

Tohoku Chapter, Architectural Institute of Japan
Reconnaissance Report (15) on Tsunami Damage in Sendai City
The 2011 off the Pacific Coast of Tohoku Earthquake
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Disaster Investigation Committee

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This report introduces the damage survey of Nagamachi, Taihaku-ku (Ward) and Oritate, Aoba-ku of Sendai City carried out by the staff of Sendai Technical college.

1. Damage in Nagamachi District, Taihaku-ku (Ward), Sendai City

The survey was conducted on March 15 (Tue) from Nagamachi 1-chome to Asuto Nagamachi 2-chome, along the old National Road No. 4. JR Nagamachi Station is one stop south of Sendai Station (See Fig. 1 for the locations). The ground in this area is alluvial, and not good. A building, which suffered damage in the 1978 Miyagi-ken Oki Earthquake and the first story of which is used for commercial use, suffered the fall of exterior finishing. Fortunately, no buildings collapsed in this area. The area around the JR station has been re-developed, but not many buildings are constructed on land and collapse and severe damage were not observed. The ground was observed to settle in many places on the old National Road No. 4. The piers of the Tohoku Shinkansen viaducts were damaged at the ends of each viaduct unit. Fiber reinforcement sheet of retrofit was fractured in some piers.



Photo 1: A Shinkansen train stood still on
Hirose-gawa side viaduct

Nagamachi 1-chome, Taihaku-ku



Photo 2: Ground settlement of the old National
Road No. 4.

Nagamachi 1-chome, Taihaku-ku



Photo 3: Fall of exterior finishing from a timber house

Nagamachi 4-chome, Taihaku-ku



Photo 4: Fall of mortar finishing from a timber house

Nagamachi 4-chome, Taihaku-ku



Photo 5: Viaduct of the Shinkansen Line, shear failure penetrated to the concrete core of the pier.
Asuto Nagamachi 2-chome



Photo 6: Piers of viaducts for the Shinkansen (built in 1982) and the Tohoku Line (built in 2006)
Asuto Nagamachi 2-chome



Photo 7: Fracture of retrofit fiber reinforcement sheet of a pier of the Shinkansen Viaduct
Asuto Nagamachi 2-chome, Taihaku-ku



Photo 8: Shear failure of a pier below the fiber reinforcement retrofit of the Shinkansen Viaduct
Asuto Nagamachi 2-chome, Taihaku-ku

The damage of the Shinkansen Viaducts, shown in Photos 5 to 8, were re-visited on April 6 (Wed) at

Asuka Nagamachi 2-chome. The repair work was completed by this time.



Photo 9: Shinkansen Viaduct, repair work of a pier after the shear failure to the core concrete.

Asuto Nagamachi 2-chome, Taihaku-ku



Photo 10: Shinkansen Viaduct, repair work (injection of plastic resin) below previous fiber reinforcement retrofit.

Asuto Nagamachi 2-chome, Taihaku-ku



Photo 11: Shinkansen Viaduct, right pier after the fracture of fiber reinforcement sheet (see Photo 9), and left pier after shear cracking (see Photo 10).

Asuto Nagamachi 2-chome, Taihaku-ku



Photo 12: Left is the Shinaknsen (1982) viaducts and right is the Tohoku Line (2006) viaducts

Asuto Nagamachi 2-chome, Taihaku-ku



2. Damage in Oritate District, Aoba-ku, Sendai City

The damage was surveyed on April 5 (Tue). In Oritate District, the damage was severe in Oritate 5-chome, to the south west of Oritate Elementary School (see Fig. 1 for locations). Damage of retaining walls and houses were seen attributable to land slide. More than 10 houses were judged to be severely damage, The quick damage inspection was completed in this area; many houses in Oritate 5-chome were determined to be “cautious” or “dangerous.” According to the residents, the land slide occurred in a region of previous dale. The regions with and without land slide are clearly separated in accordance with previous geology.



Photo 1: Failure of retaining walls.
Oritate 5-chome, Aoba-ku



Photo 2: Damage of a house caused by land slide.
Oritate 5-chome, Aoba-ku



Photo 3: Failure of retaining walls.
Oritate 5-chome, Aoba-ku



Photo 4: Damage of road surface.
Oritate 5-chome, Aoba-ku



Photo 5: Failure of road surface.
Oritate 5-chome, Aoba-ku



Photo 6: Fall of concrete block walls.
Oritate 5-chome, Aoba-ku



Photo 7: Fall of masonry walls and damage of a house due to land slide
Oritate 5-chome, Aoba-ku



Photo 8: Ground settlement (80 cm).
Oritate 5-chome, Aoba-ku



Photo 9: Damage of a house due to land slide.
Oritate 5-chome, Aoba-ku



Photo 10: Damage of a house due to land slide
Oritate 5-chome, Aoba-ku



Photo 11: Land slide.
Oritate 5-chome, Aoba-ku



Photo 12: Fall of concrete block walls.
Oritate 5-chome, Aoba-ku



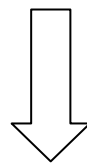
Photo 13: Land slide (previously straight road)

Oritate 5-chome, Aoba-ku



Photo 14: A house of relatively light damage in this area

Oritate 5-chome, Aoba-ku



Detail



Fig. 1: Area Map