

Numerical reproduction of wave-induced seabed liquefaction and solidification

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Miyamoto et al. [1] experimentally demonstrated the sequential wave-induced seabed behavior from liquefaction to solidification (consolidation under continuous wave loading) as shown in Fig.1 and Fig.2a); Fig.1 shows their experimental apparatus and Fig.2a) depicts time history of measured excess pore water pressure at the four vertical locations A-D, which are denoted in Fig.1. This behavior, however, has not been reproduced numerically by most of the previous studies, which employed elastic constitutive models for seabed soil. On the contrary, we could reproduce the sequential elasto-plastic seabed behavior using the soil-water coupled analysis code **GEOASIA** [2] with SYS Cam-clay model as shown in Fig.2b). Using the numerical analysis code, we will evaluate instability of offshore infrastructure due to seabed deformation in a future study.

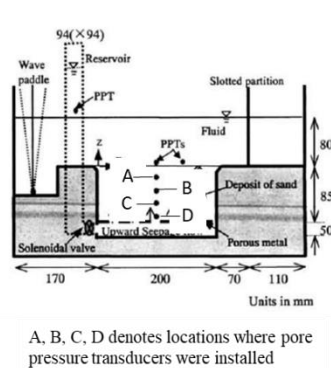
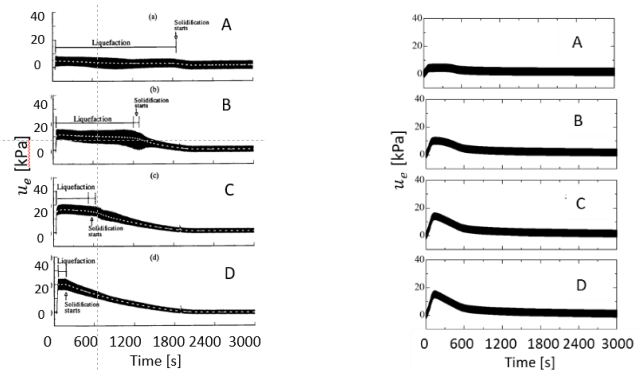


Figure 1.* Sketch of experimental apparatus [1]

* modified from the original figures



a)* Experimental result [1]

b) Our numerical result

Figure 2. Time history of excess pore water pressure u_e at four vertical locations A-D

References

- [1] J. Miyamoto, S. Sassa and H. Sekiguchi: Progressive solidification of a liquefied sand layer during continued wave loading. *Géotechnique*, Vol.54, No.10, pp. 617-629, 2004.
- [2] T. Noda, A. Asaoka and M. Nakano: Soil-water coupled finite deformation analysis based on a rate-type equation of motion incorporating the SYS Cam-clay model, *Soils and Foundations*, Vol.48, No.6, pp. 771-790, 2008.