Engineering Geophysics

Down-hole engineering seismology at BSU is focused on the in situ measurement of soil properties. Joint inversion of body wave amplitude decay and velocity dispersion has resulted in the determination of both soil stiffness and damping under a Kelvin-Voigt constitutive model. While viscous damping appears to dominate the loss mechanism below the water table (at frequencies in the 10 to 100 Hz range), results in the vadose zone have suggested that non-viscous effects may dominate in dry soils.

Down-hole surveys in sites subject to sparging of the ground water have also yielded interesting results. Entrapped air has been shown to substantially increase the propagation velocity of SH-waves. At this time, it is not yet clear whether the velocity increase is principally due to an increase in stiffness, an increase in damping, or a change in the stress conditions which also affect wave propagation velocity.

Other engineering geophysics activities include the use of refraction and surface waves to help solve problems in civil engineering. These include foundation studies, non-destructive testing, and problems in slope stability.

**Selected References**


