**Investigating the influences of Various Complexity of Hydrogeological Models on Pore Water Pressure Distribution Due to Seismic Wave Propagation**

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**Abstract**

Several types of seismic wave propagate through sediment and rock media when an earthquake occurs. The propagation speed and pattern are different in different media due to their properties. Traditional studies conducted research on seismic wave propagation commonly uses the perfect soil layer system (e.g., Huded *et al.* (2020)). To assess the effect of uncertainty in the hydrogeological model on pore water pressure due to wave propagation, various complexity of hydrogeological models will be constructed using synthetic models and a real case model. Homogeneous, perfect layer, and heterogeneous hydrogeological models will be constructed, respectively. A UBC-sand model-based software of Midas GTS NX is adopted to simulate seismic waves in a fully saturated porous medium. UBC-sand is a simple elastoplastic model for simulating the liquefaction phenomenon for the sand material. The spatiotemporal distributions of the acceleration, displacement, and pore water pressure for the synthetic hydrogeological models are shown. The acceleration is different in different depths and the plastic response of UBC-sand render the permanent horizontal displacement. Pore water pressure in the sand material increases gradually and reaches the maximum value after liquefaction occurred. The time for pore water pressure reaches the maximum value is different for each hydrogeological model. The pore water pressure distribution obtained from the simulation of wave propagation can be used to assess soil liquefaction.

**Keywords:** Hydrogeological model, Uncertainty, Seismic wave propagation, Excess pore water pressure, **S**oil liquefaction