

**Essential Tsunami Preparedness:
Tsunami Evacuation Maps, Plans, and Procedures (TEMPP)
Training Course Materials**

The following is an English translation by the UNESCO/IOC-NOAA International Tsunami Information Center. Assistance was provided by technical experts from the UNESCO IOC, USA, and Japan, and the translation done with the permission of the Japan Fire and Disaster Management Agency.

*The document is available at
http://www.fdma.go.jp/neuter/about/shingi_kento/h24/tsunami_hinan/index.html*

This document represents a best practice example on how to make practical and reliable tsunami evacuation maps. The practice focuses on the importance of community input as the most effective way in which to build awareness and response capability in residents who may have to act immediately to save their lives from tsunami.

津波避難対策推進マニュアル検討会
報告書
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**Report from Study Group for
Promoting Guidelines for Tsunami Evacuation Countermeasures**

**Fire and Disaster Management Agency (FDMA)
Civil Protection and Disaster Management Department
March 2013**

第3章 地域こゝとの津波避難計画策定マニュアル

**Chapter 3:
Tsunami evacuation planning manual for each community**

The best way of tsunami evacuation differs with situations of each region. In making regional evacuation plans, it is essential to take into consideration the opinions of residents who will know the best about the region. With the participation of residents, the plan can be more effective than the one made only by specialists or the government. For example, local input will enable incorporation of information of past tsunami inundation areas, or dangerous zones in the expected inundation area.

In recent years, in order to develop community-specific plans for various disasters, preparedness events, emergency drills and response training have been conducted, and workshops that incorporate hands-on and group participation have been held. Chapter 3 provides guidelines to communities for making tsunami evacuation plans using workshops with residents.

3.1 Formulation of community tsunami evacuation plan using workshops

1. Purpose of workshop

A purpose of a tsunami evacuation plan is to enable safe evacuation of residents. To accomplish this purpose, it is necessary for residents, who are the most familiar with the region, to participate in the making of the plan.

Another objective is for the resident participants to take away the lessons learned from developing the tsunami evacuation plans, and as their respective region's Voluntary Disaster Prevention Leaders, elevate their community's disaster prevention readiness. In locations that were heavily damaged by past tsunamis, it is important to share these lessons learned with the next generation.

2. Workshop Key Stakeholders

Residents, Municipal Officers in charge of disaster prevention, Firefighters, and as necessary, Prefectural Officers in charge of disaster prevention and experts.

3. Roles of Key Stakeholders

Residents should take the initiative to hold the workshops and to make the regional tsunami evacuation plans. Municipalities should encourage residents to hold workshops, and participate in the operation of workshop. Prefectures should support the operation of workshops.

1) Prefectures

1. Support Municipality development of regional tsunami evacuation plans
2. Support the operation of workshop
 - a. Send experts, especially those who have experienced a tsunami disaster. Offer materials about tsunamis and tsunami mitigation, including the expected tsunami inundation.
 - b. Hold trainings for municipal officers in charge of disaster prevention.
 - c. Train human resources who will be capable of advising on the operation of workshop.
3. Support disaster mitigation measures suggested by residents during the workshops, e.g., ensure budget for measures, etc.

2) Municipalities

1. Participate in workshops, and support its operation
 - a. Encourage residents to participate in workshops
 - b. Prepare materials and necessities for workshops
2. Support disaster mitigation measures suggested by residents during the workshop, e.g., ensure budget for measures, etc.)

3) Residents

1. Manage workshops
2. Encourage other residents to participate in workshops
3. Make regional tsunami evacuation plans
4. Make the plan well-known with other residents

1. Workshop Key Stakeholders

Participants to the workshops are generally regional residents, municipal officers in charge of disaster mitigation, and firefighters. In selecting regional representatives, it is important to widely announce the workshop in order to ensure participation not only from regional residents, but also from schools, private companies, dock workers and fishermen, and from non-government and volunteer organizations.

2. Role of Workshop Key Stakeholders

The main stakeholders that will develop the regional tsunami evacuation plan are regional people like residents. However, it will be difficult for regional residents to formulate the plans by themselves in areas where Voluntary Disaster Prevention Organizations have not fully developed. In this situation, for the time being, Municipalities need to take the initiative to, for example, select the regions where regional tsunami evacuation plan will be developed and then hold workshops there.

Prefectures' role will be to support the workshop by providing tsunami information such as the expected tsunami inundation and providing training for municipal officers that will be in charge of disaster prevention. If the conducting the workshop by Municipal officers only proves difficult, then the Prefecture needs to participate in the workshop or send tsunami experts, such as people who have experienced a tsunami, or persons with expertise in tsunami inundation. In addition, if a Municipality has many regions that will require regional tsunami evacuation plans, the Prefecture should train additional persons that will be capable of advising for the operation of workshop.

Municipalities and Prefectures need to review their budget in advance, so that they will know what measures they can support in response to residents' requests (for example, installation of educational signs, building of evacuation stairs and street ramps, and maintenance of evacuation routes and evacuation points).

3. 2 Workshop Process

Municipalities or leaders of Voluntary Disaster Prevention Organizations invite participants and hold the workshops. The participants develop the regional tsunami evacuation plan using maps etc.

1. Conducting Workshop

- ① Selection of model regions
- ② Encouragement of resident participation
- ③ Selection and setting up the meeting place
- ④ Cooperation for the operation of the workshop

2. Process for the creation of the regional tsunami evacuation plan

1. Conducting Workshop

① Selection of model regions

The key to success for the development of the regional tsunami evacuation plan is to proceed step by step. First, model regions are selected to start the project, and then the results are applied to all over the Municipality.

In selecting the model regions, it is necessary to take account of the following two conditions.

A. Physical conditions

- The region damaged by past tsunamis
- The region where a tsunami inundation map is already made
- The region where damage will be severe when a tsunami happens

B. Social conditions

- The region where residents are highly aware of disaster mitigation
- The region where there are legends about past tsunamis
- The region where there is a high ratio of people requiring assistance during a disaster such as elderly people.

② Encouragement of Resident participation

Municipalities should gather participants of workshop directly or through neighborhood associations or Voluntary Disaster Prevention Organizations. The number of participants can be about 30 for each region. In the workshop, participants are divided into district groups (4 or 5 for per region). In this reason, the ration of districts of participants have to be considered in gathering participants. Municipalities should talk with neighborhood associations about the date and the place of workshop in order to assure the best participation of residents.

③ Selection of and setting up the meeting place

Reserve a place that is suitable for group discussions on the maps, and for sharing the group results to all participants.

Table 3-1 Workshop materials (example)

Item	Use	Quantity
Whiteboard or blackboard,	For the group presentation	1 for a workshop
PC, projector and screen	For the explanation of the work and knowledge about tsunamis (especially to show images or videos)	1 for a workshop
Camera	To take photos in Town Watching (walking evacuation map)	1 for each group

Map	Size: A1(841mm×594mm) ~ A0(1,184 mm×841mm) City planning map (scale: about 1/2500) to make tsunami evacuation plan map Size: A1(841mm×594mm) ~ A0(1184 mm×841mm)	1 for each group
	Blank map to write evacuation points and routes, dangerous sites, other notes and so on. Used in Town Watching (walking evacuation zone)	1 for each group
	Tsunami inundation area map to check inundation areas.	1 for each group
Blank poster	To summarize group discussions	Several for each group
Plastic sheet (transparent)	To put on maps, and write notes or stick post-its	1 for each group
Marker	To write on plastic sheet (8 – 12 colors)	1 for each group
Benzene (alcohol)	Erase mistakes written on plastic sheet	1 for each group
Scotch tape	To tape a plastic sheet on a map	1 for each group
Post-it	To write notes or comments	1 set for each group
Sticker	To stick on plastic sheets and put marks on maps	1 set for each group
Scissors	To cut plastic sheets and so on	1 for each group
Pen	To write on post-its and fill in forms	1 for each participant
Name card	To show the name of participant	1 for each participant
Documents to explain the work	To explain the work	1 for each participant

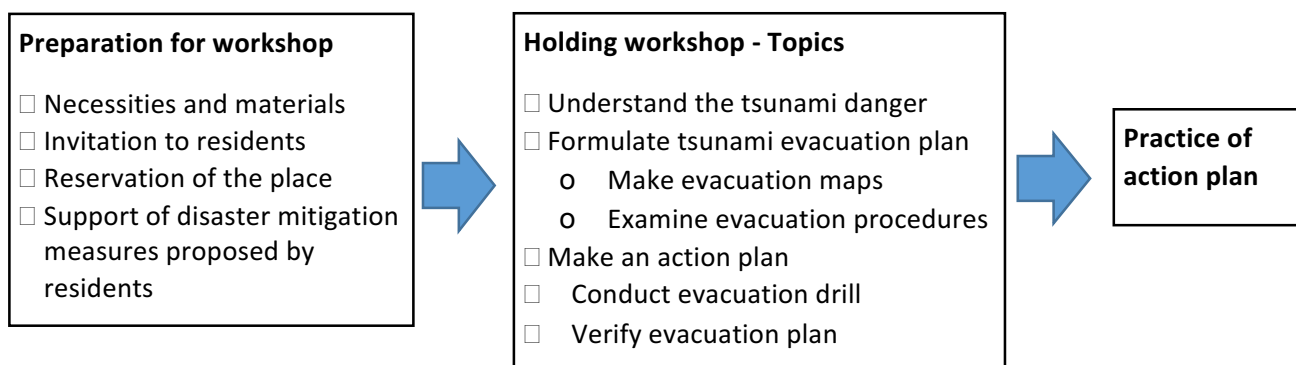
④ Cooperation for the operation of workshop

If necessary, it is desirable that the workshop is managed by not only municipal officers but also national or prefectural officers that are in charge of disaster mitigation, experts, and people experienced in tsunami disaster management

Important advice for the operation of workshop
 During workshops, it is necessary to speak loudly and encourage an atmosphere where participants easily communicate with each other. It is advisable to walk around in the meeting place, talk to each participant and praise the good points of their works or opinions. Negative comments to participants are to be avoided. If some participants have experienced a tsunami disaster in the past, listen to their stories, ask questions and make residents consider. When asking questions to the participants, it is important to provide enough necessary information so that they can respond the question. In addition, avoid the use of specialized or complicated terms, and give

2. Process for the development of the regional tsunami evacuation plan

To formulate the tsunami evacuation plan, the first step is to make a workshop plan and preparing for it. During the workshop, the tsunami evacuation plan is formulated, and future action plans (practical measures) should also be examined. Immediately after the workshop, feasible action items should be selected from the plans proposed in the workshop, and these items carry out them.



3. 3 Workshop Topics

Regional residents hold workshops in cooperation with the Prefecture and the Municipality, and formulate regional tsunami evacuation plans using maps. The following are topics that should be discussed in Workshop.

- ① Understand better the danger of tsunami (3.3.1, 3.3.2, 3.3.3)
- ② Consider how to evacuate from a tsunami (3.3.4)
- ③ Verify the plan through evacuation drills (3.3.5)
- ④ Consider future tsunami mitigation measures (3.3.6)

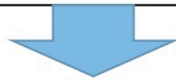
Workshop Steps

① Understand the tsunami danger

Why is making a regional evacuation plan important?

Understanding the regional tsunami danger

- Understanding about the purpose of workshop (3.3.1)
- Understanding about disasters (3.3.2)
- Understanding about regional risks (3.3.3)



② Consider how to evacuate from a tsunami

Consider how to evacuate (When, How, Where)

- What are the evacuation actions (3.3.4)
 - ✓ Make the tsunami evacuation map (evacuation routes and points)
 - ✓ Think about actions before evacuating, things to bring, how you will get information, and so on.



③ Verify evacuation map and plan through drills (3.3.5)

Practice by conducting an evacuation drill, and then review the evacuation routes or actions for lessons learned and to improve the map and plan.



④ Consider future tsunami mitigation measures (3.3.6)

Consider how to implement what was learned in the workshops as future tsunami mitigation measures

3. 3. 1 Understanding Workshop Purpose

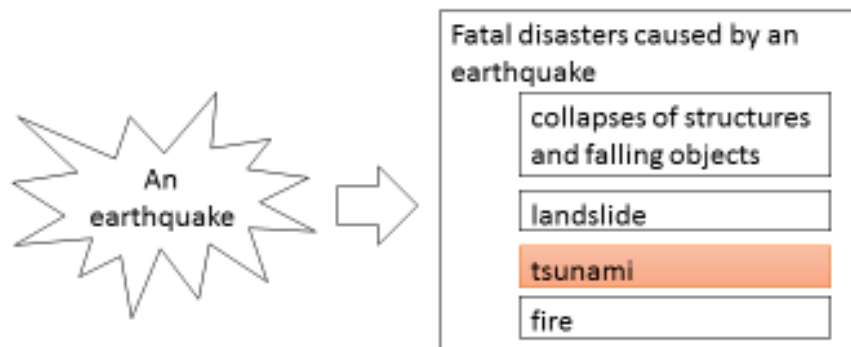
Start the workshop with a clear explanation of the reasons for involving residents in formulating the regional tsunami evacuation plan. It is necessary that the residents, who are the most familiar with the region, participate in the making of the plan to ensure a safe evacuation. It is important that residents use their local information to select the safe evacuation routes and points. It should be emphasized that their involvement is necessary.

The Workshop organizer should also emphasize that another purpose of the workshop is to have residents bring back the lesson learned on the plan so that they can serve as Voluntary Disaster Prevention Leaders in developing disaster management activities on disaster prevention. In regions that were heavily damaged by past tsunamis, it is important to hand down lessons learned to the next generation.

3.3.2 Understanding disasters

1. Disaster Perspective

Explain and describe disasters, particularly what kinds of disasters can occur and how the daily life will be affected, such as when an earthquake happens. The first step for safe tsunami evacuation should be to protect yourself from the shaking of earthquake. It is important to encourage the structural reinforcement of residences to withstand earthquakes, and to bolt down furniture so that it will not fall on you during the shaking. If you protect yourself from the shaking, then you can start evacuating quickly after the shaking stops. As the following shows, an earthquake may cause other kinds of disaster in addition to tsunami, for example, collapses of structures, damage by falling objects, landslides, and fires may result in fatalities. It is necessary to take preventive measures against these disasters too.



For tsunami evacuation, the first priority is immediate evacuation to save your own life. When a strong earthquake is felt near the coast, or tsunami warning or evacuation order is issued, it is important to evacuate to safer places as long as you have the time to evacuate.

After the evacuation, you will stay at the evacuation point until the tsunami ends, and this could last a few hours or more. It is desirable for the evacuation points to be supplied with necessities for a 1-day stay by the evacuees; necessities include information or communication equipment, emergency food provisions and blankets. After the tsunami threat passes, evacuees whose houses are not seriously damaged are able to go back to their homes. On the other hand, refugees whose houses are seriously damaged, e.g., total collapse, may need to stay at an evacuation center for weeks or months. To be ready for this case, each region needs to formulate a refuge or shelter plan, which is different from Tsunami evacuation plan.

2. What is tsunami

Explain what tsunami is, the characteristics of tsunamis, its terror, past tsunamis of the region, and legends or folk stories about tsunamis.

① Tsunami characteristics

Tsunamis are mainly caused by earthquakes and spread as a long wave that grows as it reached the coast. The wave can be big in harbors hence the word ' tsunami' (In Japanese, "tsu" means a harbor and "nami" means a wave). When an earthquake happens under the seabed, the overlying water is thrust up and down by crustal movements, generating tsunami waves.

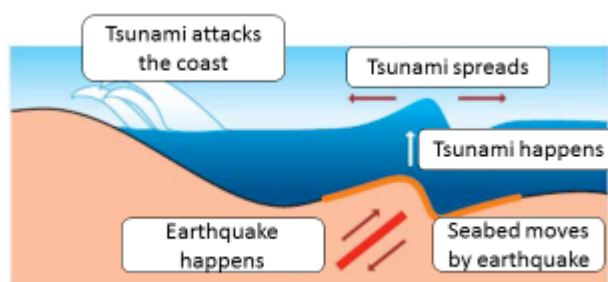


Figure 3-1 Mechanism of tsunami



If you feel an earthquake near to the coast, run to a high place or a building

Figure 3-2 Tsunami evacuation actions

In addition, tsunami can be caused by other phenomena such as landslides. In May 1792, an earthquake occurred, and 1/6 of Mayu-yama (a mountain in Nagasaki prefecture) collapsed, and poured into the Ariake Sea. This sudden inflow generated a tsunami which struck Kumamoto prefecture (opposite shore of Nagasaki prefecture) and led to 15000 deaths.

② Local tsunami and Distant tsunami

a. Local tsunami

A tsunami that occurs near to the coast. In this case, residents normally feel the earthquake shaking. Moreover, in some areas, a tsunami can arrive immediately after the earthquake, so it is necessary to take into account the damage caused by the earthquake shaking and the tsunami arrival time in formulating tsunami evacuation plan (e.g., immediate evacuation when a strong earthquake is felt, or the quick transmission of tsunami information). Also, be aware of a tsunami earthquake, which results in a large tsunami relative to its earthquake magnitude.

b. Distant Tsunami

A tsunami caused by an earthquake far from Japan, such as off the coast of South America or Kamchatka Peninsula, but which affects Japan. Examples of such tsunami include the 1960 Chile earthquake and tsunami and the tsunami generated by the earthquake off the coast of Chile in 2010 and tsunami. For this type of tsunami, residents have to understand that they need to pay attention to tsunami warnings and advisories from the Japan Meteorological Agency (JMA), because they will not feel an earthquake shaking and the tsunami travel time will be several to over 20 hours.

③ Terror of tsunami

Explain about the danger and terror of tsunami as concretely as possible, making use of video of past tsunamis, stories of disaster experiences, and so on. Especially emphasize the following points in an intelligible way.

a. Know that a tsunami can occur after an earthquake happens.

When feeling a strong shaking (seismic intensity level of 4 or greater), or a long shaking, be aware that a tsunami can happen. When no earthquake shaking is felt, pay strong attention to JMA tsunami warnings and advisories.

b. The sea does not always ebb (or recede) before a tsunami

It is said that “the sea ebbs before a tsunami”, “the sky and the sea flash”, or “tsunami makes a big noise”, but a tsunami can also arrive without any of these warning signs.

c. The speed and the force of tsunami

Tsunami travels at very high speed. When an earthquake occurs near to the Japanese coast, the tsunami can arrive immediately after the earthquake (within minutes). When an earthquake happens far from Japan, tsunami can traverse the Pacific Ocean and reach Japan. Because of geographical features, tsunami heights can be much higher than expected and the wave flow (or currents) can become stronger. These kinds of tsunamis are destructive and can wash away buildings.

d Tsunami comes repeatedly

Tsunami is a series of waves that keep receding and advancing, so residents must not leave evacuation points and go back to their homes before the tsunami warning is canceled. Share case stories of residents who had evacuated but went back to their homes to retrieve money or properties only to be swept away by the wave.

e . Do not be confused by false rumor (unofficial information)

Receive correct (authoritative) information from the radio, public information vehicle, and other official methods. After a disaster, false rumor easily spreads due to fear. Always ensure to get the correct information so that reasonable decisions and actions can be taken.

④ Damage caused by past tsunamis

Explain about past tsunamis in the region. Listen the stories of any participant that has experienced past tsunamis, and introduce regional legends or stories about tsunami. In this way, participants can more easily imagine the terror of tsunami and the damage by tsunami. In areas that have not experienced tsunami disaster, make use of videos and other visuals to deepen the comprehension about tsunami.

3.3.3 Understanding regional risks

Residents should think about what they should do to evacuate while thinking about and writing notes on a map on the tsunami risks of their region.

First, residents should put information, such as the expected tsunami inundation area, regional tsunami risks, and known tsunami-safe areas. They should consider which area will be inundated by a tsunami, and which area will be safe from a tsunami, taking into account of the expected tsunami inundation, tsunami wave height, and tsunami arrival time. In addition, they should show potential damage areas from other phenomena, such as from earthquake shaking, fire, and hazardous materials. For example, safe buildings or places can be identified if the building stock is known (types of structures, especially non-wooden), and areas where serious earthquake damage can be identified from an expected seismic intensity map. Residents should consider these factors in creating their tsunami evacuation plan.

[How to make a tsunami evacuation map]

Steps to make a tsunami evacuation map

1. Put a plastic sheet on a regional map and fix it with scotch tape. First, trace contents of the city (roads or railways) to become familiar with the map.
2. Draw and label tsunami inundation areas, evacuation points, secure evacuation routes (with directions) and dangerous sites that could impede or block evacuation routes (Example: concrete walls, vending machines, old buildings and landslides) on the plastic sheet.



Photo 3-1 Writing the routes and evacuation points

3. List evacuation problems on post-its and stick them onto the map. (Example: many old persons, no secure evacuation point, narrow evacuation routes, and no streetlights)

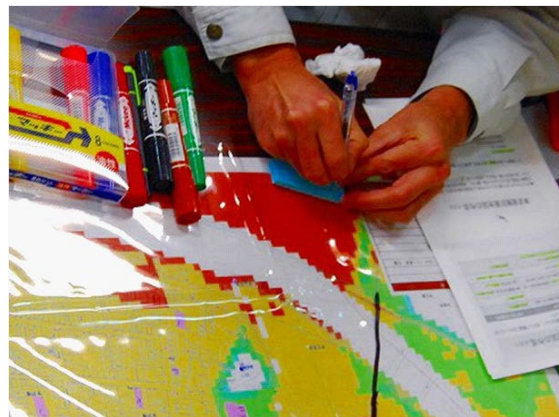


Photo 3-2 Writing on post-its

4. A completed tsunami evacuation map. (Example Evacuation routes and points (green), wide roads (brown), railway (black), dangerous sites (red dot), problems (post-it))



Photo 3-3 Completed tsunami evacuation map

Town Watching

'Town Watching' is an effective way to develop a regional evacuation plan. In 'Town Watching', people walk around the region and understand the regional situations. Even if it is familiar, you may find something new when you focus on evacuating and observe well. In 'Town Watching', you have to consider evacuation routes, dangerous sites and other factors since you will have to move fast to save your life from the tsunami. Take this activity seriously. The discoveries from 'Town Watching' are used in the next workshop to finalize the evacuation map and plan.

3.3.4 Developing Action Plan for Evacuation

In order to save lives from a tsunami, the voluntary evacuation of each resident is crucial. Each participant of the workshop needs to consider what they will do to safely evacuate, and then all participants should closely examine, discuss, and decide on the best and safest evacuation plan for the region.

1. Examination of communication system

- To people. For example, explain contents and meaning of tsunami warning and advisory, evacuation, and recommended actions. (See 2.6)
- Describe in detail the current transmission methods to residents in the region, and other regions if possible. Then, discuss the most effective and reliable ways for the region.

- Discuss what should be done to safely evacuate taking into account of the predicted tsunami arrival time.
- Discuss different ways in which information will be communicated to the most vulnerable populations, such as the handicapped and aged. Also, include ways for reaching non-residents like tourists.

2. Examination of evacuation points and routes

- Examine how, to where, and with which routes to safely evacuate by before the tsunami arrives. (See 2.3.3)
- First, identify evacuation points on the map by taking into account the expected tsunami inundation areas and elevation contours. Evacuation points are different from evacuation centers. Points are selected to ensure life safety from the tsunami. Evacuation centers also provide shelter and emergency living provisions.
- Second, identify possible obstacles and consider different evacuation routes, taking into account geographic features and road situations. Mark the possible safe routes on the map.
- For tourist regions, identify how they will be informed about the evacuation routes.
- It is especially important to pre-identify also evacuation points and/or routes which may cause problems.

3. Examination of actions to do before evacuating

- It is important to consider and identify essential actions that should be done before evacuating, considering the minimum tsunami arrival time that will be available.
- Examples would be
 - In order to prevent secondary disasters, it is necessary to put out a fire and turn off the gas at the main and breaker switches.
 - What support will be provided to the elderly and handicapped people
 - What support or guidance will be provided to tourists

4. Examination of what to bring when evacuating

It is important to discuss and identify what to bring when evacuating, taking into account the minimum tsunami arrival time that will be available.

Items to bring are the necessities for staying at the evacuation point, especially personal items such as a radio and medicines. In order to start evacuating quickly, these items should already be in an emergency carry bag that is placed where it can be taken easily.

Emergency Bag (example of items)

- Drinking water
- Provisions (food)
- Valuables (bank cards, cash, identification, medical information, etc.)
- First-aid kit (Bandage, gauze, clean towel, band-aids, clinical thermometer, scissors, tweezers, disinfectant, medicines, etc.)
- Helmet
- Work gloves
- Flashlight
- Clothes
- Underwear
- Radio (with spare batteries)
- Blanket
- Match and candle (put in a plastic bag to avoid getting wet)
- Body warmer
- Wet wipes
- Pens and paper
- If needed
 - Dried milk
 - Diaper
 - Nursing bottle

3.3.5 Verification of the evacuation map and plan through evacuation drill

A tsunami evacuation drill based on the evacuation points and routes (section 3.3.4) should be conducted to test the evacuation plan and map.

In the exercise, everyone should evacuate with their emergency carry bag and measure the required time it will take to evacuate from their home or work to the designated evacuation point.

After the drill, a post-drill evaluation meeting should be held to identify and correct the problems, and share the lessons learned from the evacuation drill. In this meeting, the evacuation points and routes, and other evacuation actions or procedures, should be reviewed. An action plan may result from the evacuation drill.

3.3.6 Consideration of future tsunami measures – post-exercise action plan

Since it will be impossible that every regional resident can participate in the workshops to develop the regional tsunami evacuation plan. At the workshops, participants increase their awareness on tsunami disaster mitigation. Thus, the most important take-home that participants can do is to share this awareness with other residents, so that every resident will work to realize the plan. At the end of workshops, it is thus important to emphasize to participants that they should tell other residents what they learned in the workshop and especially how the workshop information should be used to save their lives in the next tsunami.

For example, an action plan can be formulated by

- ① Each resident proposing action plans (necessary disaster measures)
- ② Proposed plans are classified by who must do the action (e.g., each household, region or government?)

In the proposed actions, there are ones that can be implemented by each resident and also ones that the government should do. Then, if some plans can be immediately implemented, these should be acted on immediately. For impracticable actions, the administration should explain the reasons why and avoid the situation where the confidence of residents in the government is damaged.

3.4 Points of attention after workshop

The workshop outcomes should be considered as the start of regional disaster measures. After a workshop, attention should focus on the following points.

1. Products of workshop apply to the entire region
2. Cooperation with residents is important to implement tsunami evacuation plans
3. Review of tsunami evacuation plan is needed
4. Continuation of actions

1. Products of workshop apply to the entire region

The regional tsunami evacuation plan made in the workshop reflects the feedback of regional residents. This plan is based on the participants of workshop, and should also represent the opinions of all regional residents. In order for this product to be useful, the participants have to be proactive to make sure all residents know the tsunami evacuation plan and what to do for a tsunami evacuation.

2. Cooperation with residents to implement tsunami evacuation plans

It is possible that as a result of the workshop, residents may have many proposals and demands to the administration on tsunami disaster mitigation. Though it is financially difficult to respond all proposals and demands, the administration needs to cooperate with residents to implement tsunami evacuation measures in order to keep promoting high awareness of the residents.

3. Review of Tsunami evacuation plan

The plan made in workshop is not final. It is important to continue improving the plan through evacuation drills and exercises. Moreover, in the mid- and long-term, it is necessary to review the plan to take account of the installation of new tsunami disaster facilities, such as evacuation roads, emergency evacuation points and seawalls, and land-use changes.

4. Continuation of actions

A regional tsunami evacuation plan formulated in a workshop is an important product, but it does not mean the end of the work. Continuation of action is important. Examples of these actions include tsunami evacuation drills in the region, the explanation of evacuation plan to

new residents, regular tsunami education and evacuation drills at schools, and evacuation drills that involve not only regional people, but also tourists and tourist agencies.

3.5 Examples of workshop

1. Features of target municipalities

We held workshops in Kaiyocho (Tokushima prefecture) and Yatomi (Aichi prefecture).

	Feature
Kaiyo-cho	When a big earthquake (Nankai Trough) happens, a tsunami will reach in a few minutes, but high places are easily accessible from most parts of the region.
Yatomi-shi	When a big earthquake (Nankai Trough) happens, the reach time is sufficiently long, but there aren't high places to evacuate near to the center of region.

2. Outline of target municipalities (examples)

	Kaiyo-cho	Yatomi-shi
Size and geographic features	Size: 327.58 km ² Mountainous in the north. West is 1km long. Kaibe River in the center and Shishikui River in the south flow to the Pacific Ocean. The coast has a sawtooth coastline.	Size: 48.18km ² The shape of area is slender. (Length: East-West 9km, North-South 15km). There is a riverside district along the Kiso River. Most parts of the municipality are lower than sea level.
Location	Southern end of Tokushima Prefecture. The coastline in the South-east fronts the Pacific Ocean.	20km West of Nagoya. The south area fronts Nagoya harbor.
Population	Population: 10741 (Over 65 years old: 4043 (37.6%)) Household: 4811	Population 44601 (Over 65 years old: 9779 (21.9%)) Household: 16241
Routes and railroads	Main routes: National route 56 and 193 Railroads: JR Mugi line and Asekaigan line	Main routes: Tomeihan and Isewangan highway National route 1, 23 and 155 Railroads: Kintetsu Nagoya line, JR Kansaihonsen and Meitetsu Bisaisen

Past disasters	Nankai Earthquake and Tsunami, December 1946: 85 deaths in Asakawa district, 9 in Shishikui district	Isewan Typhoon in September 1959: 358 dead and missing people caused by wave. Nearly inundated entire region.
Expected Tsunami Inundation	Maximum tsunami height: 18.4m Shortest tsunami arrival time: 4 minutes Tsunami inundation area: 5km ²	Maximum tsunami height: 4m Shortest tsunami arrival time: 87 minutes Tsunami inundation area: 50ha (Depth 1cm-30cm), 30ha (Depth 30cm-1m) and 10ha (Depth 1m+)

3. Outline of workshop

[1 st workshop] Kaiyo-cho: 25 September 2012, Yatomi-shi: 5 October 2012	
Subject	Understanding the purpose and the work of workshop Summary and understanding of present Tsunami measures
Contents	Understanding of the purpose and the work of workshop Comprehension of present Tsunami measures of the municipality and the prefecture Exchange of views

[2 nd workshop] Kaiyo-cho: 14 January 2013, Yatomi-shi: 7 December 2012	
Subject	Understanding the importance of tsunami evacuation Confirmation of evacuation points and routes
Contents	Lecture on tsunami evacuation Comprehension of the regional tsunami risk (inundation areas and depths and tsunami arrival time etc.) Making sure of evacuation points and routes, dangerous sites and so on by walking around the region (Town watching)

[3 rd workshop] Kaiyo-cho: 26 January 2013, Yatomi-shi: 22 December 2012	
Subject	Making tsunami evacuation plan map and examination of evacuation actions

Contents	Experience story of the Great East Japan Earthquake Writing evacuation points and routes on a map (Making tsunami evacuation plan map) Examination of evacuation actions
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[4th workshop] Kaiyo-cho: 3 February 2013, Yatomi-shi: 19 January 2013	
Subject	Tsunami evacuation drill and examination of feature tsunami measures
Contents	Tsunami evacuation drill Reexamination of evacuation points and actions after the drill Examination of feature tsunami measures

Working groups in the workshop are decided based on the units of neighborhood associations or voluntary disaster preventing organizations.

6 – 8 people are recommended for each group.

A workshop takes about 2-3 hours.

[Preparation]

<p>(1) Participant districts</p> <p>For Kaiyo-cho, 1-2 voluntary disaster prevention organizations are selected per district (Asakawa, Kainan, Kaibe and Shishikui). Altogether 5 organizations participated in the workshop.</p> <p>Asakawa-nishi voluntary disaster prevention organization (Asakawa), Matsubara chiku voluntary disaster prevention organization (Kainan), Yamashita voluntary disaster prevention organization (Kaibe), Kubo voluntary disaster prevention organization (Shishikui) and Seinan Chiku voluntary disaster prevention organization (Shishikui)</p> <p>For Yatomi-shi, one district was selected per school district (Shiratori, Yayoi, Sakura, Ofuji, Einan and Jyushiyama). Altogether, six districts participated in the workshop.</p> <p>Maegadaira (Shiratori), Ebie (Yayoi), Maegasu (Sakura), Moritsu-Ofujidai (Ofuji), Nabeta (Einan) and Samegachi (Jyushiyama)</p> <p>(2) Participant organizations</p> <p>Other resident participants were as follows:</p> <p>Prefecture, Municipality, Regional Meteorological Observatory, Fire Company, Police, Organizations of principals, women's clubs, social welfare councils, local welfare officers, and so on.</p>

(3) Setting up the workshop

Make groups based on voluntary organizations and/or districts, and arrange tables so that the groups can work on a map and a blank poster. In addition, have available the materials. (See the Table 3-1)



Photo 3-8, The workshop place

4. Workshop Steps

[1st workshop] Understand the Workshop's purpose and plan. Understand the present tsunami mitigation measures

Step 1. Explain the purpose and plan of the workshop (Explain the place)

- Justification for making regional evacuation map in the workshop
- Explanation of the Workshop plan.

Step 2. Comprehension of present Tsunami measures (Explanation at the place)

- Summarize the present tsunami mitigation measures by Prefecture
- Summarize the present tsunami mitigation measures by Municipality
- Summarize the improvement of tsunami warning by Regional Meteorological observatory)

Step 3. Exchange opinions (Describe the place)

- Exchange opinions among all participants (including self-introductions)
- Comment on the importance of tsunami evacuation and the important steps that experts follow to make tsunami evacuation plans

<Comments by experts>

- In order to save lives, multiple mitigation measures are necessary
- The most effective evacuation will vary and depend on the regional situation, so regional evacuation plans and evacuation drills are important
- It is difficult to create a perfect evacuation plan from the start - the most important take-home message is that participants should think about the plan by themselves in the workshops.

[2nd workshop] Understand the importance of tsunami evacuation, Confirmation of evacuation points and routes

Step 1. Describe the purpose and the plan of workshop (conducted at the evacuation place)

Explain the purpose and the plan of workshop again.

- The workshop goal is to make a regional tsunami evacuation plan to ensure safe evacuation.
- Afterward, participants have to share what they learned in the workshop with other residents and start to develop disaster management capabilities of their region.

Step 2. Emphasize the importance of tsunami evacuation (at the place)

Lecture on Tsunami evacuation by expert. The following are facts to convey:

- Save your life by yourself (your own action)
- Understand the risk from a large earthquake and following tsunami and prepare correctly
- Evacuate when you feel a shaking
- It is important that residents are familiar with the region, think on how they will save their lives, and make a tsunami evacuation plan that takes into account the regional situation. In addition, it is also important to verify the plan through evacuation drills and to continuously improve the plan
- There are three (3) disasters that can result from an earthquake , which are damage and death from the shaking, the tsunami, and from fire. The three (3) phases of disaster response to save lives from a tsunami and fire are to take measures responding to the shaking, evacuation from the tsunami to save your life, and afterward, to reconstruct residences, towns and villages..
- The most important goal is to save lives. It is necessary to adopt structural measures such as seawalls, non-structural measures such as evacuation procedures, and people measures such as campaigns to increase awareness and practice evacuation through drills



Photo 3-10 Lecture by an expert

Step 3. Improve comprehension of region's tsunami risk (at the place)

The Prefecture explains the expected tsunami inundation area and tsunami arrival time.

The Municipality summarizes the damage caused by past tsunamis and describes the present tsunami mitigation measures.

It is good to share eyewitness stories of past tsunamis in order to build a better understanding of the tsunami danger and the importance of implementing tsunami mitigation measures.

Step 4. Recommend evacuation points and routes by Town Watching (in each district)

Each group selects evacuation points and routes, and walking routes for Town Watching, then draws them on a map.

Town Watching at each district is conducted using the maps (No.1 and 2)

In Town Watching, attention is paid to the following:

- Places that could cause traffic accidents, especially involving motorcycles and bicycles
- Routes that are narrow and cause people to have to stop
- Places where evacuation will cause congestion
- Places (evacuation target points) where you can stop before reaching the emergency evacuation points. This is in case you feel tired and are unable to go further.



Photo 3-11 Sign for evacuation



Photo 3-12 Indication of sea level



Photo 3-13 Wall of concrete block



Photo 3-14 Narrow road



Photo 3-14 Evacuation stairs



Photo 3-16 River and evacuation route



Photo 3-17 Evacuation target point



3-18 Emergency evacuation point (Welfare center)

Example of Town Watching List

Town Watching List (No.1)			
District	XXX	Date	Jan 14. 2013
Name of person filling out	XXX XXX	Evacuation Point	XXX
Checklist 1 (Evacuation routes and points)			
Check	Questions about evacuation route	Situation	
X	Traffic of cars? (Heavy or Little)	<i>Heavy traffic in the morning in YYY district.</i>	
X	Width of roads?	<i>The prefectural road in YYY district is wide</i>	
X	Are there stairs?	<i>There are in YYY district, but they are under construction, so details are unknown</i>	
X	Are there streetlights?	<i>There are in YYY district, but not so many. In case of a disaster, blackout is possible</i>	
X	Are there signs for evacuation?	<i>There are a few in YYY district. Installation at intersections is necessary.</i>	
X	How long does it take to evacuate?	<i>30 – 40 minutes for the elderly</i>	
X	Others	<i>There are many concrete block walls and narrow roads in XXXX district, so this area is dangerous to evacuate</i>	
Check	Questions about evacuation points	Situation	
X	Is it high ground or a building?	<i>A high ground.</i>	
X	Is the elevation high enough compared to the tsunami height?	<i>OK (an altitude of 38m)</i>	
X	Can you enter easily?	<i>Yes</i>	
X	Other	<i>This point is on the top of mountain, so measures for the cold are necessary.</i>	

* Participants fill out what is *in Italic*.

Town Watching List (No.2)

Checklist 2 (Possible obstacles)

Check	Questions about evacuation route	Situation
X	Block concrete walls (Risk of collapse?)	<i>There are many in YYY district.</i>
	Utility poles (Risk of overturning?)	<i>No</i>
	Old trees (Risk of overturning?)	<i>No</i>
	Vending machines (Risk of overturning?)	<i>No</i>
	Signboards (Risk of falling?)	<i>No</i>
	Area with high density of wooden buildings (Risk of fire?)	<i>No</i>
	Railway crossing (Risk of being impassable?)	<i>No</i>
	Bridge (Risk of collapse and unpassable?)	<i>No</i>
	Multi-level crossing (If collapses, risk of being impassable?)	<i>No</i>
	Other	

[Problems in evacuating]

Write possible problems for the evacuation (For example, there are few evacuation signs, the distance to evacuation points too great, etc.)

*The support to handicapped people and the elderly is not sufficient.
In case of a blackout, evacuation in the night is very difficult.*

[3rd Workshop] Make tsunami evacuation map and examine evacuation procedures

Step1 Share stories from the Great East Japan Earthquake (at the place)

Ms. Oikawa told about her experience during the Great East Japan Earthquake

<Summary of her story>

- 20-m tsunami came at 3:15 pm, March 11 2011, and washed away houses, cars, tracks, big ships and trees.
- An island in the harbor was submerged, then the bottom of the sea appeared because of the receding ocean. It was a view she saw for the first time.
- After the recession, the next wave that attacked was higher and came very fast. So they evacuated to a higher place.
- Most of the people who died were those who went back to their home to retrieve items or went to meet their family. It is important to leave your car and evacuate by foot to a high place immediately.
- It is important to know that a tsunami can run up a river. Koizumi District in Motoyoshicho, which is 5km from the coast, was damaged by the tsunami that ran up in the river.
- Starting immediately after the tsunami, she worked without rest for search-and-rescue, nursing for the injured, and managing relief supplies. The factory she worked in was not damaged, so it was used as an evacuation center. It sheltered 150 people.
- In the evacuation centers, they divided people into groups. In each group, each person had a role such as leader, medical leader, or meal leader. There were no lifelines (water, electricity and communication), but everyone helped each other.



Photo 3-19 Experience story

Step2 Make tsunami evacuation maps (at the place)

Make tsunami evacuation maps by drawing the following on a blank map (scale: 1/25000).

Table 3-2 Items drawn on a map (Example)

Item	Content	How to note
Road	Trunk roads with high traffic, such as national routes and prefectural roads	Brown marker
Railway	Railway tracks	Black marker
Dangerous sites	For example, sites where there are concrete block walls, vending machines, or old buildings that can collapse, or a landslide can happen	Red marker or red sticker
Evacuation target point(s)	Safe evacuation target points designated by the municipality (there can be more than one)	Green marker
Evacuation routes	Based on the items above, consider which routes are the best for evacuation, and write them on the map. Select some common points as the starting point.	Green marker
Problems	Write problems for the evacuation. Example: There are many old people, it makes quick evacuation difficult. The evacuation routes are narrow.	Write on post-it



Photo 3-20 Tsunami evacuation map

Step 3. Presentations by working groups 1 (at the place)

Each group presents on the 1) characteristics of the district, 2) evacuation points and routes, and 3) problems for the evacuation.

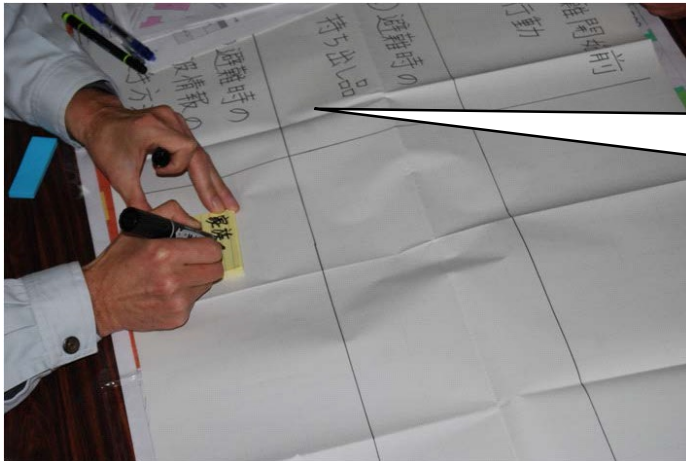
[example]

Characteristics of the district	High density of wooden buildings, district near to the ocean, no building with over 3 floors.
Evacuation points and routes	Only 3 evacuation points. The capacity will support only half of the residents.
Problems for the evacuation	How to take handicapped people to an evacuation point. The risk of liquefaction.

Step 4. Examination of evacuation actions (at the place)

All participants write their opinions on post-its, and stick them on a blank poster to classify them by each topic or action. The summary then forms the “Tsunami Evacuation Actions and Procedures”.

1. The actions before the evacuation (the first things to do)
2. Items to bring with your for the evacuation
3. How to get tsunami information during the evacuation
4. How to evacuate (Use a car, a bicycle or by walking?)
5. How to support the handicapped and elderly
6. How to support the evacuation of tourists or non-regional people.



Each participant writes his/her opinion on a post-it. One post-it for each subject

Photo 3-21 Write on post-its



Stick post-its on a poster and explain the opinions to other group members.

Photo 3-22 Stick post-its



The discussion is improved by the participation of prefectural officers and firemen.

Photo 3-23 Discussion in group

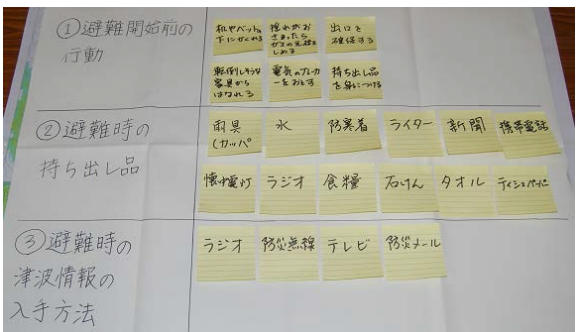


Photo 3-24 Summary result

Step 5. Presentation 2

Each group presents on 1) the actions before the evacuation, 2) items to bring with you for the evacuation, 3) how to get tsunami information during the evacuation, 4) how to evacuate, 5) how to support the handicapped and elderly, and 6) how to support the evacuation of tourists or non-regional people.

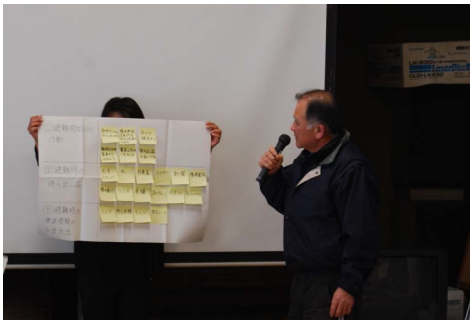


Photo 3-25 Presentation

Form “Tsunami Evacuation Actions” (Example of Kaiyo-cho)

Form “Tsunami Evacuation Actions”	
District	XXX
Actions before the Evacuation	<i>Go under a desk or bed Be some distance from the furniture since it can overturn Turn off the gas at the main switch after the shaking Decide on a safe way out</i>
Items to bring for the evacuation	<i>Cellphone, radio, flashlight, water, provision, towel, lighter, Kleenex</i>
How to get tsunami information during the evacuation	<i>Radio, TV, loudspeaker of public information, email</i>
How to evacuate	<i>Walk, bike, car, handcart for handicapped or old people</i>
How to support handicapped and elderly	<i>Call out to them, prepare handcarts, daily communication</i>
How to support the evacuation of tourists or non-regional people	<i>Evacuation signs, loudspeakers in tourist spots</i>

Form “Tsunami Evacuation Actions” (Example of Yatomi-shi)

Form “Tsunami Evacuation Actions”	
District	XXX
Actions before the Evacuation	<i>Save your body during the shaking Go under desk, close shutters Turn off the gas at the main switch Decide on a safe way out. Put on a helmet or a hat. Inform the evacuation point to the family</i>
Items to bring for the evacuation	<i>Valuables, water. Provisions, cloths, medicines, cellphone, radio, light, portable toilets, blanket</i>
How to get tsunami information during the evacuation	<i>Radio, TV, loudspeaker of public information, internet, cellphone</i>
How to evacuate	<i>Walk, motorcycle, bicycle</i>
How to support handicapped and elderly	<i>Use a car for the evacuation Use handcarts Make a list of the people</i>
How to support the evacuation of tourists or non-regional people	<i>Evacuation signs, brochure about evacuation (in different languages), people who can communicate in foreign languages</i>

[4th Workshop] Tsunami evacuation drill and examination of future tsunami mitigation measures

Step 1. Tsunami evacuation drill (in each district)

Each participant evacuates to an evacuation point carrying an emergency bag using evacuation routes selected by the district. Both workshop participants and other residents participate in the drill.



Photo 3-26 Evacuation drill



Photo 3-27 Evacuation support to old people

Step 2. Discuss and identify on the lessons learned and problems in the drill

After the evacuation drill, the workshop participants hold a post-drill evaluation meeting. Each participant fills out a questionnaire, then discusses “the necessary time for the evacuation”, “dangerous sites or things found in the drill” and “the lessons learned and problems found in the drill”

<Opinions on the lessons learned and problems found in the drill
(Example of Kaiyo-cho)>

Dangerous points along evacuation routes

Evacuation routes are slippery, routes are narrow, stairs are steep, it takes much time to evacuate because of the steep slope, few streetlights, concrete block walls, and fishing boats may come drifting up.

Lessons learned and problems found in the drill

A handcart blocked an evacuation route, the need for rope, sea-level indicators, evacuation point is small, not so many participants, many old people, no communication among neighborhoods

<Opinions about the lessons learned and problems found in the drill (Example of Yatomi-shi)>

Dangerous points in evacuation routes

Manhole, irrigation canal, bridge, railway crossing, unavailable route due to the construction, many utility poles (risk of collapse), narrow roads, poor visibility

Lessons learning and problems found in the drill

It was hard to hear a public information speaker, no communication among neighborhoods, the evacuation of old people and small children, the evacuation of non-regional people, the evacuation point is locked

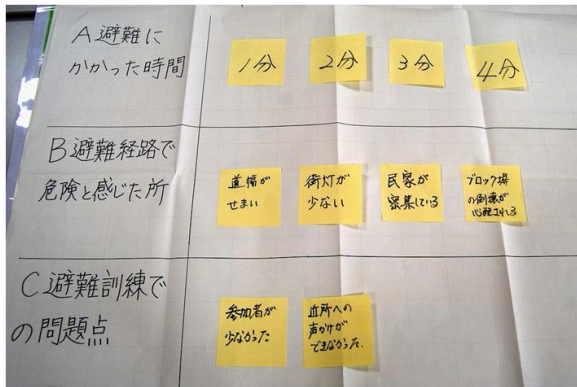


Photo 3-28 Lessons learned and problems found in the drill

Step 3. Consideration of Recommended Tsunami Mitigation Measures (at the place)

Each participant writes opinions on the following, then discusses in their group using a blank poster. First, each group chooses a summary phrase, then writes their opinions on the form “Recommended Tsunami Mitigation Measures”.

Table 3-3 Recommended Tsunami Mitigation Measures

Point	Content
Purpose (Summary phrase)	The purpose of the tsunami mitigation measures.
Regional problems	Classify and list problems discussed so far.
Recommended tsunami mitigation measures	Classify by measures For example, measures practiced by households, the region or community, or the administration?

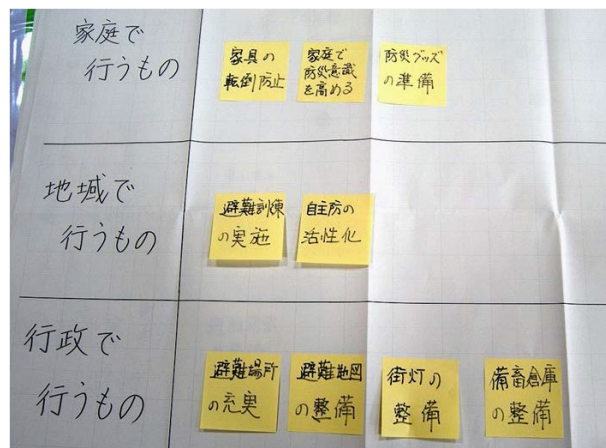


Photo 3-29 Recommended Tsunami Mitigation Measures

Step 4. Presentation (at the place)

Each group presents on 1) Purpose (catch phrase), 2) Regional problems, and 3) Recommended Tsunami Mitigation Measures.

Form “Recommended Tsunami Mitigation Measures” (Example of Kaiyo-cho)

Form “Recommended Tsunami Mitigation Measures”	
District	XXX
Purpose (Summary phrase)	
<i>Save your life by yourself</i>	
Regional problems	
<i>Institutions for the elderly (In the night, few staff members), the support to old people living alone, tourists (especially in the summer), elementary school students</i>	
Recommended Tsunami Mitigation Measures	
Household	<i>Have an emergency carry bag. Ensure that furniture cannot overturn, Have a communication method within the family. Take precautions to prevent a fire</i>
Regional community	<i>Regular drills, Emergency contact network</i>
Administration	<i>Install evacuation route signs and storehouses Install communication equipment</i>

Form “Recommended Tsunami Mitigation Measures” (Example of Yatomi-shi)

Form “Recommended Tsunami Mitigation Measures”	
District	XXX
Purpose (summary phrase)	
<i>Daily training saves your life!</i>	
Regional problems	
<i>No high building, it is necessary to have safe sidewalks, no streetlight along the evacuation routes, construction of evacuation points needed in high places</i>	
Recommended Tsunami Mitigation Measures	
Household	<i>Prepare an emergency carry bag. Ensure a safe way out</i>
Regional community	<i>Communication and mutual help among neighborhoods, evacuation drill</i>
Administration	<i>Install evacuation routes Maintain public information speakers</i>

5. Further activities following workshop model

1) Sharing information and the process with other Districts

For districts that did not participate in the workshop, they can use the model workshop to make their making tsunami evacuation plan or practice tsunami evacuation drills

2) Enrichment and enforcement of disaster education

In Kaiyo-cho, they had put a great deal of effort into tsunami evacuation drills and disaster education at elementary schools, junior high schools and high schools before this workshop. Also, in Yatomi-shi, tsunami evacuation drills are practiced at nursery schools and elementary schools. After this workshop, they will try to develop and enforce the drills and the education based on what learned in the workshop.

3) Consider another drill using different communication methods.

In the drill practiced in Yatomi-shi on January 19, 2013, the disaster management radio communications system was used, but in some districts, the reception was poor. So, the municipality is considering a drill using different communication methods such as early warning emails, CATV, and the Internet.

3.6 Overview of DVD on tsunami evacuation

1 Purpose

The Great East Japan Earthquake caused unprecedented damage and loss of life. As a result, there is a need to prepare for future tsunami disasters generated by large-magnitude earthquakes. The "Tsunami Evacuation Measures Guidance Manual" report and DVD provide information promoting the development of tsunami evacuation plans.

2 Overview

(1) Title "Let's start from your city! Tsunami evacuation measures in your region."

(2) Video time is about 25 minutes

(3) Use

The DVD was created to provide information on tsunami evacuation planning to local governments, relevant ministries and agencies for use in training sessions, aired in public facilities, and loaned to local residents, schools, and businesses – It is assumed that the DVD will be used for outreach and education on the creation and review of tsunami evacuation plans.

3 Video outline

The video is composed of 2 parts, with an outline as follows.

Part	Topic
Workshop (for general public)	<ol style="list-style-type: none">1. The tsunami evacuation plan, planning, tsunami evacuation planning stakeholders and roles2. Workshop, Evacuation planning using workshops3. Workshop plan<ol style="list-style-type: none">i. A better understanding of the tsunami risk, tsunami mechanism, risk factors, tsunami facts to rememberii. How to escape from a tsunami, how to make a tsunami evacuation plan, evacuation behavior and actionsiii. Verify evacuation plan, implementation of plan, points to check in planiv. Recommended tsunami mitigation measures
Setup Guide (for staff)	<p>Be the first to start a workshop</p> <ol style="list-style-type: none">1. Workshop participants2. Invite residents to participate3. Venue, maps, documents, and other preparation materials

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