



Evaluation of Soil Bulk Density from Shear Wave Velocity Profile

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Conventional methods for determination of soil compaction characteristics are tedious, time consuming and generally expensive in nature. For these reasons geophysical methods have become better alternatives for soil investigation works involving soil compaction evaluation when large numbers of repetitive tests are required. The objective of this study is to compare the bulk density and shear wave velocity profile obtained from SASW technique. The Spectral Analysis of Surface Waves (SASW) tests were also conducted at four locations in the field to obtain shear wave velocity (VS) profiles using WinSASW 3.2.10 software. The density of these soils were measured using Sand Replacement method in the field. For both methods, a depth of 1-1.1m from the surface were considered. To convert the shear wave velocity into the density of soil, two empirical equations of Keceli (2009) and Potter and Stewart (1998) were used. After analyzing the results it was found that there is a very negligible offset in the soil density obtained from the shear wave velocity from the density obtained from the sand replacement test. In most cases the density from the shear wave velocity is slightly lower than the density from conventional method. Despite of many uncertainties, the pattern of the density profile is quite similar in both methods. Also the standard deviations and variances is slightly low for the densities from shear wave velocity compared to the conventional methods. This study will help to evaluate bulk density of soil in an efficient, fast and cheap way.