粒間極限剪應力值之假設

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摘要

In conventional soil mechanics, Coulomb's equation defined that the ultimate shear strength (f) of a soil consists of intrinsic cohesion (c) and frictional resistance (tan). However, such theory was based on an assumption that the intrinsic cohesion and the frictional resistance are identical physical events and therefore they can be summed up in accordance with superposition principle. Such assumption has never been questioned since the application of Coulomb equation in 1776. This paper proposes that based on the theory of Physics, before the combination of any two types of shear stress using superposition principle, it shall be examined if they are identical scale of shear stress. Based on the occurrence of time and space of these two shear stresses, they can be verified if they are identical physical events. This research conducts a series of step-increased stress-controlled and strain-controlled direct shear tests to study the mechanism of intrinsic cohesion and the frictional resistance so as to verify they are identical events with simultaneous occurrence and identical phases. Tests were conducted using three types of soils that consisted of intrinsic cohesion. The results of the study have not shown that both intrinsic cohesion and frictional resistance can be found on the failure plane. However, they have never been found simultaneously and in the same scale of space. In conclusion, for a given failure plane of a soil, it is likely to occur only one type of shear stress under identical time and space.

關鍵字：Interparticle Utimate Shear Stress, Superposition Principle, Identical Shear Stress Event, Measured Scale.