

## Geological survey for liquefaction-fluidization phenomena: Geological cross section of man-made strata and mechanism

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Terrible liquefaction-fluidization phenomena happened partially with subsidence, 10-50 m width and 20-100 m length, less than 1m height in northern Tokyo bay reclaimed land on the 3011 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 jetted sand outside of the terrible subsided part (RIEGC, 2011).

Continuous box core samples from surface to 5-7 m depth could be taken at the each 3-5 m length from little subsided part to terrible subsided part in Chiba city. Detailed litho-stratigraphy and liquefaction-fluidization parts were studied on the continuous box core samples and large relief peel on the core samples. These data indicate as follows.

1. The thickness of man-made strata is 5-7 m. The thickness increases to subsided part.

2. Man-made strata is composed of Dumped Association, Upper Filling Association and Lower Filling Association. Two Filling Associations were made by sand pump method from bottom sediments in the Tokyo bay. Upper Filling Association consists of lowermost, lower, upper and uppermost bandle.

3. Litho-facies of each man-made strata is as follows.

Dumped Association: This association is composed of 1.5-2.2 m thick sandy silt to silty fine sand layers with siltstone brocks and rock gravels. Sand dike with yellowish brown sand and gray sand distribute rarely

Uppermost Bandle of Upper Filling Association: this bandle is composed of 0.2-0.8 m thick yellowish brown laminated fine-medium sand layers. Upper part of this bandle lost primary sedimentary structures and loose. The base of this bandle consists of laminated coarse-very coarse sandy shell fragment layers.

Upper Bandle of Upper Filling Association: This bandle is composed of 0.4-1.8 m thick gray medium sand layers. Shell fragment layers often interbedded in this sand layers. The sand layers lost primary sedimentary structures and very loose.

Lower Bandle of Upper Filling Association: This bandle is composed of 0-1.8 m thick gray silt layers. Lower part of the silt layer sometimes show slump structures.

Lowermost Bandle of Upper Filling Association: This bandle is composed of 0.7-1.8 m thick gray shelly medium sand layers. Shell fragment layers often interbedded in the shelly sand later. Top of this bandle consists of loose medium sand without primary sedimentary structures. The medium sand injected in the upper silt layers.

Lower Filling Association: This association is composed of 0.5-3.5 m thick yellowish gray laminated relatively dence matrix free good sorted fine-medium sand layers. This association may deposited removed filling sand by wave action on shoreface.

4. Liquefaction-fluidization parts are in man-made strata, top of the lowermost bandle, upper bandle and uppermost bandle of the Upper Filling Association.

5. Subsidence part distribute in thin part of lower bandle and thick part of upper bandle of the Upper Filling Association. The aboves show that subsidence concern with the liquefaction-fluidization part of the upper bandle of Upper Filling Association.

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