World Academy of Science, Engineering and Technology
International Journal of Geotechnical and Geological Engineering
Vol:13, No:08, 2019

Effect of Temperature on the Water Retention Capacity of Liner Materials

Authors : Ahmed M. Al-Mahbashi, Mosleh A. Al-Shamrani, Muawia Dafalla

Abstract : Mixtures of sand and clay are frequently used to serve for specific purposes in several engineering practices. In environmental engineering, liner layers and cover layers are common for controlling waste disposal facilities. These layers are exposed to moisture and temperature fluctuation specially when existing in unsaturated condition. The relationship between soil suction and water content for these materials is essential for understanding their unsaturated behavior and properties such as retention capacity and unsaturated follow (hydraulic conductivity). This study is aimed at investigating retention capacity for two sand-natural expansive clay mixtures (15% (C15) and 30% (C30) expansive clay) at two ambient temperatures within the range of 5 -50 °C. Soil water retention curves (SWRC) for these materials were determined at these two ambient temperatures using different salt solutions for a wide range of suction (up to 200MPa). The results indicate that retention capacity of C15 mixture underwent significant changes due to temperature variations. This effect tends to be less visible when the clay fraction is doubled (C30). In addition, the overall volume change is marginally affected by high temperature within the range considered in this study.

Keywords : soil water retention curve, sand-expansive clay liner, suction, temperature
Conference Title : ICGGGE 2019 : International Conference on Geoenvironmental, Geotechnical and Geological Engineering
Conference Location : Vancouver, Canada
Conference Dates : August 07-08, 2019