

**CHARACTERIZATION OF SOIL PROPERTIES  
USING**



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## **ABSTRACT**

Soil is a complex engineering material by nature that formed by a combination of various geologic, environmental and physical-chemical processes. The inherent variability of soil and thus its uncertainty has been treated as a perpetual component in geotechnical design and construction that needs careful evaluation. Probability theory and statistics provide a formal, scientific and quantitative basis in assessing risk and uncertainties but have been extremely little deployed in the field of geotechnical engineering especially in the region of Southeast Asia. In this study, a rational framework in characterizing soil properties using systematic statistical approaches has been proposed and illustrated through a case study using some simple physical index properties of soft marine clay in Peninsular Malaysia. The framework includes an initial data screening, followed by trend analysis, removal of outliers, normality conformance and lastly the descriptive statistics. Common erroneous treatments that used to be overlooked were examined in detail and the results of analyses were interpreted statistically incorporating engineering judgment. The effectiveness of various common statistical methods were compared, contrasted and discussed. The proposed framework was found useful in characterizing soil properties. The important findings that were listed could also serve as a reference for future research and development in geotechnical engineering.