

Synthesizing an Artificial Loess for Geotechnical Investigations of Collapsible Soil Behavior

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Abstract : Collapsible soils like loess comprise an important category of problematic soils for construction purposes and sustainable development. As a result, research on both geological and geotechnical aspects of this type of soil have been in progress for decades. However, considerable natural variability in physical properties of in-situ loess strata even in a single block sample challenges the fundamental laboratory investigations. The reason behind this is that it is somehow impossible to remove the effect of a specific factor like void ratio from fair comparisons to come with a reliable conclusion. In order to cope with this limitation, two types of artificially made dispersive and calcareous loess are introduced which can be easily reproduced in any soil mechanics laboratory provided that all its compositions are known and controlled. The collapse potential is explored for a variety of soil water salinity and lime content and comparisons are made against the natural soil behavior. Trends are reported for the influence of pore water salinity on collapse potential under different osmotic flow conditions. The most important advantage of artificial loess is the ease of controlling cementing agent content like calcite or dispersive potential for studying their influence on mechanical soil behavior.

Keywords : artificial loess, unsaturated soils, collapse potential, dispersive clays, laboratory tests

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