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High potential part of liquefaction-fluidization in man-made strata of reclaimed land around Tokyo bay, central Japan: based on the geological survey on damaged part on the 2011 off the Pacific coast of Tohoku Earthquake

Kazaoka, O.¹, Nirei, H.², Kagawa, A.¹, Yoshida, T.¹, Ogitsu, I.¹, Kato, A.¹, Kameyama, S.³, Kusuda, T.⁴, Sakai, Y.⁴, Sato, M.⁵ and Shigeno, K.⁶

¹ Research Institute of Environmental Geology, Chiba Chiba city, Japan

² Japan Branch of IUGS-GEM Katori city, Japan

³ Environmental Protection division of Chiba Prefectural Government Chiba city Japan

⁴ Former member of Research Institute of Environmental Geology, Chiba

⁵ Shinko Engineering Co. Chiba city, Japan

⁶ Meiji Consultante Co., Ltd Sapporo city, Japan

Terrible liquefaction-fluidization phenomena happened partially, 10-50 m width and 20-100 m length, with subsidence less than 1m height on the reclaimed land of northern Tokyo bay at the 2011 off the Pacific coast of Tohoku Earthquake. Large amount of sand and groundwater spouted out in the terrible subsided parts. But there are little subsidence and no jetted sand outside the terrible subsided part.

In the reclaimed land in northeastern Tokyo Bay, the remarkable liquefaction-fluidization phenomena were distributed concentratly in zones with 0.5-1km width and northeast trend. Undisturbed continuous core samples took from some cites with different subsidence and thickness of man-made strata for clarifying mechanism of subcdence by liquefaction-fluidization on Inage-Kemigawa district in Chiba city [1][2][3][4].

As a result, the following things became clear. 1) Liquefaction - fluidization phenomena occurred in man-made strata by sand pump method on the bottom sediments of Tokyo bay. 2) The man-made strata are composed of fine-medium sand beds, shell fragment beds, clayey silt beds. These beds often change laterally. Disapper and deformation of lamination by liquefaction-fluidization were recognized partially on fine-medium sand bed. Shell fragment bed and clayey silt bed did not liquefy.

3) Total thickness of liquefaction-fluidization part in man-made strata correlate with amount of subsidence generally. 4) Shell fragment bed with pebble deposited near the outlet of the sand pump. And fine-medium sand deposited on the more down stream side from the outlet. Further mud deposited in the distal part from the outlet. At the construction for making man-made strata, the strata had liquefied and fluidized partially. 5) Terrible liquefaction – fluidization phenomena ware observed near the boundary between thick mud strata and thick sand strata. 6) Degree of subsidence by liquefaction - fluidization increase on the thick part of man-made strata. 7) Liquefaction - fluidization damage concentrates generally on the thick part of the Holocene formation under the man-made strata.

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