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Shear wave velocity profiles determined from the inversion of surface wave velocity data

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Surface wave velocity measurements are a non-destructive and non-intrusive means to determine the shear wave velocity (VS) profile at soil sites. The VS profile is a primary input for site amplification calculations and is also used in the International Building Code to determine site classification. In many cases, surface wave measurements are performed at sites where complicating conditions exist, such as velocity inversions or embedded stiff layers. The purpose of this research is to investigate the effectiveness of surface wave inversion procedures at complex geotechnical sites. This was accomplished by using simulated surface wave measurements at both simple and complex soil sites. The stimulated surface wave data was analyzed using the Spectral-Analysis-of-Surface-Waves (SASW) method and a linearized least-squared inversion approach was performed to estimate the VS profile. Comparisons are presented between the actual and inverted VS profiles for several common complex geotechnical profile conditions.