

MASW2D SEISMIC METHOD FOR URBAN TUNNELING DESIGN

MASW2D method is a high-resolution S-wave surveying that involves the acquisition of multiple records (24 or more channels) with the same **source-receiver** configuration moved successively by a fixed distance interval (a few to several stations) along a linear survey line. Acquired records then go through the dispersion-inversion processing to produce a 1-D (depth) Vs profile. All these 1-D profiles are then assembled according to the surface coordinate at the midpoint of the spread used to acquire the corresponding record and then the final 2-D map is constructed by using a spatial interpolation scheme (See the example of Figure 1). MASW2D has many advantages for urban tunneling design :

- 1.Can be collected next to traffic
- 2.The acquisition is relatively quick on pavement (with proper equipment, see later)
- 3.It is not affected by buried, overhead utilities
- 4.It provides a physical property useful for design (shear wave velocity –stiffness).
- 5.As the shear wave velocity is a direct indication of the stiffness of subsurface materials, MASW2D method is applied in urban environment for:
- 6.Investigating Karst and Sinkhole Features
- 7.Determining Depth to Rock and Rock Quality
- 8.Mapping Weak Soil Zones
- 9.Locating Fracture Zones

Depth of investigation depends on the geophones spacing; with **active and passive** acquisition, survey can reach a depth of 50-60 m (spacing of 2 or 3 m).

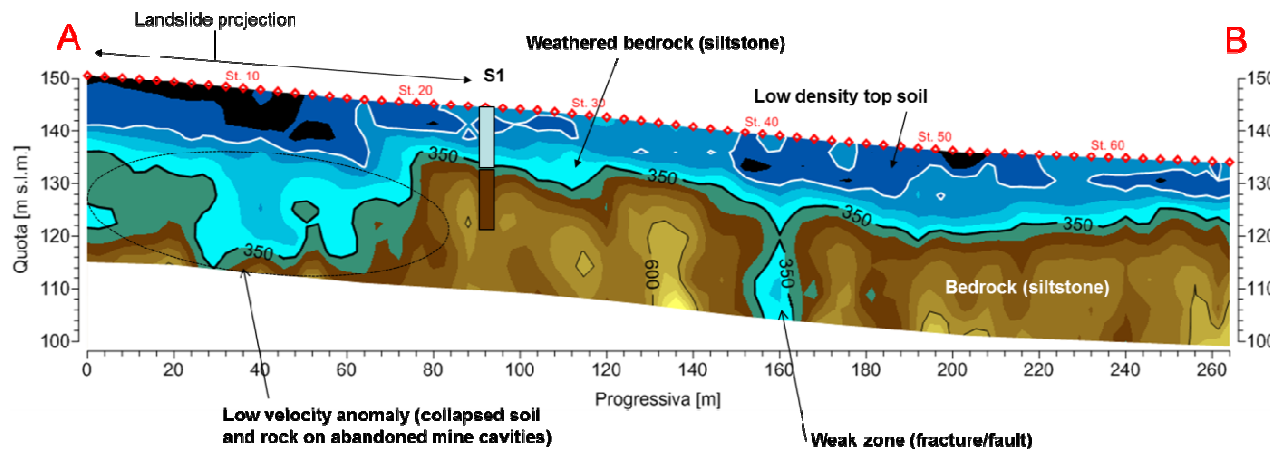


Figure 1 – MASW2D section on a roadside to detect zones of weakness in the bedrock (geophones spacing = 2 m; number of geophones on a mobile land streamer = 24). The stratigraphic layering has been calibrated with borehole logging.

Figure 2 - Land Streamer with regular spaced geophones

