

Comparison and Improvement of the Existing Cone Penetration Test Results: Shear Wave Velocity Correlations for Hungarian Soils

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Abstract : Due to the introduction of Eurocode 8, the structural design for seismic and dynamic effects has become more significant in Hungary. This has emphasized the need for more effort to describe the behavior of structures under these conditions. Soil conditions have a significant effect on the response of structures by modifying the stiffness and damping of the soil-structural system and by modifying the seismic action as it reaches the ground surface. Shear modulus (G) and shear wave velocity (v_s), which are often measured in the field, are the fundamental dynamic soil properties for foundation vibration problems, liquefaction potential and earthquake site response analysis. There are several laboratory and in-situ measurement techniques to evaluate dynamic soil properties, but unfortunately, they are often too expensive for general design practice. However, a significant number of correlations have been proposed to determine shear wave velocity or shear modulus from Cone Penetration Tests (CPT), which are used more and more in geotechnical design practice in Hungary. This allows the designer to analyze and compare CPT and seismic test result in order to select the best correlation equations for Hungarian soils and to improve the recommendations for the Hungarian geologic conditions. Based on a literature review, as well as research experience in Hungary, the influence of various parameters on the accuracy of results will be shown. This study can serve as a basis for selecting and modifying correlation equations for Hungarian soils. Test data are taken from seven locations in Hungary with similar geologic conditions. The shear wave velocity values were measured by seismic CPT. Several factors are analyzed including soil type, behavior index, measurement depth, geologic age etc. for their effect on the accuracy of predictions. The final results show an improved prediction method for Hungarian soils

Keywords : CPT correlation, dynamic soil properties, seismic CPT, shear wave velocity

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