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Estimation of Shear Wave Velocity from Cone Penetration Test for Structured Busan Clays

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Abstract : The degree of structuration of Busan clays at the mouth of Nakdong River mouth was highly influenced by the depositional environment, i.e., flow of the river stream, marine regression, and transgression during the sedimentation process. As a result, the geotechnical properties also varies along the depth with change in degree of structuration. Thus, the in-situ tests such as cone penetration test (CPT) could not be used to predict various geotechnical properties properly by using the conventional empirical methods. In this paper, the shear wave velocity (Vs) was measured from the field using the seismic dilatometer. The Vs was also measured in the laboratory from high quality undisturbed and remolded samples using bender element method to evaluate the degree of structuration. The degree of structuration was quantitatively defined by the modulus ratio of undisturbed to remolded soil samples which is found well correlated with the normalized void ratio (e0/eL) where eL is the void ratio at the liquid limit. It is revealed that the empirical method based on laboratory results incorporating e0/eL can predict Vs from the field more accurately. Thereafter, the CPT based empirical method was developed to estimate the shear wave velocity taking the effect of structuration in the consideration. The developed method was found to predict shear wave velocity reasonably for Busan clays.

Keywords : level of structuration, normalized modulus, normalized void ratio, shear wave velocity, site characterization
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