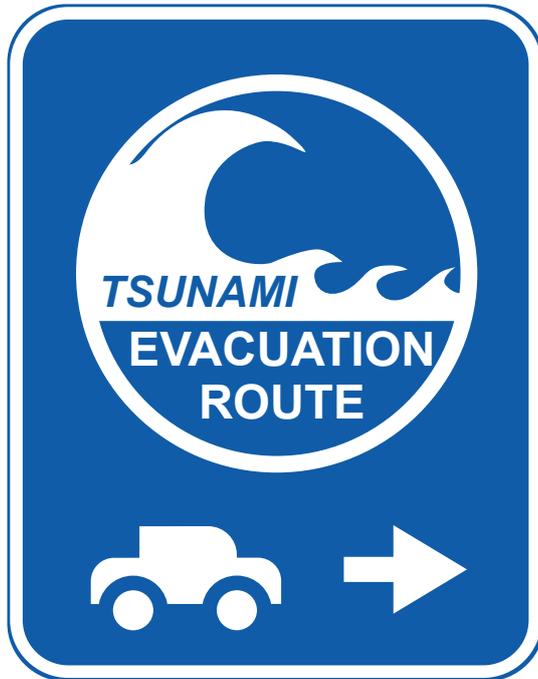


Figure 7: Tsunami evacuation driving route sign

Legend.....White
Symbol and textWhite and Blue
BackgroundBlue
Border.....White

Width400mm
Height500mm

LocationThe sign should be located in order to be visible for drivers have an uninterrupted view of it over a distance of 120m in rural areas and at least 60m in urban areas.

(4) In-place vertical tsunami evacuation route sign

In-place vertical tsunami evacuation route signs are to be employed indoors or outdoors where the most appropriate means to escape the threatened area by climbing to higher elevation at that location.



Figure 8: In-place vertical tsunami evacuation route sign

Legend.....White
Symbol and textWhite and Blue
BackgroundBlue
Border.....White

Width280mm
Height.....350mm

LocationSigns should be placed within buildings or on structures where people can safely evacuate to a higher elevation. These signs should be placed alongside “safe-locations for in-place evacuation” signs (see page 17) to provide an indication of distance to safety.

Evacuation safe-location signs

These signs denote locations of safety for individuals evacuating from a tsunami hazard. Two versions are outlined in this technical standard: safe-locations for walking evacuation routes; and safe-locations for in-place evacuations.

(1) Safe location for walking evacuation routes

The evacuation safe-location sign is for walking evacuation routes only and is used in conjunction with the tsunami evacuation walking route sign (see page 13). This sign **should not** be placed on vehicle evacuation routes. This is to avoid vehicle congestion which may prevent others reaching the safe location.

These signs include three components:

1. Symbol of people at safe location;
2. Title: 'Tsunami Safe Location'; and
3. Directive text i.e. "Wait for official all-clear"



Figure 9: Safe location for walking evacuation routes sign

Symbol.....Blue
Title and directiveBlue
BackgroundWhite
Border.....Blue

Width280mm
Height.....350mm

LocationSafe location signs are to be placed at identified areas at the end of walking evacuation routes in accordance with established plans.

(2) Safe-locations for in-place vertical evacuations signs

Safe locations for in-place vertical evacuations advise individuals in buildings or other structures of the safe location and action to take in the event of warnings of tsunami.

These signs should include two components:

1. Identification of safe location
2. Direction for action should tsunami warnings occur.

Both components should be text with clear guidance (see example below).



Figure 10: Safe location for in-place vertical evacuation sign

Legend.....White
BackgroundBlue
Border.....White

Width280mm
Height.....350mm

LocationIn-place safe locations signs should be placed at the appropriate point on the evacuation route. They can also be deployed alongside the evacuation route signs to indicate the distance to safety.

Previous event (impact/elevation) signs

This category refers only to simple poles or other markers of elevation inundated in an event. This type of sign intends to raise awareness of the existence and magnitude of past events, hopefully motivating preparedness. However, these signs may give a false sense of security inland of the point where they have been placed, if the event denoted is anything other than the maximum credible from all sources.

The message on the sign should be simple, clearly stating what event is represented (historic, maximum credible, etc.). See example below.



Figure 11: Previous event sign

| | |
|--------------------------------|--|
| Symbol | Blue |
| Title | Blue |
| Event description | White |
| Background | White |
| Border | Blue |
| Width | 280mm |
| Height | 350mm |
| Location | Should be placed at areas where maximum benefits are provided for public education purposes. |

Development of tsunami and other hazard signage

The specifications on tsunami signs within this technical standard represent accepted best practice. Through establishing a national standard on tsunami signage, the intent is to ensure maximum consistency across the country and compatibility with practice in most Pacific Rim countries. Further development of tsunami signage may see the emergence of additional signs or modifications to the signs outlined in the technical standard. In that case, an updated version of the technical standard may be issued.

The adoption of the tsunami signage standard will also provide a basis for a consistent set of standards for similar signage for a wider range of hazards, as is the case in other Pacific Rim countries.

