

Planning for Receipt of Special Earthquake Warning Information in the Nankai Region: Guidance for Municipal Governments



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Forward

This document contains recommended planning actions for municipal governments, villages, towns, cities and prefectures in the Nankai region of Japan. The actions in this guide are specific to receipt by municipal governments of “special earthquake warning information” (SEWI) from the Japan Meteorological Agency (JMA) indicating that seismic activity in the Nankai Trough has raised the short-term probability of a large potentially tsunami-genic earthquake. The objective of this guideline is to promote planning among jurisdictions that have not, thus far, developed plans and offer reasonable additional planning options for jurisdictions that have plans for this contingency.

The planning recommendations in this guideline are based on best practices from municipal governments in the Nankai region and other nations with similar operational earthquake forecasting systems. These recommendations are consistent with those published by the national government of Japan as White Papers on Disaster Management in 2015, 2019 and 2021, but go beyond the national government’s recommended planning actions by adding additional considerations deemed important. This document will be distributed at all training seminars we plan to conduct in the Nankai region over the coming year and will incorporate new actions that emerge during these seminars, making it a dynamic rather than static guide.

The actions described in this guideline are grouped into six categories: evacuation, resident home preparedness, alert period communications, coordination and cooperation, internal mobilization and postponement of non-essential activities. In an appendix to this guide, we have included a brief summary of the results of our survey and interviews conducted with disaster managers in the Nankai region which contributed to our understanding of the opportunities and constraints faced by municipal governments that may confront the

challenges of a Nankai earthquake alert. This guide is divided into sections that are organized around six sets of recommended planning actions, each introduced by assumptions and justifications as to why we consider them to be best practices in an earthquake alert and special considerations that emerged in our year-long study. Where the recommended actions in this guide overlap with those provided by the national government, we have referenced the location of the recommended action in the national guidance documents.

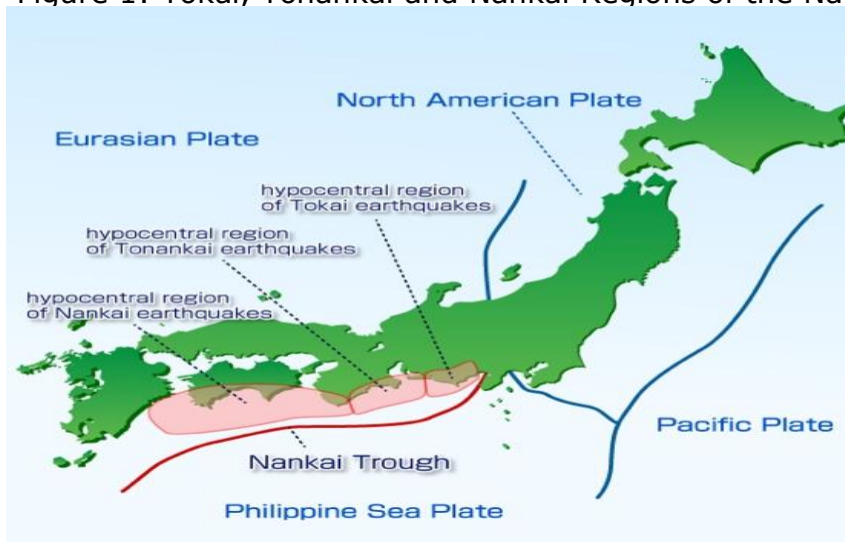
In the sections that immediately follow, we provide some basic background information on the earthquake forecasting system, the region that is the focus of the alerting system, the scenarios that would cause an advisory or warning to be issued and how the occurrence of one of the scenario events would be evaluated and an alert issued. We have also included an observation from our survey conducted between September and December 2022 that most local jurisdictions in the Nankai region have different provisions in their plans for response depending on whether the alert received is an advisory or a warning while others have the same provisions for both an advisory and a warning.

Special Earthquake Alerts in the Nankai Region: An Explanation of the System

I. The Region

The geological area to which this guideline applies is the Nankai Trough, which extends from Suruga Bay in the north to the Pacific Ocean facing area of Kyushu. This portion of the subduction zone includes three subsections, the Tokai, Tonankai and Nankai all capable of generating large magnitude earthquakes and tsunamis.

Figure 1: Tokai, Tonankai and Nankai Regions of the Nankai Trough



Source: Japan Agency for marine-Earth Science and technology (<https://www.jamstec.go.jp/donet/rendou/en/about/index.html>)

The region includes 707 municipal governments (cities, towns and villages) located in 29 prefectures (Cabinet Office, 2015). These jurisdictions were defined as those that would be subject to 6- shaking intensities on the Japan Meteorological Agency's intensity scale (See Figure 2). A total of 139 jurisdictions (See Figure 3) were identified as

being at risk of both strong earthquake ground motion and a tsunami of 30 centimeters or more that would arrive within 30 minutes of a major earthquake (Areas of Special Reinforcement of Nankai Earthquake Tsunami Evacuation Measures).

Figure 2: Map of Maximum Intensity Distribution in the Nankai Region

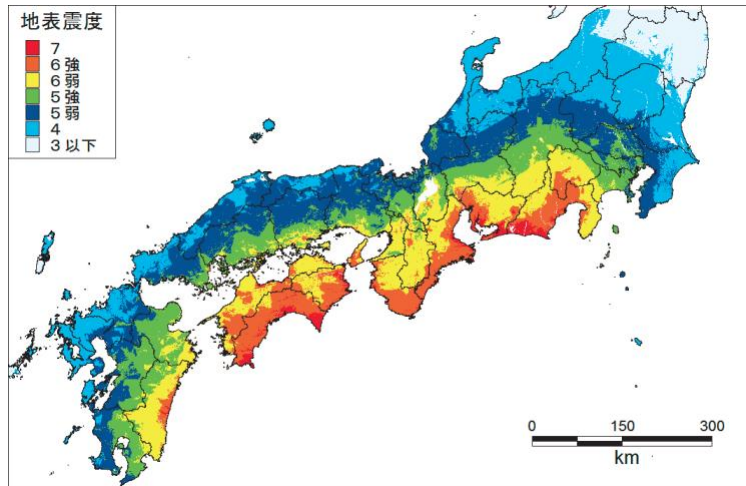


Figure 3: Maximum Tsunami height at High Tide in Nankai Region



Source: Cabinet Office, Government of Japan 2015

The Cabinet Office in March 2018 established the Working Group on Disaster Risk Management for Anomalous Phenomena along the

Nankai Trough (Cabinet Office, 2019). Three scenarios were identified and described, that if they were to occur, the Japan Meteorological Agency (JMA) would convene a council of scientists to determine whether an alert will be sent to jurisdictions in the defined Nankai region warning them that the probability of a major earthquake had increased for a period of a few days.

II. The Scenarios

The scenarios included a magnitude 8 class event, a “partial area rupture,” deemed most likely in the eastern portion of the Nankai Trough. The occurrence of this scenario earthquake is estimated to occur once in 100 to 150 years and would represent a significant probability gain, that is, a follow-on similar or larger event is 100 times more likely than the normal background seismicity rate. The scenario is based on the two most historically recent major earthquakes in the region including the 1944 Mw 8.2 Tonankai earthquake and the 1946 Mw8.6 Nankai event. Previous major earthquakes (both Mw 8.6) in Tokai and Nankai occurred 32 hours apart in 1854.

Two additional scenarios are regarded as raising the short-term probability of a major earthquake and tsunami. The first is a magnitude 7 class event, a “limited area rupture” expected to occur in the region with a frequency of once in 15 years and represents a probability gain of “once in a few hundred times.” (Cabinet Office, 2019, p. 56). A slow slip event as recorded on strainmeters may, after qualitative assessment and if regarded as anomalous, constitute the third scenario that could trigger an alert by the JMA to local jurisdictions in the region. Such events occurred in the days prior to the March 11, 2011 Great East Japan Earthquake and Tsunami.

The three scenarios represent two levels of assumed risk. The magnitude 8 scenario would be a major damaging event whether or not a follow on “twin earthquake” were to occur and in addition to

triggering a major response effort, it would prompt a “major earthquake warning” for adjacent regions within the Nankai Trough. Magnitude 7 class earthquakes (“limited area rupture”) or slow slip events are expected to occur more frequently and, in the case of the earthquake, cause far less damage. These scenario events would be evaluated by the JMA and, if deemed precursory to a much larger earthquake, an earthquake advisory would be announced.

III. Issuing an Advisory/Warning

The JMA will evaluate the occurrence of an earthquake or measured seismic activity that conforms to one or more of the scenarios and report to the national government within 2 hours; the national government will provide instructions to prefectural and municipal governments in the designated Nankai region on disaster management actions that should be taken during the period (one week) in which the major earthquake risk has increased; and, if during the week-long period a major earthquake does not occur, local governments in the region are instructed to stand-down (evacuation is specifically mentioned), but encourages residents to remain alert.

After scientists have assessed the situation and determined that the earthquake risk has increased based on one or more of the scenarios, and in consultation with the national government, the JMA will release an alert (either an advisory or warning) via a nationwide press conference. The national government will set up a disaster management headquarters and encourage prefectures and municipal governments to do the same.

As a caveat in presenting recommended planning activities for local government (including residents) and business and industrial organizations, the Guidelines for Formulating Disaster Risk Management Measures Based on Various Nankai Trough Earthquake Scenarios (1st Edition) on March 29, 2019 caution that in planning, entities must seek a balance between the risk of an earthquake and

the impact of disaster management measures on the maintenance of day-to-day life and business activities. And second, those encouraged to plan for “special earthquake warning information” are advised that accurate prediction of the timing of an earthquake is impossible, nor is it possible that disaster management measures will assure safety.

IV. Divided and Combined Plans

In our study of municipal planning in the Nankai region, we discovered that about two-thirds of the jurisdictions have plans with separate provisions and planned actions depending on whether the alert received from the JMA is a warning or an advisory. The remaining third had plans with provisions that apply to either type of alert whether it is a warning or advisory. Either approach to planning is commendable and selection of one approach or the other will depend on many factors including the size and complexity of the jurisdiction and other characteristics of the population and capabilities of the municipal government.

The two types of alerts differ in important respects. Warnings are issued in situations where a magnitude 8 has occurred in one of the three Nankai regions and the two other regions will receive a major earthquake warning. The region affected by the magnitude 8 earthquake will be fully mobilized and responding to what is likely to be significant casualties and damage. The remaining two regions will activate plans based on the warning they receive from the JMA. This “partial area rupture” scenario is less likely over time than the scenarios (magnitude 7 “limited area rupture” or slow slip event) which will prompt an advisory. Thus, advisories, while a lower level of alert than a warning, will probably be more frequent than warnings. The one planning action that is sensitive to differences between divided and combine plans is evacuation of vulnerable populations which is highly recommended for warnings but optional for advisories.

V. Using the Planning Guide

The planning guide that follows this section includes recommended actions contained in documents published by the national government of Japan as well as recommendations developed in other nations with earthquake forecasting systems similar to the one now being implemented in Japan. This guide also benefited from answers to our survey questions provided by disaster managers in the Nankai region. The information from our survey conducted between September and December 2022 provided us vital information on the understandings and challenges faced by local government officials in the region for which this guide was specifically designed. Thus, we hope that it will provide information and recommended actions that meet the planning needs of municipal governments in the Nankai region.

We also regard this guide as a “living document” which will continue to incorporate best practices as they emerge from the workshops we will conduct between August 2023 and April 2024. A further word is in order regarding the guidance provided by the national government of Japan through the Cabinet Office and the contents of this planning guide. The national guidance provided in Cabinet Office White Papers dated 2015, 2019 and 2021 emphasize evacuation planning for vulnerable populations, urges preparedness planning by residents and organizations of the private sector and cautions that actions taken should reflect a balance between safety and maintenance of normal social and economic activities in the region. The guidance provided by the national government in these documents is reasonable, appropriate and should be implemented by local jurisdictions in the Nankai region.

Our guidance, as provided in this document, should be considered a supplement to government-provided recommendations. It addresses practices we feel are not contained or adequately addressed in the national government documents and involve actions that can be implemented by and within local governments and actions that require outreach to other organizations, both private and public. One particularly critical action that we consider a central responsibility of local governments under a SEWI alert is to provide periodic briefings for residents regarding the message from the JMA and what the jurisdiction is doing to promote their safety. A second area which we emphasize in this document is engagement with local community-based groups including organizations of the private sector and community-based groups of volunteers that can be mobilized to assist the jurisdiction with needed emergency period supplies and provide emergency period assistance with shelter operations, transportation, evacuation drills and other actions. Finally, we want to encourage jurisdictions to effectively coordinate with other levels and agencies of government—with prefectures, neighboring jurisdictions, public and private utilities, life line operators and the Japan Meteorological Agency.

Planning Guidelines

Evacuation of Vulnerable Populations

Planning Assumptions and Justification: For jurisdictions with mapped tsunami inundation zones in the Nankai region, evacuation of vulnerable populations in response to a SEWI **warning** from the JMA is highly recommended both by the national government of Japan (Cabinet Office, Government of Japan, 2015, 2019, 2021) and as an action that, in our view, represents a best practice. While evacuations are highly recommended if a SEWI warning is issued, evacuations are discretionary for advisories and Nankai region local governments must carefully consider whether to recommend evacuations following an advisory. Vulnerable populations are defined as individuals who are unlikely to be capable of evacuating to safe locations in a timely manner following the occurrence of a potentially tsunami-genic earthquake. These populations include elderly persons with conditions that limit mobility, persons with disabilities and others who may require more time to evacuate.

Special Considerations: Some jurisdictions may have a large number of residents who require evacuation and many small jurisdictions may find proactive evacuations in response to a warning difficult due to limited staffing and logistical challenges. One possible solution in both planning and execution of an evacuation is to: 1) encourage evacuees to identify relatives or friends outside tsunami inundation zones with whom to stay during the warning period; 2) mobilize community-based organizations to acquire training in shelter management and assist during a warning; 3) develop a program to encourage private sector organizations e.g., local food distributors to contribute provisions needed at shelters during an evacuation.

Recommended Actions:

Define the demographic categories of people in your jurisdiction that will require proactive evacuation during a warning. These groups may include:

- *Elderly residents unlikely to evacuate the tsunami inundation area in a timely manner during a tsunami warning*
- *Persons with disabilities who will require assistance in evacuating to safety in a tsunami warning*
- *Persons who reside or work in tsunami inundation zones and could not reasonably evacuate to safety within 30 minutes of the issuance of a tsunami warning.*

Using GIS, map the locations of persons who will be proactively evacuated in an earthquake warning. If a prioritized evacuation is anticipated, identify the basis of the prioritization (e.g., geographic, demographic, etc.) and a strategy for phased evacuation.

Notify those who have been designated as proactive evacuees and provide them details of plans for their possible evacuation if a SEWI warning is received. Provide for ongoing communication with this population as their willingness to evacuate, their choice of evacuation location and their presence in the tsunami hazard zone may change due to relocation, death or other circumstances.

Conduct a needs assessment that will address the following considerations:

- *The number and location of shelters where those who cannot relocate to alternative lodging or the homes of family or friends outside the tsunami inundation zone can be housed during a warning.*

- *Given the demographic make-up of those designated in need of evacuation, consider the needs for staffing and provisions for shelters (e.g., food service, equipment for persons with disabilities, medical personnel, etc.).*
- *Consider the needs for transportation of evacuees to shelter locations as many older people and people with disabilities will not be able to self-evacuate without assistance.*
- *Identify means of communicating with potential evacuees to notify them of the issuance of a warning, the availability of shelter and transportation to and from shelter locations.*

Develop strategies for staffing shelters if jurisdictional resources are inadequate, for example by trained volunteers from the community or experienced staff from other jurisdictions.

Identify shelter facilities for evacuees

- *Select facilities that are outside the mapped tsunami inundation zones, but geographically accessible by foot.*
- *Identify appropriate shelter locations with accessible facilities for persons with disabilities and those with mobility impairments.*
- *Select facilities that will accommodate the desired number of evacuees. In addition, identify at least a subset of shelters that will accommodate evacuee pets as many potential evacuees will be reluctant to leave without their pets.*
- *If the services to be provided include feeding, the facilities should include necessary kitchen appliances and supplies.*

In selection of facilities to be used for shelter, give consideration to the primary function of these facilities. If schools are selected, for example, assure to the extent possible, that classes and school activities can proceed in a normal manner during the evacuation.

Consideration must be given to the fact that proactive evacuees constitute only a portion of the people who may require shelter if a large tsunami-genic earthquake occurs, thus, shelter capacity, services

and supplies must be adequate for all potential evacuees, both those proactively relocated and those who may need shelter if a tsunami warning is issued following the occurrence of a large earthquake.

Evacuation signage, guidance material and drills

- *An important consideration for tsunami evacuation in general is that tsunami danger zones, evacuation routes and safe locations be clearly marked by signage (See Figure 1).*
- *Beyond public posting of these zones, potential evacuees should be provided with information on all aspects of an evacuation, particularly maps and route information to guide evacuees to safety if personal means of evacuation are necessary. Essential in these materials are (Scheer et.al., 2013):*

Definition of a tsunami

Identification of the tsunami-related risk

Basic precautions including an explanation of proactive evacuation and why certain classes of people will be evacuated under a special earthquake warning

How to be prepared

How a warning will be communicated

A map of the hazard and safe zones, evacuation routes and locations of assembly areas and shelters

Examples of tsunami hazard zone signs (See Figure 1)

How to respond to a warning

What to do after an evacuation is canceled.

These items should be incorporated into a single brochure and disseminated to all residents in the tsunami hazard zones, including

external workers and employees who are not full-time residents and posted in locations that are frequented by tourists.

Local jurisdictions should conduct evacuation drills at least once per year. These drills should include proactive evacuation, if feasible.

Figure 4: ISO (International Organization for Standards) approved signage for tsunami evacuation.



Training, staffing and plan maintenance

Municipal government staff must receive training on plan execution, the division of function and roles each must play in responding to a SEWI warning.

In some cases, staffing may be deemed inadequate to execute the plan. In this event, the jurisdiction must consider use of trained volunteers within or outside the jurisdiction. These volunteers could function in managing shelters, providing transportation of evacuees to and from shelters or other locations of safety outside the tsunami inundation areas.

Care must be exercised in maintaining the plan and assuring that information is current as people move into and out of the tsunami hazard zones, there occur deaths among potential evacuees, evacuation shelters and routes change, signage requires replacement and so on.

Sociological considerations and potential challenges

Disaster management staff may encounter challenges in that those identified as potential proactive evacuees may not wish to evacuate based on a SEWI warning. They are not required by law to do so and may choose to remain in hazard zones.

While under-evacuation may be a problem among potential proactive evacuees, the opposite problem may be encountered among those who are not perceived to be in need of early or proactive evacuation causing crowding at shelters or unnecessary flight from the hazard area.

These problems will vary from jurisdiction to jurisdiction depending on many factors including recent experience of earthquakes and tunamis.

References:

Cabinet Office, Government of Japan. 2015. White Paper, Disaster Management in Japan, Nankai Trough Earthquake Measures, 85-93.

Cabinet Office, Government of Japan. 2019. White Paper, Disaster Management in Japan, Chapter 3 Preparedness for Nankai Trough Major Earthquakes: Research on Disaster Risk Management for Anomalous Phenomena, 52-60.

Cabinet Office, Government of Japan. 2021. Summary of "Disaster prevention response study guidelines prepared for diverse occurrence modes of Nankai Trough Earthquake" (Ver. 1).

S. Scheer, A. Gardi, R. Guillande, G. Eftichidis, V. Varela, B. de Vanssay, L. Colbeau-Justin. (2013). Handbook of Tsunami Evacuation Planning. European Commission Joint Research Centre Institute for the Protection and Security of the Citizen. Ispra, Italy. <http://ipsc.jrc.ec.europa.eu/>

Residential Home Preparedness

Planning Assumptions and Justification: Providing residential home preparedness for disaster should be a routine function of local government; however, during a period of enhanced seismic activity which has triggered an earthquake advisory or warning, public attention will be focused on the hazard, providing an opportunity to enhance residential preparedness for a major earthquake and tsunami. This opportunity should not be missed and local jurisdictions should provide a prioritized list of actions that can be taken by residents to be better able to respond effectively to both the alert and the earthquake, if it occurs. Residents and businesses in the Nankai region are urged to review individual and corporate preparedness in the guidelines provided by the government and in this guide.

Special Considerations: In our survey conducted last year, we discovered that residential preparedness was a feature of most SEWI plans, but two actions, how to respond when the shaking of an earthquake is encountered and fire suppression were not sufficiently emphasized in preparedness recommendations to residents. Below are what we consider a comprehensive list of residential preparedness actions for residential households (Japan Times, no date;

Recommended Actions:

Before the Earthquake:

Residents should be familiar with evacuation routes from home, work and children's school as well as places frequently visited. Recommend having paper maps with these routes.

Residents should prepare an earthquake kit that includes the following items.

Phone numbers of family and friends and emergency contacts.
Foreign visitors should have the phone number of their respective embassies.

Flashlight (spare batteries or charger)

Portable radio (spare batteries or charger)

First aid kit

Blankets

Important documents (passports, bank book, deed to home and cash)

Extra clothes including rainwear

Residents should have water and non-perishable food for at least one week (check for expiration dates at least annually)

Residents should have a fire extinguisher in their homes and know how to use it.

Residents should secure furniture that may topple and cause injury or inhibit egress. Included are tall bookcases, wall mounted mirrors and artwork, large electronics including kitchen appliances that could fall during strong shaking of an earthquake. Hardware stores have a variety of bracing, strapping and tools for fastening and securing household appliances and furniture.

Remind residents that Japan has an earthquake early warning system and that an app can be downloaded that may provide them a few seconds to a few tens of seconds warning before they feel ground motion from an earthquake.

<https://www.jma.go.jp/jma/en/Activities/EEWLeaflet.pdf>

Self-Protective Actions: Recommended response will vary depending on a resident's location when an earthquake occurs.

If at home, work or school, the best response is to move away from dangerous locations like windows and falling hazards and take cover under sturdy furniture. As most buildings in Japan are earthquake resistant, there is no need to rush outside and standing in doorways does not provide the level of protection many people believe.

Figure 5: Self-protection in an earthquake



If driving a vehicle, gradually pull to the side of the road and stop; remain in the car. Be sure not to stop beneath electrical wires and away from buildings.

If working outside, move away from overhead electrical wires and other potential hazards.

Post-Earthquake Actions:

If residents live in a coastal area, they should be instructed to move to high ground immediately without waiting for an official tsunami evacuation alert. They can check their portable radio or phone (if it's online) for updates later.

If they are trapped under rubble, recommend that they cover their mouth. Bang rhythmically on a pipe or wall, or send a text for help instead of shouting. They will conserve energy and oxygen by doing so.

If phone lines are down, try other applications or texting services. Social media use is another method of communication in an emergency.

When evacuating buildings, don't use the elevators, even if it seems like the shaking has stopped. Keep in mind the likelihood of aftershocks and use the stairs.

Turn off your gas immediately if you smell what may be leaking gas (and be careful about flames from lighters until you confirm there hasn't been a gas leak). If you need to evacuate your home, turn off your circuit breaker.

References

Japan Times (no date), "Japan earthquake tips: "What to do before, during and after an earthquake", <https://www.japantimes.co.jp/japan-disaster-information/earthquake-preparation/> Accessed May 30, 2023.

Japan Meteorological Agency (no date). "Earthquake Early Warnings: Forecasts of strong motion caused earthquakes <https://www.jma.go.jp/jma/en/Activities/EEWLeaflet.pdf>

Alert Period Communications (with Residents)

Planning Assumptions and Justification: Typically, this set of actions would be included under the general topic of actions to be taken within the jurisdiction, but these actions are particularly important to SEWI planning and are neither mentioned in the national governments recommended actions nor were they frequently reported as actions included in SEWI plans in our survey of local government planning for SEWI alerts. Specifically, these actions consist of regular briefings for residents to first announce the issuance of an advisory or warning from the Japan Meteorological Agency, detail any changes in the status of the alert and announce, in coordination with the JMA, the cancelation of an alert.

Special Considerations: Residents of a jurisdiction will look to local government for information when a SEWI alert (advisory or warning) has been issued. They will want to know the nature of the risk, the likelihood that an earthquake will occur during the alert period, what the local government has done to mitigate the risk and what they should do during the alert period. While much of this information will come from sources outside the local government, residents will look to their elected representatives at the local level to coordinate disparate information and provide a consistent narrative that considers the local context.

Recommended Actions:

Identify a spokesperson, preferably a single person and someone in a high-level elected position (e.g., mayor) or a well-known and respected municipal official who will provide daily briefings to residents. The attitudes conveyed should be confident, empathetic and engaged.

Establish a schedule of regular briefings, at least once daily over the period of the alert (several days).

The spokesperson will provide information regarding the alert (advisory or warning from the JMA) based on information received from official sources including the JMA, national government and disaster management officials within the municipal and prefectural governments. This information will be presented in simple straightforward language and should include the following:

- *Accurately relay the alert as presented by Japan Meteorological Agency*
- *Convey the risk to the jurisdiction which may include strong ground shaking from an earthquake and a tsunami if the jurisdiction is on the Pacific Coast or has mapped tsunami inundation zones.*
- *Indicate that the municipal government has a plan for a SEWI alert and has taken steps to protect residents if the alert results in the hazards indicated in the alert.*
- *In general terms, provide an overview of what the plan entails*
- *Report how the plan is being executed based on regular reports from the jurisdiction's staff who are involved in plan activation and implementation within the jurisdiction.*
- *Dispel rumors and misinformation and be sensitive to the concerns and issues communicated to municipal staff from residents.*
- *Remind residents that there are actions that they can take to promote their safety during the alert (See Section II). If there are volunteer opportunities during the alert, announce these and details of participation.*

You have many communication methods to choose from, including in-person events (news conferences), print and broadcast media, and Internet and social media. Each has advantages and limitations depending on your communication objective and the intended audience. To use media in a timely fashion, learn local media news cycles and deadlines.

Be sure to provide information from the briefings in formats that reach people with disabilities as these residents may require proactive evacuations if the jurisdiction has tsunami inundation zones.

If there are non-Japanese speaking communities within the jurisdiction, be sure that there is a means for them to receive critical information in the language they speak.

One way to help prevent errors or omissions that can occur in moments of urgency is to use templates that are tailored to threats and hazards likely in your warning area. Using a template that incorporates pre-approved language can reduce delays in issuing alerts and warnings. Another advantage is that, if you need to use a language in addition to Japanese, your templates can be translated in advance. Sample alert messages are contained in Appendix B.

Effective alerts and warnings are those that result in members of the public taking recommended actions to protect themselves. To help ensure that messages are effective, they must be issued in a timely manner and should include the following components:

Figure 6: Some useful content for announcing an advisory or warning in the first briefing (US Federal Emergency Management Agency, 2014).

Specific hazard: What hazard is threatening? What are the potential risks for the community?

Location: Where will the impacts occur? Describe the location so those without local knowledge can understand their risk.

Timeframes: When will it arrive at various locations? How long will the impacts last?

Warning source: Who is issuing the warning? Identify an official source with public credibility.

Magnitude: What impact is expected and how bad is it likely to get?

Likelihood: How probable is occurrence of the impact?

Protective behavior: What protective actions should people take and when? If evacuation is called for, where should people go and what should they take with them?

Coordination and Cooperation

Assumptions and Justification: In a major disaster, a jurisdiction may find itself overwhelmed with insufficient personnel and resources to effectively respond, and require the assistance of other levels of government (prefectures and national government). While other government entities are a reasonable and appropriate source of assistance, a local government may also draw on internal sources of assistance from private sector organizations and community-based organizations. In facing the near-term potential for responding to a major earthquake and tsunami, local governments in the Nankai region must consider both sources of possible assistance. These measures received meager attention in government guidelines for a SEWI alert, but we feel that coordination and cooperation between levels of government and within a jurisdiction among major local stakeholders is essential.

Special Considerations: Based on our study of SEWI planning among local governments in the Nankai region, we know that smaller jurisdictions are challenged to carry out SEWI planning due to resource and personnel shortfalls. Thus, it is of critical importance to reach out to both governmental and non-governmental sources of assistance.

Recommended Actions:

Consider forming Memoranda of Agreement with jurisdictions outside the Nankai region that may provide disaster management trained personnel to assist in implementing SEWI related actions during a warning or advisory.

Assure that plans for responding to a SEWI alert are consistent with comparable plans of the prefecture in which the jurisdiction resides.

Identify organizations at the prefectural level with which the jurisdiction must interact during a SEWI alert (e.g., the prefectural JMA office).

The print and broadcast news media that serve your jurisdiction will be important sources for communicating with residents during a SEWI alert. Reach out to these media and include coordination with them in SEWI response plans.

Social media will also be important means of communicating jurisdictional actions during a SEWI alert. Someone in your jurisdiction should be familiar with how these media can be employed in a SEWI alert and mobilized, as needed.

Identify organized community-based groups and private sector organizations within the jurisdiction that are willing and capable of assisting the jurisdiction during a SEWI alert.

- *Once non-governmental organizations within the jurisdiction are identified, determine whether members of the organizations require training in the tasks they are expected to perform.*
- *Provide the training considered necessary for the community-based organization to perform functions assigned, as deemed necessary.*

Internal Mobilization

Assumptions and Justification: Given the short-term nature of a SEWI alert (advisory or warning), it will be of critical importance to quickly assemble disaster management personnel and representatives of all departments and agencies with roles in response to an alert. The national government recommends that a disaster management headquarters be established which will serve as a coordination center for information gathering decision-making, coordination and emergency period information provided to residents.

Special Considerations: Our study revealed that a great majority of municipalities have provisions in their SEWI plans to mobilize a response and set up a disaster management headquarters; however, few jurisdictions reported having conducted drills or exercises of their SEWI plans. In addition, it appears that coordination with agencies and organizational entities outside the jurisdiction including the mobilization of community-based groups has not been a priority in many SEWI plans.

Recommended Actions:

Carefully consider the roles that will be performed in a SEWI response by departments and agencies within the jurisdiction. Conduct a training seminar in which departmental representatives who will assume these roles become acquainted with their responsibilities when the SEWI plan is activated for an advisory or warning.

Identify the location that will serve as a disaster headquarters during a SEWI alert and for response if an earthquake occurs. If this location is an established emergency operations center (EOC) it should have all of the communications, monitors and other equipment needed for an emergency response. If there is no established location that is so equipped, consider designation of a location and acquiring the necessary equipment.

The primary functions of staff in the disaster headquarters include:

- *Collecting, analyzing and sharing information;*
- *Supporting resource needs and requests, including allocation and tracking;*
- *Coordinating plans and determining current and future needs; and*
- *In some cases, providing coordination and policy direction.*

In addition to representatives within the jurisdiction familiar with the SEWI plan and who have well-defined roles to perform during a SEWI alert, consider other organizations within the jurisdiction whose presence in the disaster headquarters would be useful including representatives of the prefectural government, utility companies, lifeline operators and major employers in the jurisdictions.

Develop a reporting and briefing protocol among representatives at the disaster headquarters. Compile a situation assessment report and keep it updated on a regular schedule as the situation evolves over the period in which an alert is in force.

A high priority activity will be to establish briefings for residents of the jurisdiction very soon after an alert has been declared, ideally holding the first briefing within an hour of the alert being issued. Subsequent briefings should be scheduled on a regular basis, at least once a day and as important new developments occur.

Develop a strategy for public information regarding the cancellation of an alert as announced by the Japan Meteorological Agency. Since the basis for a SEWI alert is the enhanced short-term likelihood of an earthquake, the downgrade of a warning to an advisory or the cancellation of an alert does not mean that an earthquake will not happen and residents should be informed that personal earthquake preparedness should be maintained given the long-term probability of a large earthquake in the region.

References

Federal Emergency Management Agency (2022). Emergency Operations Center How to-Quick Reference Guide.
www.fema.gov/sites/default/files/documents/fema_eoc-quick-reference-guide.pdf

Dealing With Non-Essential Activities

Assumptions and Justification: While seismic activity in the Nankai region has raised the short-term likelihood of a major earthquake and possible tsunami and a SEWI alert has been issued, your jurisdiction may have been minimally impacted by this activity. Thus, your main concern is to be prepared and response ready if additional earthquakes occur. The national guidelines do not identify specific actions for postponement or cancellation, but both the national government and our recommendation is to seek a balance between safety and maintaining normal or near-normal social and economic activity in the jurisdiction. Postponement or cancellation of activities within the jurisdiction in response to a SEWI alert are recommended in only a few situations.

Special Considerations: There may be situations in which a jurisdiction would recommend postponing or delaying activities for the short period in which a SEWI alert is in force, typically a period of a few days. Some of these situations are noted below.

Recommended Actions:

Scheduling large assembly events for venues in mapped tsunami inundation zones during an alert may be discouraged.

Residents may be encouraged to consider whether elective surgeries or non-emergency medical procedures be scheduled during the SEWI alert period.

Jurisdictions may advise residents and organizations to consider whether buildings, bridges and other structures known to be vulnerable to earthquakes be avoided during a SEWI alert. If so, these structures must be identified.

Employees who work or deliver goods within a mapped tsunami inundation zone should be encouraged to be especially aware of tsunami evacuation routes during a SEWI alert.

High risk (hazardous) materials processing or maintenance activities may be considered for postponement during a SEWI alert.

Disaster management organizations and other organizations with critical disaster response functions should consider cancellation of leaves for employees during a SEWI alert.

Appendix

Sample SEWI Messages

Earthquake Advisory/Warning Message (Sample Message)

Following the <date of event> magnitude <moment magnitude> earthquake in <location of event>, the Japan Meteorological Agency (JMA) has conferred with scientists knowledgeable about this region's seismic history and potential. Based on these discussions, the JMA has issued an earthquake <advisory/warning> for the Nankai region indicating that an increased likelihood exists for continued seismic activity for approximately <number of days>. This activity could involve earthquakes as large as, or somewhat larger than, the <date of event> and could cause damage and possibly a tsunami. Local governments in the Nankai region, including <name of jurisdiction>, have activated plans to promote the safety of residents and businesses.

Earthquake Advisory/Warning Period Ends (Sample Message)

The <number of days>-day earthquake <advisory/warning> issued by the Japan Meteorological Agency on <date of>

issuance> has ended as of <date and time>. The likelihood of earthquake activity in the Nankai Region is believed by scientists to have decreased such that normal social and economic activities may resume. Nevertheless, residents are advised to remain aware that large earthquakes may occur at any time and preparedness should be maintained. <name of jurisdiction> will remain in close contact with the JMA in <prefecture name> for any changes that may require reissuance of an earthquake advisory or warning.

Adapted from The California Earthquake Advisory Plan (1990). California Office of Emergency Services, Sacramento, California, USA.