

Geo-Institute of ASCE 2018-2019 Cross-USA Lecture

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Geocharacterization using the seismic piezocone test

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Abstract

Towards geotechnical site characterization, seismic piezocone penetration testing (SCPTu) offers up to five separate measurements with depth from a single sounding: cone tip resistance (q_t), sleeve friction (f_s), porewater pressure (u_2), time rate dissipation (t_{50}), and shear wave velocity (V_s). Thus it is an expedient and economical means for obtaining stratification of the ground and the determination of a variety of soil engineering parameters for analysis and design, including nonlinear stress-strain-strength curves for clays and sands. Calibration and documentation of selected geoparameters are presented with statistical datasets, including the effective stress friction angle and profile of yield stress (preconsolidation) of all soil types. This has applications in analytical and numerical modeling simulations and relevance in both soil mechanics and soil dynamics, including screening of soil liquefaction behavior. A number of case studies are presented to show the utilization and relevance of SCPTu in geotechnics. The talk also presents some new developments in equipment, procedure, and versatility.