

Variation of collapse potential and stiffness degradation with matric suction of compacted unsaturated cohesive soil

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Collapse of soil skeleton due to variation in its loading and boundary conditions impacts the strength and stability of soil in its unsaturated state. The present study is focused on the influence of matric suction on collapsible behaviour and stiffness degradation of compacted unsaturated cohesive soil. Collapse characteristic of unsaturated soil is assessed under sudden inundation and varying vertical stress application. A series of dynamic triaxial, double oedometer and filter paper tests were conducted on unsaturated Ahmedabad cohesive soil under as-compacted conditions at varying dry density and water content to determine cyclic degradation index ( $\delta$ ), collapse potential and matric suction ( $u_a - u_w$ ), respectively. Significant influence of matric suction was observed on collapse potential and stiffness degradation of unsaturated cohesive soil. Larger collapse potential at higher matric suction clarified the meta-stable state of compacted unsaturated cohesive soil under dry conditions. Cyclic degradation index ( $\delta$ ) with number of loading cycles was found to be decreasing with increase in matric suction representing brittle nature of soil possessing higher matric suction signifying soil skeleton to be highly volatile and unsafe under dynamic loading conditions.

**Keywords:**

Collapse potential, stiffness degradation, matric suction, dynamic traxial testing , unsaturated soil