World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:16, No:09, 2022

Challenges in Experimental Testing of a Stiff, Overconsolidated Clay

Authors : Maria Konstadinou, Etienne Alderlieste, Anderson Peccin da Silva, Ben Arntz, Leonard van der Bijl, Wouter Verschueren

Abstract : The shear strength and compression properties of stiff Boom clay from Belgium at the depth of about 30 m has been investigated by means of cone penetration and laboratory testing. The latter consisted of index classification, constant rate of strain, direct, simple shear, and unconfined compression tests. The Boom clay samples exhibited strong swelling tendencies. The suction pressure was measured via different procedures and has been compared to the expected in-situ stress. The undrained shear strength and OCR profile determined from CPTs is not compatible with the experimental measurements, which gave significantly lower values. The observed response can be attributed to the presence of pre-existing discontinuities, as shown in microscale CT scans of the samples. The results of this study demonstrate that the microstructure of the clay prior to testing has an impact on the mechanical behaviour and can cause inconsistencies in the comparison of the laboratory test results with in-situ data.

Keywords : boom clay, laboratory testing, overconsolidation ratio, stress-strain response, swelling, undrained shear strength
Conference Title : ICGESLT 2022 : International Conference on Geotechnical Engineering and Soil Laboratory Testing
Conference Location : Amsterdam, Netherlands
Conference Dates : September 15-16, 2022