DIV. 5002019 ONTARIO LTD

Seismic Site Class
Subject to Change Without Notice

MEASURING SEISMIC SITE CLASS

Introduction

Structural Engineers design buildings for seismic events such as earthquakes based on seismic site class.

Site Class	Soil Profile Name	Average Properties in Top 30 m as per Appendix A		
		Soil Shear Wave Average Velocity, $\overline{V}_s$ (m/s)	Standard Penetration Resistance, $\overline{N}_{60}$	*Soil* Undrained Shear Strength, s_u
A	Hard Rock	$\overline{V}_s > 1500$	Not applicable	Not applicable
B	Rock	$760 < \overline{V}_s \leq 1500$	Not applicable	Not applicable
C	Very Dense Soil and Soft Rock	$360 < \overline{V}_s < 760$	$\overline{N}_{60} > 50$	$s_u > 100$kPa
D	Stiff Soil	$180 < \overline{V}_s < 360$	$15 \leq \overline{N}_{60} \leq 50$	$50 < s_u \leq 100$kPa
E	Soft Soil	$\overline{V}_s < 180$	$\overline{N}_{60} < 15$	$s_u < 50$kPa
E		Any profile with more than 3 m of *soil* with the following characteristics: ▪ Plastic index PI > 20 ▪ Moisture content w ≥ 40%, and ▪ Undrained shear strength $s_u < 25$ kPa		
F	Others[1]	Site Specific Evaluation Required		

Measuring Site Class

Since site class is based on the shear wave velocity in the upper 30m (100 feet), how do your measure it?

Method 1 – Based on correlations to Standard Penetration Tests. While such tests are common, they often reach no deeper than 9m.

Method 2 – Based on measurement of shear wave velocity between adjacent boreholes. This is time consuming and costly in an urban setting. Seismic noise must be generated.

Method 3 – Seismic profiling by MASW. This method requires an active seismic noise signal to be generated.

Method 4 – Conventional Seismic profiling by means of a generated large seismic noise signal (heavy equipment, explosive). This is costly.

Method 5 – ReMi – uses ambient noise in the environment to measure the seismic profile. This is a quick and inexpensive method.

Timing

All the above methods can be used to provide feedback on seismic site class. V.A.S.E. Pro use method 1 and 5 and provide the following information on timing: Method 5, ReMI can often be carried out in less than a day on relatively short notice. Method 1, testing by blow counts and boreholes can take several weeks.

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