

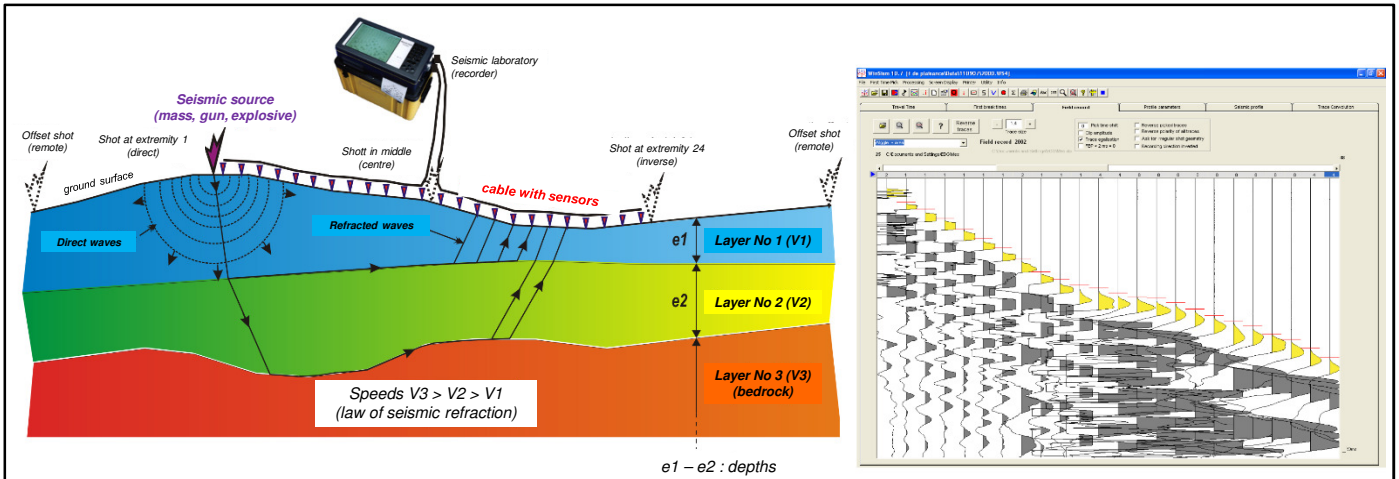


SOLDATA
GEOPHYSIC

LAND SEISMIC REFRACTION



AGAP Approval of Quality: Seismic Refraction
ASTM Standard D5777

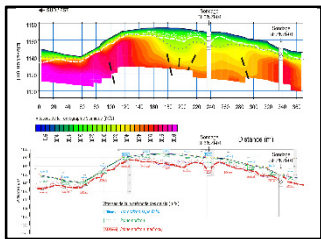


Seismic refraction is a non-destructive system for interpreting the properties of soils, and the depth to bedrock, by analysing variations in seismic velocities corresponding to transmission rates in a solid medium (shock waves).



Applications

- Locating and assessing the volume and extent of mineral deposits / quarries for possible exploitation
- Tracing the top of bedrock
- Creating an image of an area of ground - reconstructing an internal structure of the ground
- Evaluating the elastic properties of the soil
- Landslides
- Structures - Geotechnics - Foundations
- Can also be implemented in a borehole



The principle of the method is to measure the arrival time of the compression waves (P) from an artificial source (dropped weight, air-gun, hammer, weight, explosive) according to certain distances. The most compact materials (rock) show high speeds, compared with low speeds in unconsolidated materials (alluvium).

The seismic refraction measurements are carried out along longitudinal profiles of multiple aligned sensors (geophones), with different impacts positioned along the profile.

The tally of first arrivals of seismic wave P is performed with SeisImager v3.14 (OYO Corporation) and WinSism v14 (W_Geosoft) software.

The results, corresponding to the speed of propagation of the compression wave, in the form of tables or sections, allow areas of contrast between materials of different density and alteration to be highlighted. Acquisition profiles are positioned relative to investigation boreholes in order to calibrate the data according to a known geology. Recommendations can be made regarding the situation studied.

Legend

1. Sketch of principle with data processing
2. Measurement with an explosive source
3. Results – probable structures or top of bedrock

Key figures

- Depth of investigation from 0m to 100m depending on the site geology and the length of the measuring device
- The unit used for seismic velocity is metres / second (m/s) or kilometres / second (km/s)
- The method achieves an accuracy ≤ 10%

SDG Equipment

- Seismograph (Geometrics / Seismic Source 24 channels)
- Multiconductor cables with receivers spaced 1 to 10m
- Seismic source: mass, dropped weight (PEG40), explosives