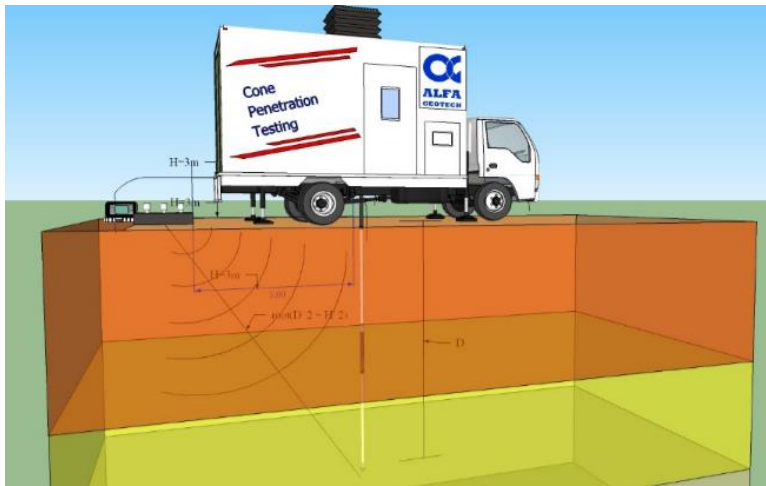


Simplified Diagram of Seismic Cone Test



CPT Truck



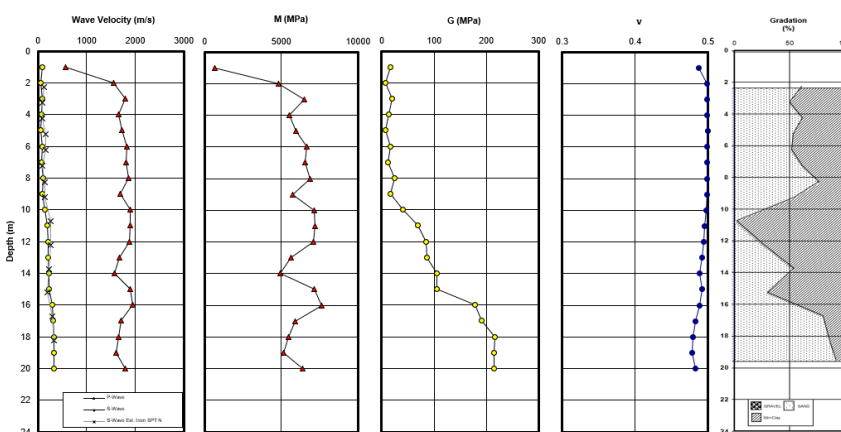
Seismic Cone



Downhole seismic test is a rapid cost-effective method for directly measuring shear wave velocity of in-situ soils. In this test the arrival time of primary (P) and Secondary (S) Seismic wave are measured which is used for determination of internal velocities and estimate the important geotechnical constants like Poisson's ratio, shear modulus, bulk modulus and Young's Modulus. These shear waves velocities measurements are used in geotechnical foundation analysis, static and dynamic soil analysis, liquefaction assessment, earthquake generated ground movement, behaviour of offshore structures due to wave loading and many more. This test is conducted as per ASTM D7400 "Standard Methods for Downhole Seismic Testing".

Seismic Cone test can be conducted during cone penetration test. Here, to conduct seismic shear wave test, the penetration of cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send shear wave into the soil from the sources located on the surface. The arrival time (t) is recorded along with the distance from source to geophone. To calculate the shear wave interval velocity for given soil layer, a minimum of two tests need to be conducted. The velocity (v) is calculated accordingly with the ratio of difference in time (Δt) to difference in depth (Δd) given by simple equation: $v = \Delta d / \Delta t$.

Results



A time-depth graph and velocities-depth can be obtained for P and S waves. Based on the values of P and S waves, the Poisson's ratio, constrained and shear modulus of the soil can be determined.