

Geophysics and Geology

Using Borehole Geophysics



Borehole geophysics is used to collect unbiased and continuous measurements of borehole conditions and surrounding formations. The tools passed through the hole typically sample a larger volume of soil and rock than core and drill cuttings. The resulting data can correlate between boreholes and can obtain valuable information from boreholes where no soil or rock samples exist.

Borehole geophysics measures physical properties using sources and receivers suspended in a borehole. A number of different borehole geophysical tools are available for measuring specific physical properties. The choice of logging tools is dependent upon the site-specific geology, borehole conditions and data needs for each project.

Borehole geophysics, used as an adjunct to drilling, may minimize the number of needed boreholes and reduce required lab analyses. This in turn can reduce design and construction costs by providing more thorough site characterization and reducing construction claims. Since these methods provide continuous measurement along the length of the borehole, they can augment discrete information obtained from lab analysis of core data. By calibrating the geophysical response with the data obtained from a representative number of cored holes, the amount of coring needed to characterize a site may be reduced substantially, with a corresponding reduction in cost.

As with surface geophysical techniques, borehole geophysical logging is susceptible to external interference and borehole conditions (collectively referred to as noise). Borehole geophysical noise is usually less problematic compared to noise associated with surface surveys. However, the effect of noise on borehole logging must be assessed and appropriate measures taken to reduce any undue influence.

More information on borehole geophysics is available from the Federal Highway Administration at the following link:

<http://www.cfhd.gov/resources/agm/geoApplications/GeophysicalBoreholeMethods.cfm>