**VS30 METHOD**

**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, \( VR40 \), 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 \( VR40 \) 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.