Tohoku Chapter, Architectural Institute of Japan

Reconnaissance Report (18) on Miyako City and Kamaishi City

The 2011 off the Pacific Coast of Tohoku Earthquake

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Disaster Committee, Tohoku Chapter

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This report describes the damage in Miyako City, Yamada-machi, Ohtsuchi-cho, and Kamaishi City, all in Iwate Prefecture. The route map is shown in Fig. 1.

1. Miyako City, Iwate Prefecture (No. 1 in route map)

The population of Miyako City is 59,118; 381 were dead and 1,301 were missing as of April 5, 2011. According to IOC (Intergovernmental Oceanographic Commission)/UNESCO Bulletin No. 17, as of April 5, 2011, tsunami height was measured by Hokkaido University and University of Tokyo:

- Miyako port: 8.5 m
- Shirahama district: 11.5 m (Note; Height of seawall is 7.6 m. Eyewitness information: 2nd wave is the largest. As Tsunami exercise is assumed that tsunami wave will over the seawall, no death, missing and injury is in this district.)
- Tarou district: Seawall of the coastal side was destroyed. Tsunami over the seawall and inundated urban area. The roof of the 4th floor building near the coast is damaged by tsunami. Run-up heights were 19.5m, 25.5m and 24.7 m. *(the detail information on Tarou is introduced at the end of this report.)*
- Koborinai fishing port: 37.88 m

The photos were taken at the exit of Miyako-Minami interchange.

Photo 1: View of breakwater. The tsunami wave flowed over the breakwater.

Photo 2: Failure of breakwater. It is not clear the relation of the failure and damage in the area.

	
Photo 3: Damage of signboard. Some indication of tsunami height.	

2. Yamada-machi, Shimo-Hei Gun (county), Iwate Prefecture (No. 2 in route map)

The population of the town is 18,745; and 503 were dead.

According to IOC (Intergovernmental Oceanographic Commission)/UNESCO Bulletin No. 17, as of April 5, 2011, tsunami height was measured by Hokkaido University:

- Port: 9.5 m (seawall height: 6.2 m), and run-up is 10.0 m. the 1st wave was largest without receding.

	
Photo 1: Collapsed breakwater.	Photo 2: Remaining parts of breakwater.

Photo 3: Collapsed breakwater.

3. Funakoshi, Yamada-machi, Shimo-hei Gun, Iwate Prefecture (No. 2 in route map)

Photo 1: Collapsed breakwater (On March 23).

Photo 2: Collapsed breakwater

Photo 3: Neighborhood of the collapsed breakwater.

Photo 4: Only remaining building in the neighborhood of the collapsed breakwater.

4. Ohtsuchi-cho, Kami-Hei Gun, Iwate Prefecture (No. 3 in route map)

The population is 15,293; 555 were dead and 1,068 missing as of April 5.

According to IOC (Intergovernmental Oceanographic Commission)/UNESCO Bulletin No. 17, as of April 5, 2011, tsunami height was measured by Sasaki et al.;

- Run-up; 12 – 19 m

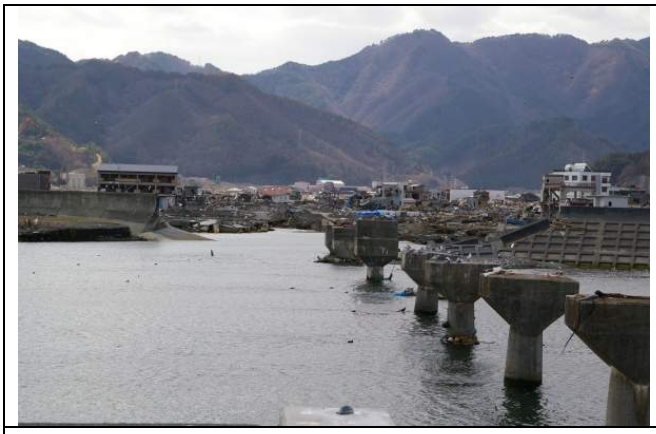


Photo 1: Breakage of embankment, view toward Ohtsuchi station. Front structure is washed away piers of railway bridge of the Yamada Railway Line.

Photo 2: An overturned two-story reinforced concrete apartment building.

Photo 3: The foundation of the apartment building shown in Photo 2.

Photo 4: Overturned and dislocated breakwater by tsunami.

Photo 5: Buildings near the breakwater.

Photo 6: A reinforced concrete building standing, completely submerged under water.

5. Ryoishi-cho, Kamaishi City, Iwate Prefecture (No. 4 in route map)

	
Photo 1: Failure of breakwater.	Photo 2: Damage of houses in Rias shore.
	
Photo 3: The view at the highest point in the area. A house was flowed out to this height.	

6. Kamaishi City, Iwate Prefecture (No. 4 in route map)

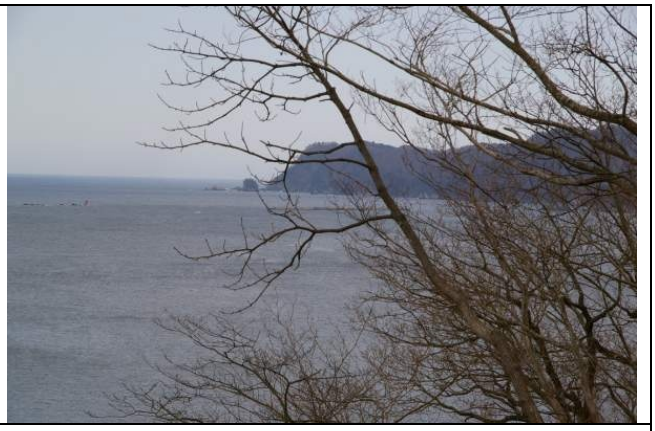
The population of Kamaishi City is 39,294; 681 were dead and 633 missing as of April 5, 2011.

According to IOC (Intergovernmental Oceanographic Commission)/UNESCO Bulletin No. 17, as of April 5, 2011, tsunami height was measured by Port and Airport Research Institute;

- Kamaishi harbor: 7 – 9 m

Kamaishi Port was hit by many tsunamis in the past; the 1896 Meiji Sanriku-oki Earthquake Tsunami, the 1933 Showa Sanriku-oki Earthquake tsunami, and the 1960 Great Chilean Earthquake tsunami. Many valuable lives and properties of the people in the area were lost by the tsunami attacks. Therefore, as one of counter measures to tsunami attack, sea walls were constructed at the mouth of Kamaishi Port from 1978; the construction was completed in 2008.

The great sea walls collapsed by the tsunami wave, but according to the numerical simulation by Port and Airport Research Institute, the sea walls were effective delaying the arrival of tsunami in the city and reducing the run up height of tsunami.

	
Photo 1: View of collapsed Kamaishi Port Mouth Sea Wall (left side)	Photo 2: View of collapsed Kamaishi Port Mouth Sea Wall (right side).
	
Photo 3: Kamaishi Port. Grounding of a large scale ship.	

7. Toni-cho, Kamaishi City, Iwate Prefecture (No. 4 in route map)

	
Photo 1: Toni Elementary School. Tsunami reached the third floor of the building.	Photo 2: A brand new water gate. Houses were all washed away.

Fig. 1: Route Map