

JSCE Annual Meeting September 5-6, 2012, Nagoya

## International Roundtable Meeting on

# Multilateral Cooperation/Collaboration in Developing Disaster-Resilient Infrastructures

### Questionnaire Summary 2

**1. Disaster**

- Flood , Drought, Cyclone/Typhoon, Earthquake, Tsunami, Landslide, Whirlwind, Volcanic eruption

**2. Basic systems**

Present	-Disaster management operation systems
Problem	-Incomplete hazard maps / legal systems -Poor coordination -Uncertain prediction of forces -Different departments' contingency plans execution

### Questionnaire Summary 3

**3. Before the disaster**

Present	-National disaster risk reduction and management plan
Problem	-No commitment of academic people to decision making -Delay in education to control overall fields -The lack of knowledge and training in disaster risk reduction

### Questionnaire Summary 4

**4. After the disaster**

Problem	-Slow or inept response of the government -Lack of detailed system to supply enough resources
Idea	-Clarification of the role of national/regional government -To develop emergency drill plans -To strengthen industry-government-school cooperation

Questionnaire Summary	
5. International cooperation	
Present	Effective cooperation FROM -Rescue team and strategy sharing, -Experienced country Effective cooperation FOR -Disaster management package
Idea	-Establishment of academic cooperation system in the world (Discuss twice a year) -Government's regulation of inaccurate misleading information

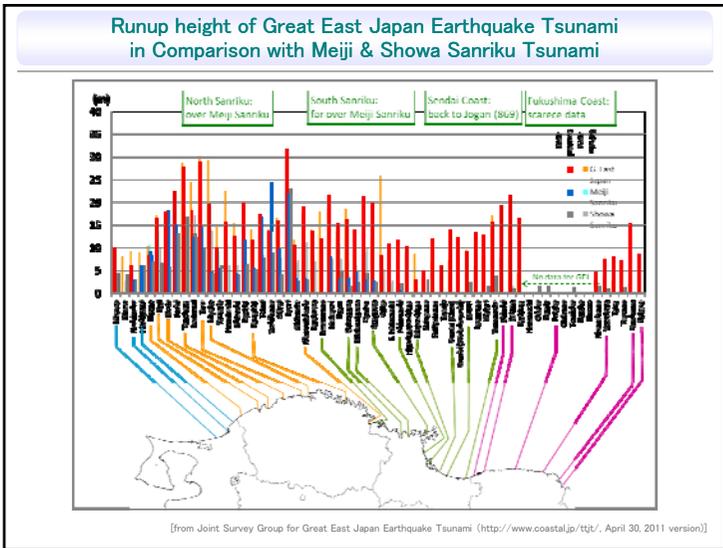
- ### Important Keywords
- Earthquake & Tsunami
  - Flood
  - Landslide
  - Cyclone/Typhoon (Strom surge)
  - Other disasters (Volcanic eruption, Debris flow, Drought, ...)
  - Monitoring & Information dissemination
  - Institutional framework
  - International cooperation/collaboration

- ### Important Keywords
- Earthquake & Tsunami
    - Earthquake-resistant structures (design standard)
    - Geological map, Earthquake hazard map
    - Rescue, Damage evaluation
    - Resilient coastal structures
    - Tsunami monitoring & warning system
    - Tsunami hazard map & evacuation (capacity development) (shelter)
    - Recovery of traffic system & infrastructures
    - Skilled workforce in recovery
    - Land-use planning
    - Disaster management package

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## 2011 Tohoku Earthquake Tsunami

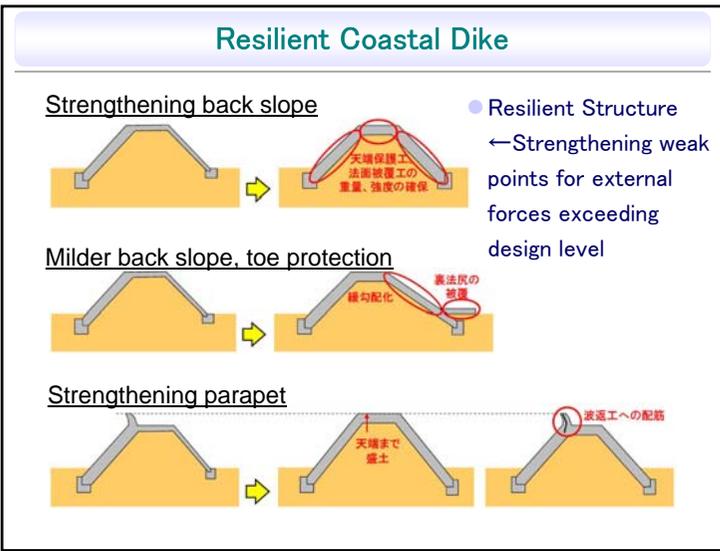
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### History of Major Tsunamis in Tohoku Area

Date	Name	Magnitude		Maximum runup height (T.P. m)	Death (Missing)	Houses	
		Earthquake (M)	Tsunami (m)			Destroyed (complete, half)	Inundated
869.7.13	Jogan	8.6	4		1,000		
1611.12.2	Keicho Sanriku	8.1	3	15-20 (Taro)		Taro, Kominata, Shimosetai, Miyako	Death/Houses Ratio
1896.6.15	Meiji Sanriku	6.8	4	24.4 (Sanriku)	22,072	10,393	2 3,694
1933.3.3	Showa Sanriku	8.1	3	23.0 (Ryori)	1,522 (1,542)	5,851	4,018 0.5
2011.3.11	Great East Japan	9.1		38.4 (Omoe)	15,726 (4,593)	268,708	0.1

[from Watanabe (1998), Central Disaster Prevention Council (HP)]



### Beach Erosion



Before



After



Before

Beach was protected by coastal dike



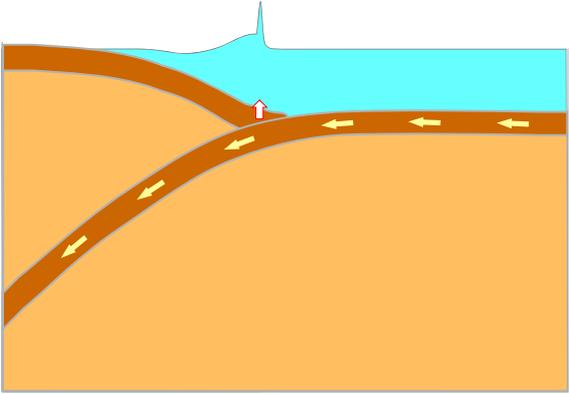
After

左: 蒲生干潟、右: 深沼海水浴場

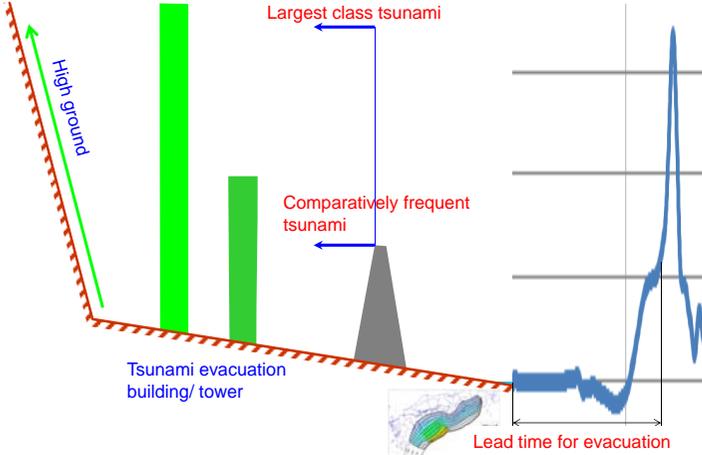
### Concept of Coastal Defense for Rehabilitation of Damaged Areas

- Technically possible to construct of higher structures to protect against great tsunamis, but very costly
- Apart from cost,
  - Daily separation between land and sea causes is undesirable
  - Inconsistency with lifetime of structures (50 or at most 100 years)
  - Possibility of tsunamis even larger than the great tsunami of design level
  - Economic and recreational activities seaward of the coastal structures such as in ports and beaches will resume
- Save human lives against tsunamis of maximum level
  - Relocation, artificial hill, tsunami evacuation building & tower
  - Multiple safety system considering tsunamis exceeding the maximum level
- Save human lives and assets against tsunamis of design level by structures
  - Protection from tsunamis encountering once in a life
  - Development of structures resilient to tsunamis exceeding design level

### Generation of Tsunami due to Earthquake



### Evacuation from Tsunami



### Important Keywords

#### ● Earthquake & Tsunami

- Earthquake-resistant structures (design standard)
- Geological map, Earthquake hazard map
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- Land-use planning
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### Important Keywords

#### ● Flood

- Hydraulic & meteorological monitoring (water level, rain fall)
- River train (bank, channel dredging, floodway), Dams, Detention basin, Polder
- Flood management (dam operation)
- Integrated flood control system

#### ● Landslide

- Natural & engineered slopes
- Landslide hazard map
- Monitoring of precursory phenomena
- Slope reinforcement

### Important Keywords

#### ● Cyclone/Typhoon (Strom surge)

- Meteorological monitoring & forecasting
- Coastal structures
- Strom surge hazard map and evacuation (shelter)

#### ● Other disasters

- Volcanic eruption
- Debris flow
- Drought

### Important Keywords

#### ● Monitoring & Information dissemination

- Automated damage monitoring
- Mass media (TV, radio), loudspeaker, internet, mobile phone
- Integrated, systematic & consistent information dissemination
- Misleading information

#### ● Institutional framework

- Laws & acts
- Disaster management plan, Proactive measures
- Disaster reduction programs, evacuation drill
- Collaboration among central & local governments, NGOs, Scientists & Citizens
- Conflict with other factors

### Important Keywords

- **International cooperation/collaboration**
  - Disasters are region specific, but and therefore, mutual cooperation/collaboration effective
  - International organizations, Governments, NGOs, Engineers, Scientists, Citizens
  - Structural & non-structural, Technical (Design codes) & institutional (“Disaster management package”)
  - “Asian board for natural disaster prevention/reduction”

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  - Flood management (dam operation)
- **Landslide**

### Schedule 23

Year	ACECC	Board of Natural Disaster Prevention/Reduction in Asia (BoNDisPRA)
2012	Oct 23: ECM in Manila	Sep 5-6: JSCE Annual Meeting
2013	Feb 24: ECM in Taiwan Aug 25: ECM in Jakarta Aug 6: CECAR in Jakarta	Aug: Board Meeting in Jakarta
2014		Nov: Board Meeting
2015		Nov: Board Meeting in Kyoto (World Engineer’s Convention in Kyoto)
2016	7th CECAR in Hawaii	Roundtable Meeting in Hawaii