(b) Undrained test on partly saturated cohesive soils *

The most common application of this test is to samples of earth-fill material which are compacted in the laboratory under specified conditions of water content and density. It is also applied to undisturbed samples of strata which are not fully saturated (for example, residual soils), and to samples cut from existing rolled fills or trial sections. In the latter cases the density change which may occur during the driving of a sampler must not be overlooked.

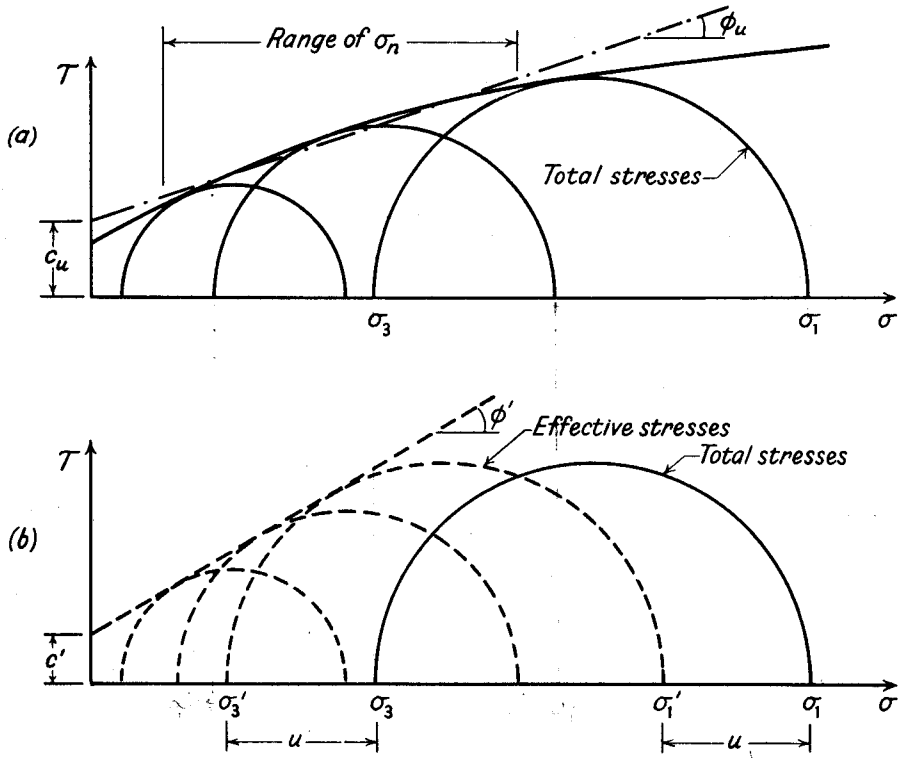

Fig. 6. Mohr stress circles for undrained tests on partly saturated soil

(a) total stresses,
(b) effective stresses.

The deviator stress at failure is found to increase with cell pressure. This increase becomes progressively smaller as the air in the voids is compressed and passes into solution, and ceases when the stresses are large enough to cause full saturation. The failure envelope expressed in terms of total stress is thus non-linear, Fig. 6 (a), and values of c_u and ϕ_u can be quoted only for specific ranges of pressure.

If the pore pressure is measured during the test, as is now more usual, the failure envelope can be expressed in terms of effective stress, Fig. 6 (b), and is found to approximate very closely to a straight line over a wide range of stress. Apparent departures from linearity are usually found to be due to small differences in water content between the three or four samples used to define the envelope.