1. Damages caused by the Great East Japan Earthquake

2. MLIT’s emergency response to the Great East Japan Earthquake

3. Recent policy changes regarding tsunami disaster countermeasures
Fundamental Strategy for Tsunami Disaster Measures

Reducing human and economic damages by “disaster mitigation” is the fundamental for all levels of tsunami.

Comparatively Frequent Tsunami

- Aim to ensure protection of human lives, assets and national land (coastal line), etc. against comparatively frequent tsunami (once every several tens of years to a hundred years and several tens of years) on the basis of constructing coastal protection facilities.
- Conduct technical development and improvement of structures so that they cannot be easily broken even when the tsunami height exceeds the design level.

Largest Scale Tsunami

- Aim to prevent as much human damages as possible against largest scale tsunami by “Integrated Prevention” combining structural and non-structural measures such as land use regulation, building code and emergency/evacuation procedures.
Determining Design Tsunami Level, the basis for Coastal Levee Height

For the series of coastlines and ports:
- Historical tsunami trace height records are investigated
- Conduct tsunami simulation for earthquakes with high probability of occurrence

Design tsunami level is set by tsunamis occurring every several tens of years to a hundred and several tens of years.

2011 Tohoku Earthquake Tsunami

Levee height before disaster

Subsidence

Levee destroyed by tsunami attack

Maximum Level Tsunami

Relatively Frequent Tsunamis
Levee height is set by considering the environmental aspects, economic efficiency and manageability.
In order to prevent/reduce tsunami disasters in the future, develop a standard institutional system to be utilized nationally and promote “tsunami resilient city” through “integrated prevention” incorporating structural and non-structural measures.

1. Basic Guidelines to be set by Minister for Land, Infrastructure, Transport and Tourism.
2. Tsunami Inundation Assumption to be set by Governors.
3. Promotion Plan (a plan to comprehensively promote tsunami resilient city) to be prepared by municipalities.
4. Development of tsunami adaptation structures
   - Prevent expansion of inundation
5. “Tsunami Disaster Security Zones” to be designated by Governors.
   - Escape from tsunami
   (Yellow zone: development of preparedness and evacuation procedures)
6. “Tsunami Disaster Special Security Zones” to be designated by Governors.
   - Avoid tsunami
   (Orange and Red zone: land use regulation)
Image of Tsunami-Resilient City

- Zones to prevent inundation
- Tsunami inundation assumption zone
- Tsunami evacuation building
- Land raising of residential area
- Tsunami evacuation tower
- Designated tsunami adaptation structure (existing road)
- Tsunami adaptation structure (inland lock gate)
- Tsunami Disaster Special Security Zone (orange zone)
- Tsunami Disaster Special Security Zone designated by ordinance (red zone)
- Evacuation route
- Evacuation site (high ground)
- Coastal levee
Yellow Zone (Tsunami Disaster Security Zone)

Zones where residents or others have possibilities of losing their lives or being injured by tsunamis.

- Development of preparedness and evacuation procedures (Escape from tsunami)

- Inclusion of tsunami preparedness/evacuation procedures (evacuation facilities/routes, tsunami evacuation drills, information delivery, etc) in the local disaster management plans for municipalities

- Preparation of tsunami hazard maps by municipalities

- Designation of evacuation facilities and execution of management agreements (succession effective) by municipalities

- Preparation of evacuation plans or implementation of tsunami evacuation drills in underground facilities or facilities used by people who need assistance for evacuation
Orange Zone (Tsunami Disaster Special Security Zone)

Zones included in the Yellow Zone where residents or others have high possibilities of loosing lives or being injured by tsunami.

Land Use Regulations (Avoid Tsunami)

- Hospitals and social welfare facilities
  - Building or embankment structures to be safe against tsunamis
  - Floor level of rooms to be above the tsunami water level
Red Zone (Tsunami Disaster Special Security Zone designated by ordinance)

Zones included in the Orange Zone where persons can not evacuate smoothly or promptly when tsunami occurs.

Land Use Regulations (Avoid Tsunami)

- Residential houses
  - Building or embankment structures to be safe against tsunamis
  - Floor level of rooms or rooftop where persons can evacuate to be above the tsunami water level
Development of Tsunami Adaptation Structures
(Prevent inundation expansion)

- Tsunami Adaptation Structures
  Such structures as embankment structures, inland lock gates, protective walls or breast-walls built and managed by governors or mayors based on the tsunami inundation assumptions in order to prevent or mitigate human damages caused by tsunami disaster.

Schematics of Tsunami Adaptation Structure

- Installation of inland lock gate to existing road embankment
- Installation of breast-wall to existing road embankment
- Embankment structure as multiple-use infrastructure (tsunami adaptation structure, road, etc)

* Build barriers by embankment
* Install lock gate or protective walls as necessary
Making and publishing Hazard Map

Evacuation area (high ground)

Evacuation area (building)

Expected time of inundation (minute)

Evacuation route

Inundation depth (m):
- 6 – 13.5
- 3 – 6
- 1.7 – 3
- 0.8 – 1.7
- 0.4 – 0.8
- 0.15 – 0.4
Designating Tsunami Evacuation Building
Constructing Evacuation Route
Conducting Evacuation Drill