

Correlation Between SPT and PMT for Sandy Silt: A Case Study from Kuala Lumpur, Malaysia

Abstract

In this study, the pressuremeter modulus (E_M) and the unload–reload modulus (E_{ur}) consisted of a wide range of data were correlated to blow counts (N_{60}) using a maximum of 50 blows/300 mm and the extrapolated N_{60} of 300 blows/300 mm. A 3D model and statistical analysis were used to provide relevant justifications for the selection of this extrapolation method, considering that N_{60} was limited to 50 blows. In generating a 3D model, the N_{60} profile was developed using the inverse distance weighting method for predicting unsampled data between boreholes. Correlations were established for the sandy silt soil type that was observed as the dominant lithology in the Klang Valley Mass Rapid Transit line 1 project in Kuala Lumpur, Malaysia. A total 52 pressuremeter test and standard penetration test data pairs were obtained at depths ranging from 6 to 41.7 m within the Kenny Hill Formation (KHF) and the contact zone between the KHF and the limestone formation. This contact zone has shown distinct geological features with the characteristic of a lower N_{60} value underlying stiff strata. According to the E_M/E_{ur} ratio, the maximum value of 7 indicated that this zone is unpredicted in initial and unload–reload stiffness compared to the non-contact zone (the KHF only), with a maximum ratio of 3. Therefore, separate correlations were established to distinguish these zones. Strong correlations between N_{60} and E_M were identified by splitting these zones. The proposed correlation was then compared with the previous research.

Keywords

Kenny hill formation; Pressuremeter test; Sandy silt; Standard penetration test