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Liquefaction damage in the Tone river basin

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By the 2011 off the Pacific coast of Tohoku Earthquake, a large number of liquefaction occurred in the Tone river basin. By this liquefaction, serious damage including the cutoff of the lifeline, the destruction of the house basics and the nonequivalent subsidence occurred. The liquefaction damage taken up by the news was a small portion. Then we carried out field investigation for the purpose of catching perspective of the liquefaction damage in the Tone river basin.

Investigation areas are Kamisu, Kashima Itako, Namegata, Ryuugasaki, Kawachi, Tone, Toride, Tsukubamirai, Moriya, Joso, Shimotsuma, Yachiyo, Chikusei, Bando, Sakai, Goka, Koga, Yuuki (in Ibaraki Prefecture), Choshi, Tohnosho, Katori, Kozaki, Narita, Sakae, Inzai, Abiko, Kashiwa (in Chiba Prefecture), 28 city areas in total. We carried out the investigation in two days from April 7, 2011 to 8th. After having collected information about the liquefaction at the local government office of each city, the investigation carried out photography, sampling of the sand which spouted out by liquefaction, the hearing to inhabitants in the field.

We divided the Tone river basin into three areas. The characteristics of liquefaction in each area are as follows.

1. Pacific coast area (Kamisu, Kashima, Choshi)

Intense liquefaction was seen in the artificial ground such as the backfill of gravel pit, the backfill of pond. And, intense liquefaction was seen in the dune which was the natural ground, too.

2. Lower part of the Tone river basin (Itako, Namegata, Tohnosho, Katori, Kozaki, Kawachi, Tone)

It was almost the artificial ground where filled up pond and river that intense liquefaction was seen. Liquefaction might occur on the natural ground, but was not reported to local government office.

3. Middle part of the Tone river basin (other cities)

It was almost the artificial ground where filled up pond and river that intense liquefaction was seen. And the liquefaction was seen on the natural ground. But the liquefied area was almost the area of ruins of rice field, and of the topography to gather the water such as small valley region or the exit part of valley.

In addition, by the hearing to inhabitants, the testimony that a intense spout of sand was seen in at the time of the aftershock at 15:15 in comparison with the main shock at 14:46 on March 11 was provided. This suggests the possibility that strong earthquake ground motion occurred at a short interval was promote liquefaction damage.

Keywords: the Tone river basin, liquefaction damage, field investigation