

SEISMIC SURVEY IN URBAN ENVIRONMENT MASW2D METHOD

The geological and geotechnical characterization of the first subsoil in urban areas (under the paved roads) by means of geophysical survey is strongly influenced by the following reasons: a) in the urban environment there is an electromagnetic “noise” (i.e., the presence of cable or metal pipes) can cause severe disturbance to the geoelectric or electromagnetic surveys; b) the need to reduce the time of data acquisition, to minimize the interruptions of traffic.

The geophysical survey that best meets these conditions is the method MASW2D, a two-dimensional model derived from the analysis of multichannel surface waves (waves of Rayleigh, shear waves).

Compared to the seismic refraction method, the MASW2D presents numerous advantages: a) the energy produced by the seismic source propagates in the form of surface waves (rayleigh waves); in this way, also a source of modest energy (low-impact energizer) can reach significant depths (30 - 40 m); b) the shear waves are not affected by the saturation of materials (unlike the waves of compression, whose velocity increases significantly in the saturated soils); c) the method MASW2D also highlights reversal velocity (layer with low velocity below layer of high velocity)

A comparison of the seismic refraction method and the method MASW2D (relative to a survey carried out on a road for the project of an underground train, Turin - 2009) is shown below. It is quite clear how seismic refraction survey tends to mediate the velocity of the subsoil, while the MASW2D section highlight the stratigraphic contacts with greater precision. For the acquisition of the MASW2D data MASW2D we used a a mobile device (string of geophones equally spaced towed by a van). We used a medium weight seismic source has been obtained by means of a seismic source heavy weight mounted on a light truck. On average, in one day it is possible to acquire high detailed data of 700-800 linear meters per day.

