

HRSWR METHOD



HRSWR – High Resolution Shear Wave Reflection

Overview

The overall goal of the High Resolution Shear-Wave Reflection is to use shear waves generated from a surface source to provide an acoustic image of the subsurface. The main benefits of this method are:

- shear-waves are slow, providing better resolution
- they are oriented horizontally, allowing discrimination against many urban surface sources
- they do not pass through air or water, allowing better imaging of voids, and
- they are not subject to shallow ground water the way P-wave methods are, so they can be used in areas with shallow ground water.

GEOVision uses Bay Geophysical's patented "Micro-Vibrator" technology to provide a high energy source. Depth of investigation varies depending on the soil characteristics and background noise, but 150 ft in urban settings is not uncommon.

GEOVision geophysicists use the HRSWR method to:

- Map subsurface stratigraphy
- Locate deeply buried pipes
- Locate voids near buried structures
- Map buried paleo-channels
- Map faults in sedimentary layers
- Map fractures

Measurements

HRSWR field programs are characterized by very high density of data, with sensor spacing as small as one foot. The length of each line depends on the target size and depth.



Processing and Analysis

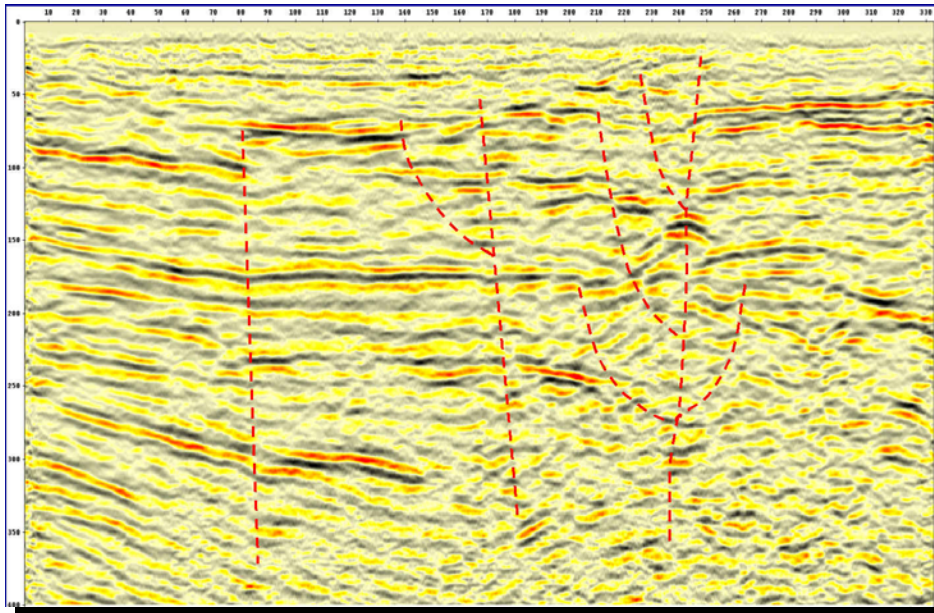
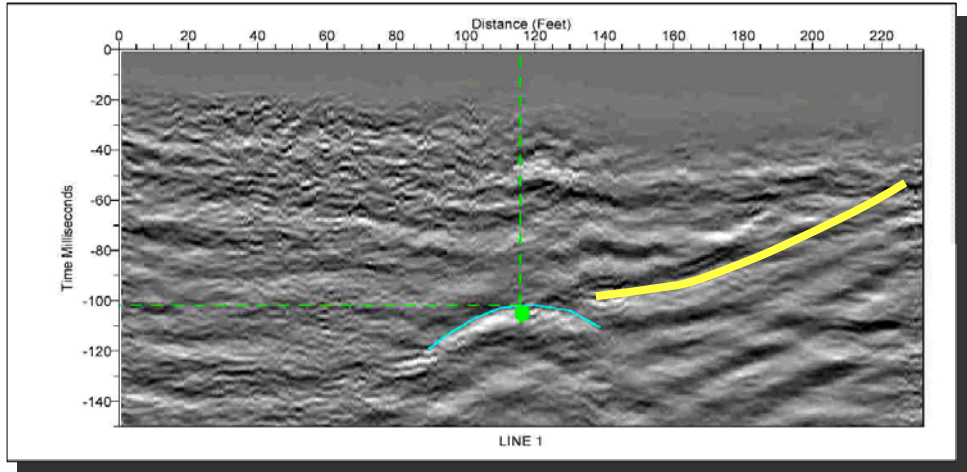
GEOVision geophysicists typically outsource the seismic processing for this application. Processing steps generally applied to reflection data include format conversion, trace editing, pre-processing (description of field geometry), spectral whitening or deconvolution, velocity analysis, surface consistent statics, velocity analysis, normal moveout corrections, prestack filtering, prestack gains, residual statics, and migration.



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Example Results

The figure at the right illustrates the vibration results for a Pipe Location project in San Pedro, California. In this application a 54" storm drain was imaged at 45ft depth. The yellow line shows the sloping edge of a buried channel. Note the "radar-like" quality of these images, at 45ft deep!



The figure at the left illustrates a Fault Location study conducted on an urban college campus in West Los Angeles. The fault is the Newport Inglewood Fault, and the depth of investigation is about 150-200ft

The image at the right shows a buried channel in Nebraska.

