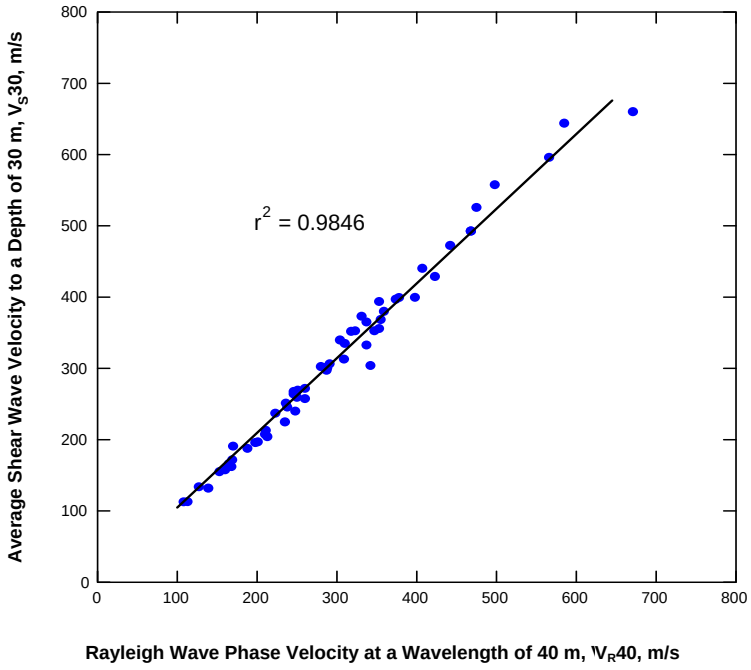
V_S30 METHOD

GEOVision geophysical services

Overview

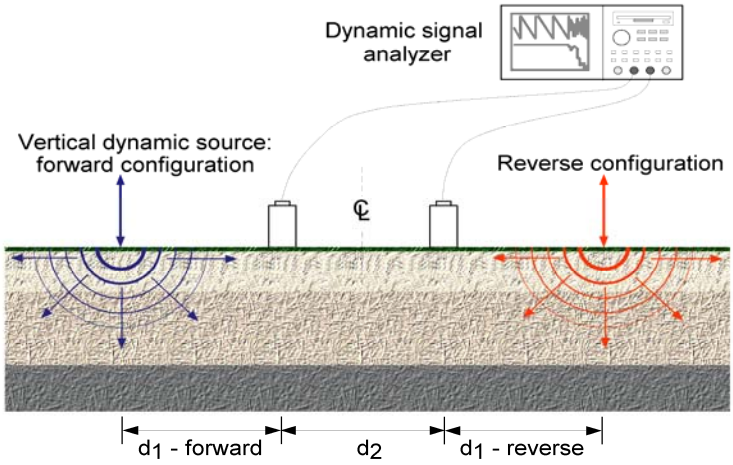
Shear-wave velocity, V_S, is an important parameter for evaluating dynamic behavior of soil. V_S averaged over the top 30m of soil is referred to as V_S30. Both the *NEHRP Provisions* and the *Uniform Building Code* use V_S30 to classify sites according to type of soil for earthquake engineering design.

The new V_S30 method is a simplification of the Spectral Analysis of Surface Waves (SASW) method. It provides only a single number for the average shear-wave velocity in the top 30m. The simplified method is based on the correlation between Rayleigh-wave phase velocity and V_S30, as shown at left.



Procedure

Only the phase velocity of a 40m long Rayleigh wave, V_R40, is needed to estimate V_S30, so the standard SASW testing procedure is modified. Only one receiver spacing is used, instead of an expanding spread. The field setup is shown below.



A dynamic source on the surface generates Rayleigh waves, which are monitored by a pair of geophones. After V_R40 is calculated from the phase difference between the two geophones, an empirical predictive equation is applied to estimate V_S30. The accuracy of the estimate is +/-10%.

Key Benefits

The new V_S30 method is non-invasive and nondestructive. It is a promising, cost-efficient alternative to borehole measurements for V_S30. The method is simple, robust, and can be performed quickly, making it an ideal standard engineering test. Applications include site characterization and seismic hazard mapping. It could be used for a detailed characterization of a large site in order to focus a drilling program.

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