Geotomographie

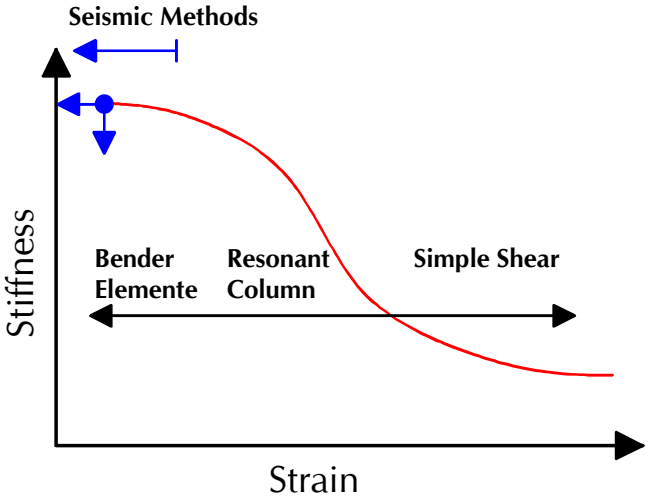
Equipment Design	Consulting	Software	Rental

Dynamic Soil Properties

For new constructions or reconstructions, a complete description of the ground is needed including the site history and long-term loads the soil was exposed to (e.g. consolidation, creeping, maturing). In this context, the prediction of ground deformation is one of the most important topics in geotechnical engineering, where the prediction requires the knowledge of soil stiffness.

In most cases local site tests such as Cone Penetration Tests (CPT) and load bearing tests as well as laboratory tests are used to estimate stiffness. However, due to the assumption of homogeneity of subsurface conditions, inherent in most interpretation methods, significant uncertainties and errors may be introduced since in almost all cases subsurface structures and parameter distributions are highly heterogeneous.

An alternative for a spatial continuous characterization of the subsurface is the use of geophysical methods.

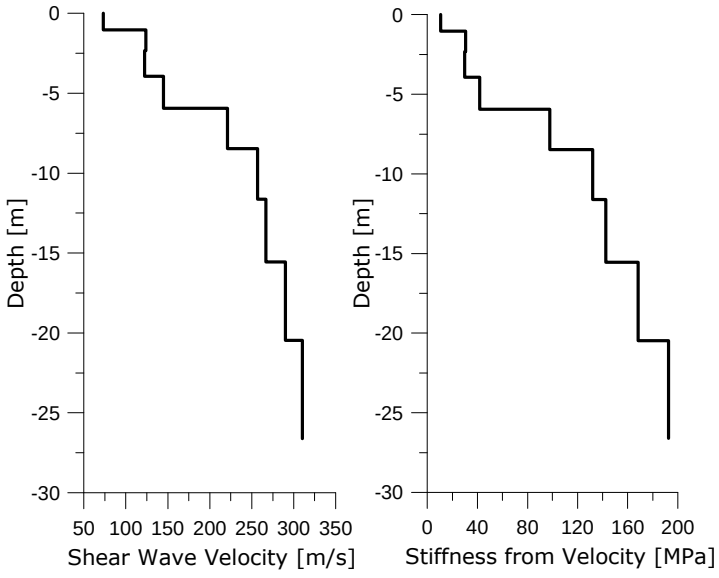


It is known that soil stiffness is shear strain dependent. Soil stiffness increases with increasing load stress and depth. Further, stiffness depends on the long-term load history of the site and on the resulting deformation of the soil. Due to new load stress, the soil strain level and therefore the soil stiffness will change leading to a decrease in stiffness with increasing shear strain (left picture, red line).

In order to provide soil parameters such as stiffness as input to geotechnical numerical models, depth dependent stiffness profiles are needed. As these parameters are strain dependent, they have to be described for a wide range of shear strains. Among these, starting values are needed, i.e. maximum stiffness at small shear strain.

Seismic geophysical methods provide these data.

There are several seismic methods applied on surface (MASW) or in boreholes (Crosshole Testing, VSP) to access the ground stiffness with depth by indirect measurements.



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