Determination of Suction of Arid Region Soil Using Filter Paper Method

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Abstract : Soils of Greater Himalayas mostly pertain to Leh & Ladakh, Lahaul & Sppiti, & high reaches to Uttarakhand. The moisture regime is aridic. The arid zone starts from Baralacha pass in Lahaul and covers the entire Spiti valley in the district of Lahaul & Spiti, Himachal Pradesh of India. Here, the present study is an attempt to determine the suction value of soil collected from the arid zone of Spiti valley for different freezing-thawing cycles considering the climate ranges of Spiti valley. Suction is the basic and most important parameter which influences the behavior of unsaturated soil. It is essential to determine the suction value of unsaturated soil before other tests like shear test, and permeability. Basically, it is the negative pore water pressure in partially saturated soil measured in terms of the height of the water column. The filter paper method has been used for the study as an economical approach to evaluate suction. It is the only method from which both contact and non-contact suction can be deduced. In this study, soil specimens were subjected to 0, 1, 3, & 5 freezing-thawing (F-T) cycles for different degrees of saturation to have a wide range of suction, and soil freezing characteristic curves (SFCC) were formulated for all F-T cycles. The result data collected from the experiments have shown best-fitted values using Fredlund & Xing model for each SFCC.
Keywords : suction, arid region soil, soil freezing characteristic curve, freezing-thawing cycle
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