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Distribution of liquefied sites on reclaimed lands in Tokyo during the 2011 off the Pacific Coast of Tohoku Earthquake

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The 2011 off the Pacific Coast of Tohoku Earthquake on March 11,2011,with magnitude 9.0, caused serious damage at the coastal areas in eastern Japan. After the earthquake, liquefaction phenomena of the ground occurred in various parts of flood plains and artificial ground such as reclaimed lands and/or landfills in eastern Japan. The reclaimed lands along Tokyo Bay in Koto city were within the zones seismic intensity 5+ in Japan Meteorological Agency scale, so the author identified total of 198 traces of liquefaction such as sand boiling and/or floating up of buried structures on the reclaimed lands in Koto city; Toyosu, Shinonome, Ariake, Shiohama, Tatsumi and Shin-Kiba.

The hazard map for liquefaction of the ground during the earthquakes, published by the Civil Engineering Center of Tokyo Metropolitan Government in 1987 and 1991, classifies the areas in Tokyo lowlands into three types based on the probability of occurrence of liquefaction; high probability of occurrence, low probability of occurrence and rare occurrence. In order to verify the utility of the hazard map for liquefaction, the author made a comparison between the anticipated areas by hazard map for liquefaction and the liquefied sites observed in this survey. As a result,in 198 traces identified as liquefaction, only 5 % of traces of liquefaction correspond to the areas estimated ”high probability of occurrence,” and 68 % of traces and 27 % of traces of liquefaction correspond to the areas estimated ”low probability of occurrence,” ”rare occurrence,” respectively. Recently each reclaimed land in Koto city has developed rapidly, so its land use has changed markedly. More than twenty years have passed since the hazard map above was released, therefore, the contents of the hazard map for liquefaction need to be reexamined in order to reduce serious damage during future earthquakes.