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Developing a New Relationship between Undrained Shear Strength and Over-Consolidation Ratio

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Abstract : Relationship between undrained shear strength (Su) and over consolidation ratio (OCR) of clay soil (marine clay) is very important in the field of geotechnical engineering to estimate the settlement behaviour of clay and to prepare a small scale physical modelling test. In this study, a relationship between shear strength and OCR parameters was determined using the laboratory vane shear apparatus and the fully automatic consolidated apparatus. The main objective was to establish non-linear correlation formula between shear strength and OCR and comparing it with previous studies. Therefore, in order to achieve this objective, three points were chosen to obtain 18 undisturbed samples which were collected with an increasing depth of 1.0 m to 3.5 m each 0.5 m. Clay samples were prepared under undrained condition for both tests. It was found that the OCR and shear strength are inversely proportional at similar depth and at same undrained conditions. However, a good correlation was obtained from the relationships where the R2 values were very close to 1.0 using polynomial equations. The comparison between the experimental result and previous equation from other researchers produced a non-linear correlation which has a similar pattern with this study.

Keywords : shear strength, over-consolidation ratio, vane shear test, clayey soil
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