

Geophysics and Geology

Seismic Refraction

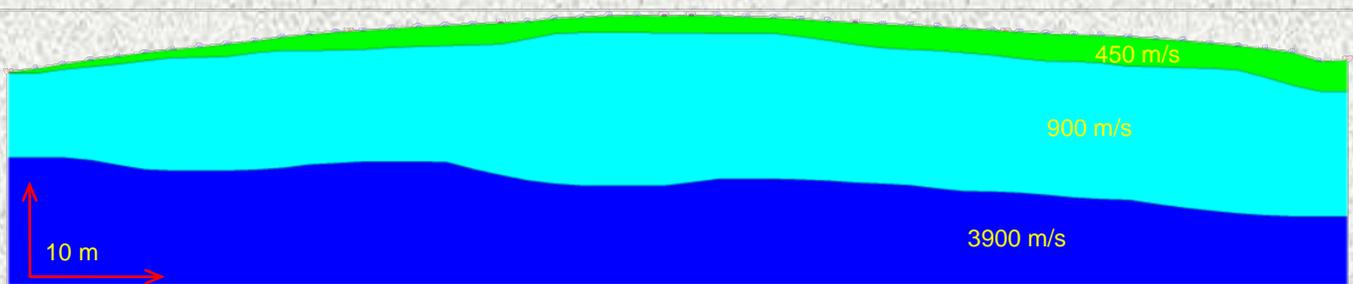


Refraction seismic methods utilize arrays of low-frequency transducers (geophones) in conjunction with recorders (seismographs) to measure the travel of sound waves in the earth. These seismic waves are generated via impact sources, such as sledge hammers, shotgun shells or small explosive charges.

The method is well-suited to delineation of bedrock surfaces and water table. Empirical estimates of ripping ability and earthwork factors may also be obtained from the seismic velocities of soil and rock layers.

Many techniques are available to interpret refraction data. At Caltrans, standard interpretation of refraction seismic data uses a layered approach known as the Generalized Reciprocal Method (GRM).

GRM provides a significant improvement over simpler layer-cake interpretation models, with the advantage that refractor depths are calculated across the entire profile, instead of just at the shot points. This provides a more robust model that better represents undulating refractor surfaces and structures with steeper dips. Another advantage over simpler models is that the GRM can accommodate lateral variations in layer velocity, enabling recognition of structural or facies changes within a designated layer.



More information on seismic refraction is available from the Federal Highway Administration at the following link:

<http://www.cflhd.gov/resources/agm/geoApplications/SurfaceMethods/92SeismicMethods.cfm>