



Ph.D.ICEAA

Ph.D. Program in Civil, Building Construction
and Environmental Engineering

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Implementation of a new liquefaction potential assessment linking SPT and Vs data to address soil density and fabric effect

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Abstract

A new liquefaction potential evaluation method using both Standard Penetration Test (SPT) and shear wave velocity (V_s) data is proposed in consideration of the effects of density and soil fabric on liquefaction characteristics. Through a series of chamber tests, it has been confirmed that for specimens created under the same density and confining stress level but of different soil fabric as reflected from V_s values, the measured SPT blow counts (N-value) did not change with different V_s at the given relative density.

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This motivates research on developing an improved evaluation approach based on both SPT and V_s results to clarify the relative contribution of density and soil fabric, which is important to liquefaction resistance.

Liquefaction resistance estimated from existing SPT-based approaches is taken as reference field resistance representing mainly density effect and a corresponding normalized V_s value could be back-calculated from V_s -based triggering curves. To account for the soil fabric influence, the back-calculated V_s is compared with the field measurement and a revised in-situ CRR is determined through the Kiyota et al (2019) empirical V_s -CRR relationship where the relative density is normalized. The applicability of the new method is demonstrated through liquefaction case histories collected in Japan.

About the Speaker



Joanne Kwok-Kwan LAU is now pursuing her PhD studies in geotechnical engineering at the University of Tokyo, Japan. Graduated from the University of Hong Kong in 2017, she went to Imperial College London, UK to undertake the MSc course in Soil Mechanics and Engineering Seismology. Afterwards, she worked as an assistant geotechnical engineer for Ove Arup & Partners (Hong Kong) for three years.

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