

Rest research regarding earthquake resistant design method of underground structures considering large scale earthquakes.

(Part 1)

[Point]

Present design method against uplift of underground structures by liquefaction, is decided with the safety rate checking based on power balance, and is not always matching with actual seismic phenomenon. Rational earthquake resistant design method and measure method of underground structures considering liquefaction of ground in large scale earthquakes are necessary. Then, in this research, objecting dynamic centrifuge model test result, we examined displacement prediction method of uplift by liquefaction, as well as examined applicability of sheet-pile cofferdam method as uplift measure construction.

As a result, we proposed uplift displacement prediction formula, which was formulated accordance with the fact that ground resistance, which is proportional to uplift speed, can operate as uplift resistance. Moreover, we clarified general possibility of prediction of uplift amount of test result by proposing formula. In addition, regarding design method of sheet-pile cofferdam method, which is used as uplift measure of underground structures, we proposed more rational design method than current one, which makes seismic soil pressure operate, corresponding to sheet piles stiffness.

Keyword: underground structures, liquefaction, uplift, sheet-pile cofferdam, centrifuge model test