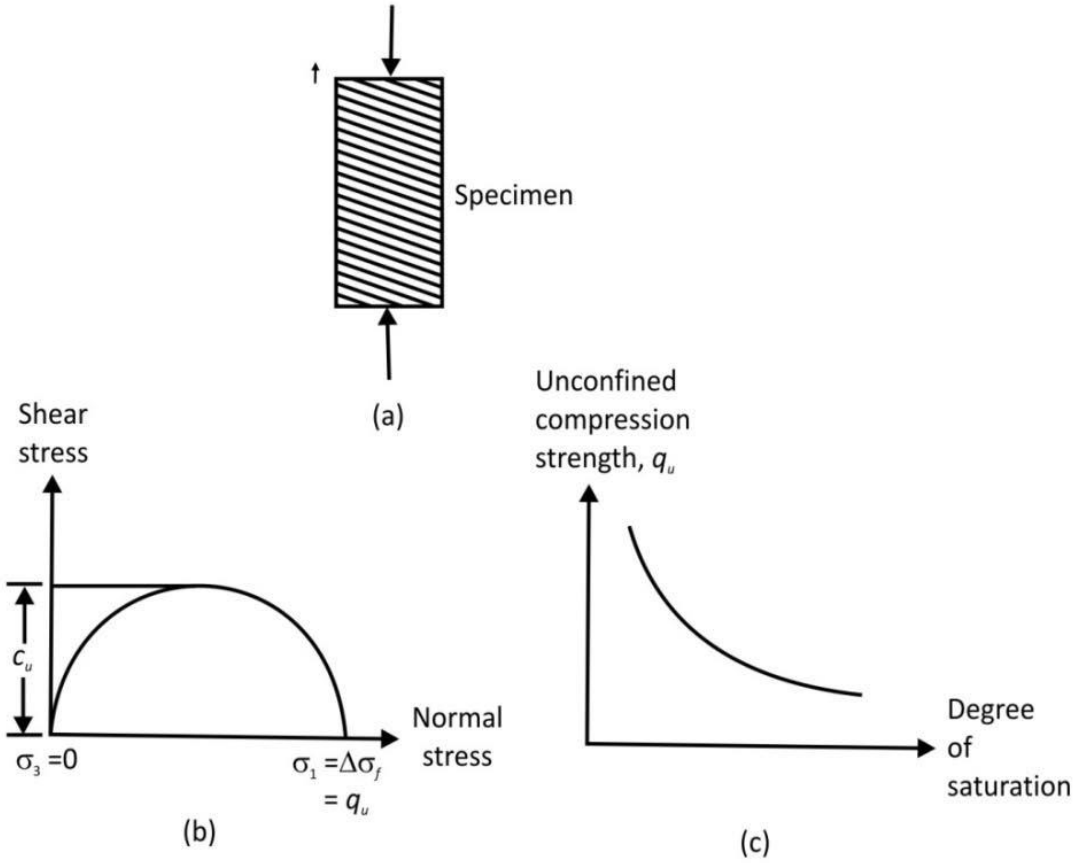
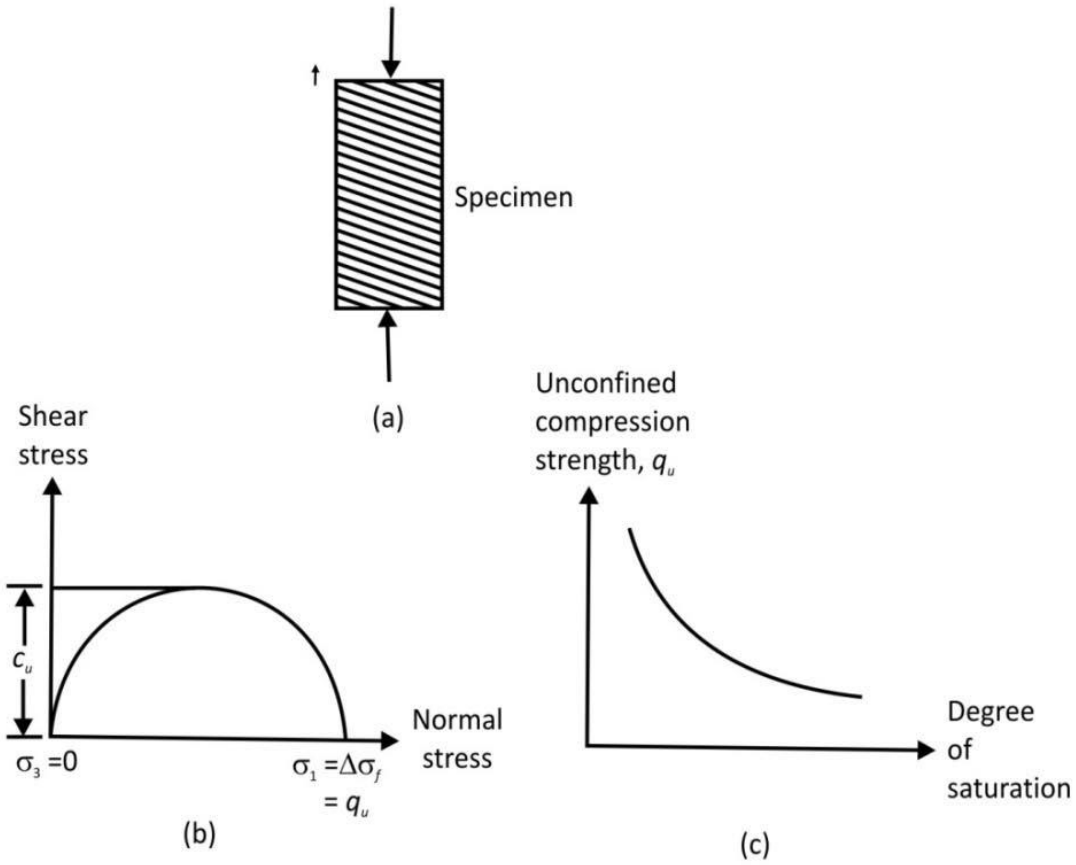
LECTURE 34

UNCONFINED COMPRESSION TEST

The unconfined compression test is a special type of unconsolidated-undrained Triaxial test in which the confining pressure σ3=0, as shown in figure. In this test an axial stress, Δσ, is applied to the specimen to cause failure (that is, Δσ=Δσf). The corresponding Mohr's circle is shown in figure . Note that, for this case, u





Unconfined compression test: (a) soil specimen; (b) Mohr's circle for the test; (c) variation of qu with the degree of saturation

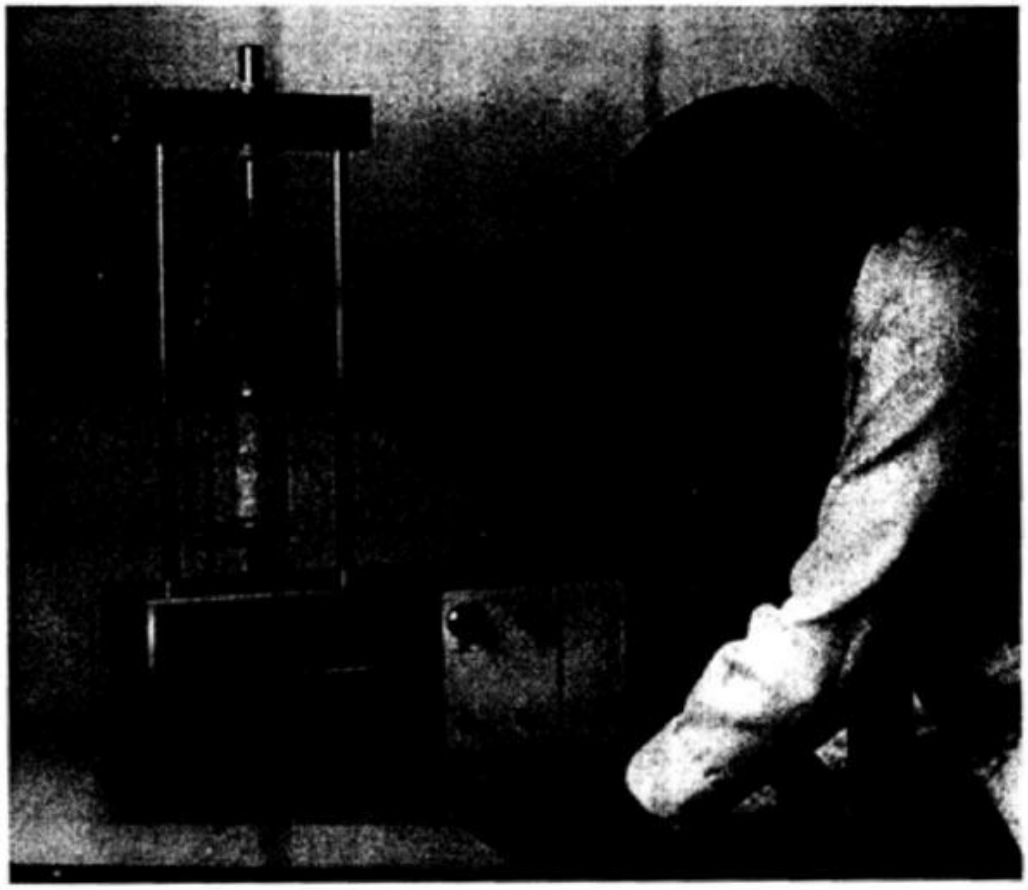
Major principal total stress =Δσf=qu

Minor principal total stress = 0

The axial stress at failure, Δσf=qu is generally referred to as the unconfined compression strength. The shear strength of saturated clays under this condition (ϕ=0,

$$s = c_u = \frac{q_u}{2}$$

The unconfined compression strength can be used as an indicator for the consistency of clays. Unconfined compression tests are sometimes conducted on unsaturated soils. With the void ratio of a soil specimen remaining constant, the unconfined compression strength rapidly decreases with the degree of saturation shows an unconfined



compression test.

Unconfined compression test in progress (courtesy of Soiltest, Inc., Lake Bluff, Illinois)