

JSCE Annual Meeting September 5-6, 2012, Nagoya

International Roundtable Meeting on Multilateral Cooperation/Collaboration in Developing Disaster-Resilient Infrastructures

Questionnaire Summary

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. 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. 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

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5. International cooperation

Present	<p>Effective cooperation FROM</p> <ul style="list-style-type: none"> -Rescue team and strategy sharing, -Experienced country <p>Effective cooperation FOR</p> <ul style="list-style-type: none"> -Disaster management package
Idea	<ul style="list-style-type: none"> -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

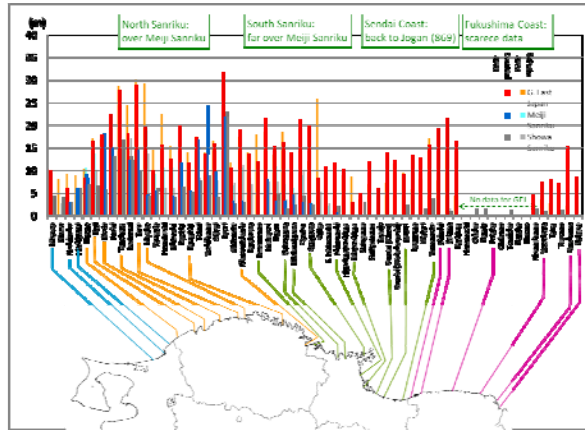
- Earthquake & Tsunami
 - Earthquake-resistant structures (design standard)
 - Geological map, Earthquake hazard map
 - Rescue, Damage evaluation
 - Resilient coastal structures
 - Tsunami monitoring & warning system
 - Tsunami hazard map & evacuation (capacity development) (shelter)
 - Recovery of traffic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

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in Developing Disaster-Resilient Infrastructures, JSCE

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2011 Tohoku Earthquake Tsunami

Runup height of Great East Japan Earthquake Tsunami in Comparison with Meiji & Showa Sanriku Tsunami



[from Joint Survey Group for Great East Japan Earthquake Tsunami (<http://www.coastal.jp/tjt/>, April 30, 2011 version)]

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, Kominato, Shimoset-tai, Miyako	Deaths/Houses Ratio
1896.6.15	Meiji Sanriku	6.8	4	24.4 (Sanriku)	22,072	10,393	2
1933.3.3	Showa Sanriku	8.1	3	23.0 (Ryori)	1,522 (1,542)	5,851	4,018
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)]

Process for Breaking of Armored Sloping Dikes



[top left: Google Earth]

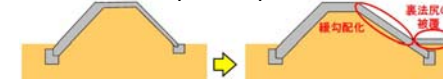
Resilient Coastal Dike

Strengthening back slope

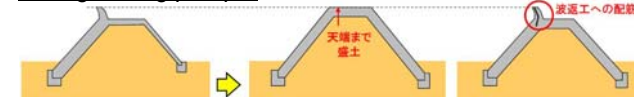


- Resilient Structure
- ← Strengthening weak points for external forces exceeding design level

Milder back slope, toe protection



Strengthening parapet



Beach Erosion



Beach was protected by coastal dike

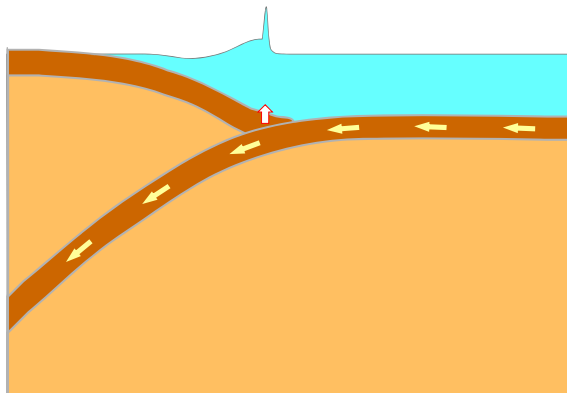


左: 蒲生干潟、右: 深沼海水浴場

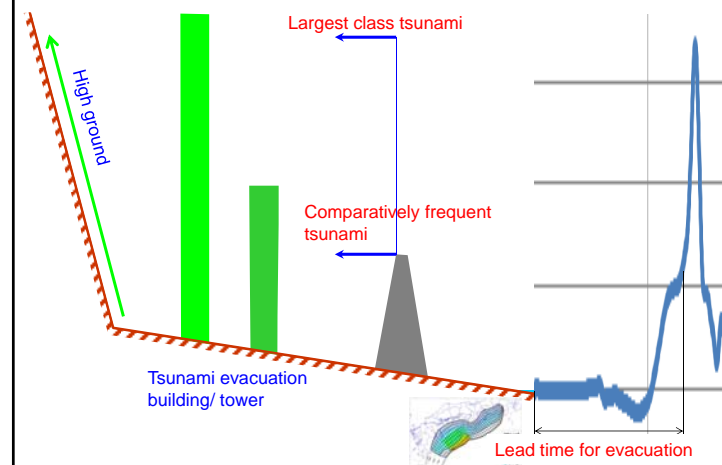
Concept of Coastal Defense for Rehabilitation of Damaged Areas

- 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

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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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Schedule

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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