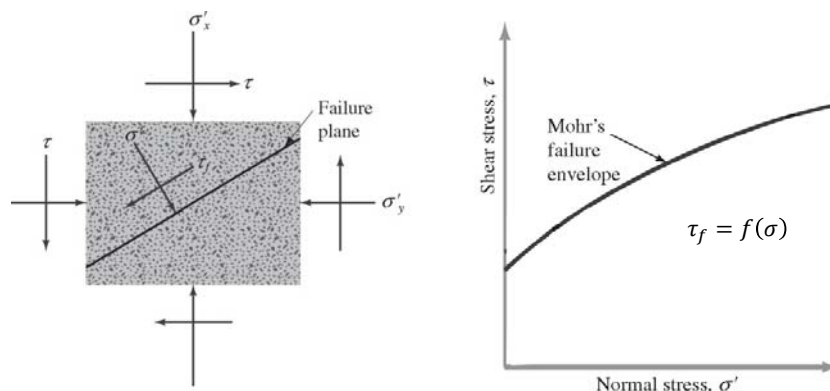


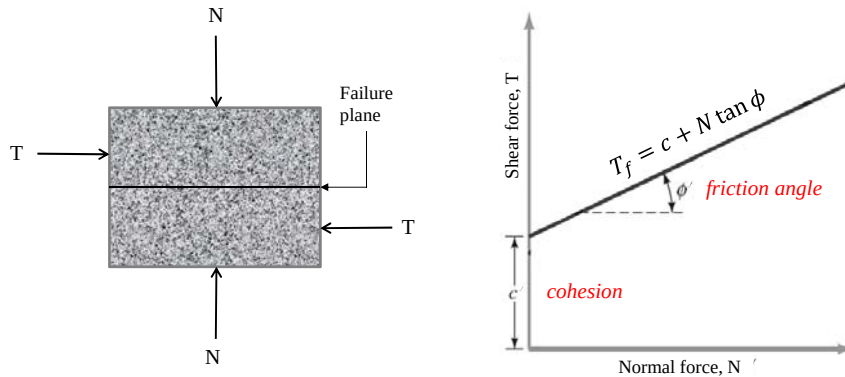
Shear Strength

Chapter 10

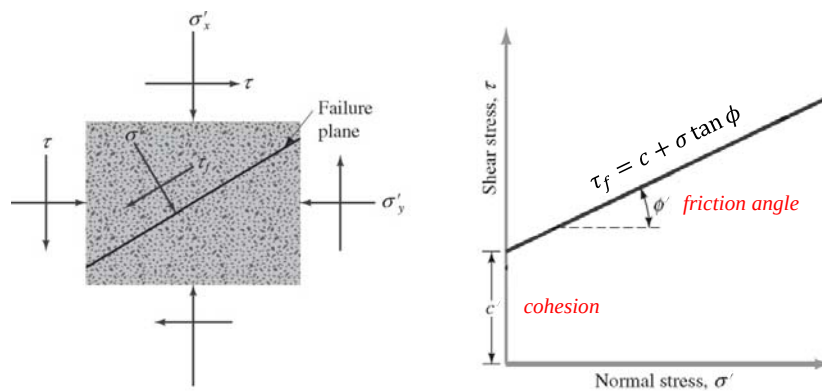
Mohr's Failure Criterion



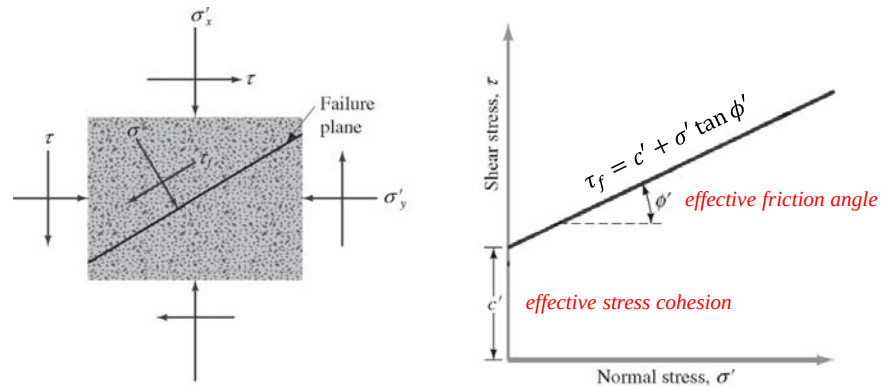
Coulomb's Failure Criterion



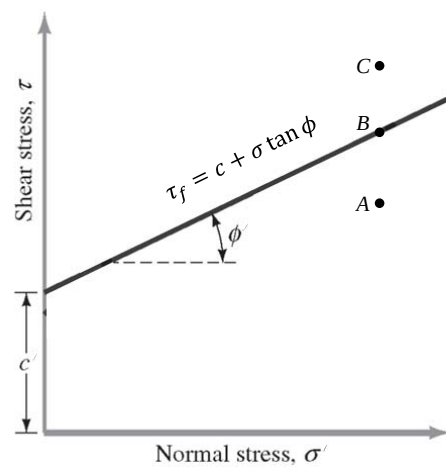
Mohr-Coulomb Failure Criterion



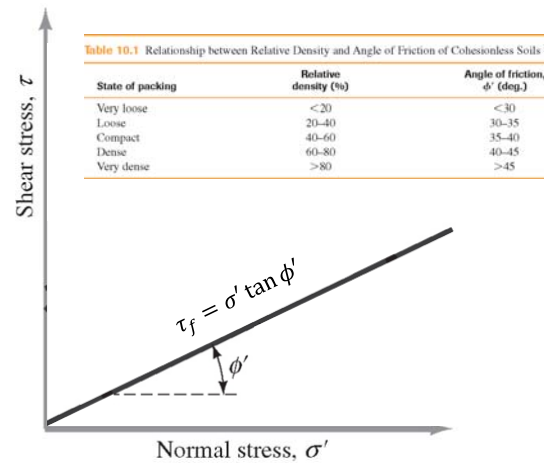
Mohr-Coulomb Failure Criterion



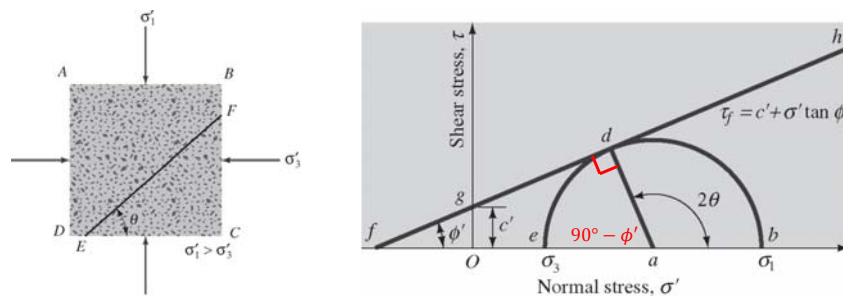
Mohr-Coulomb Failure Envelope



Mohr-Coulomb Failure Envelope



Failure Plane Orientation



Failure Plane Orientation

$$\theta = 45 + \frac{\phi'}{2}$$

$$\sigma'_1 = \sigma'_3 \tan^2\left(45 + \frac{\phi'}{2}\right) + 2c' \tan\left(45 + \frac{\phi'}{2}\right)$$

Direct Shear Test

Chapter 10.4

Direct Shear Test

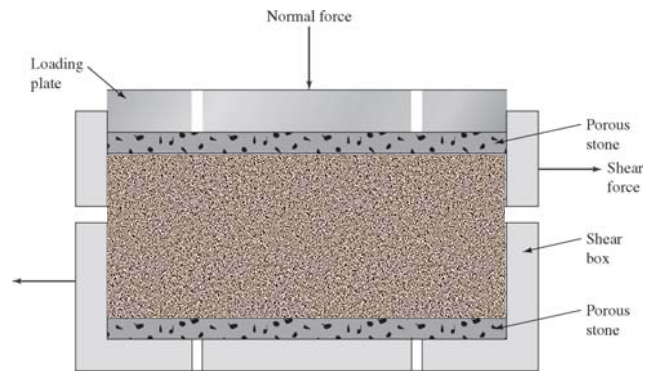


Figure 10.3 Diagram of direct shear test arrangement

Direct Shear Test

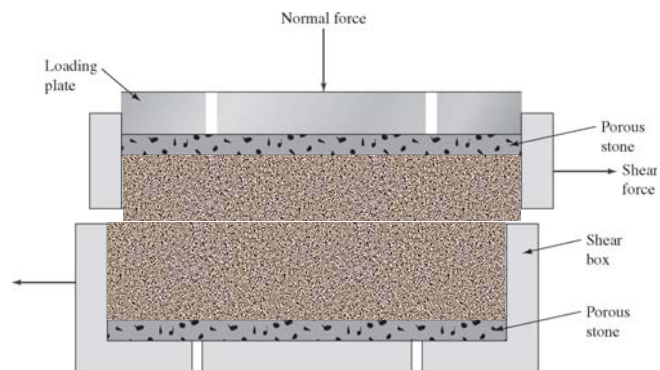
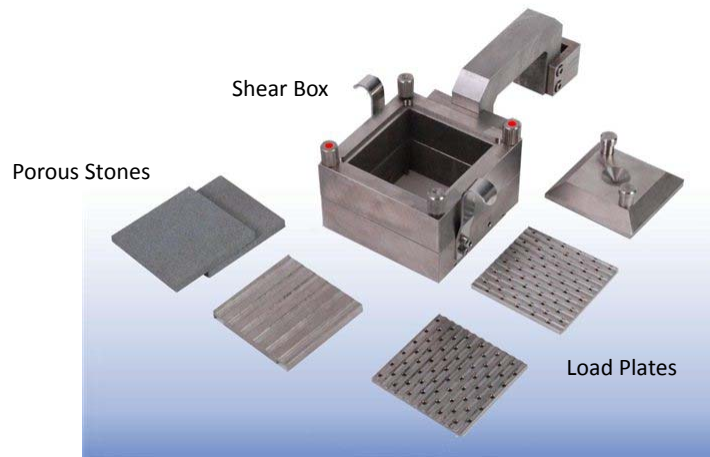
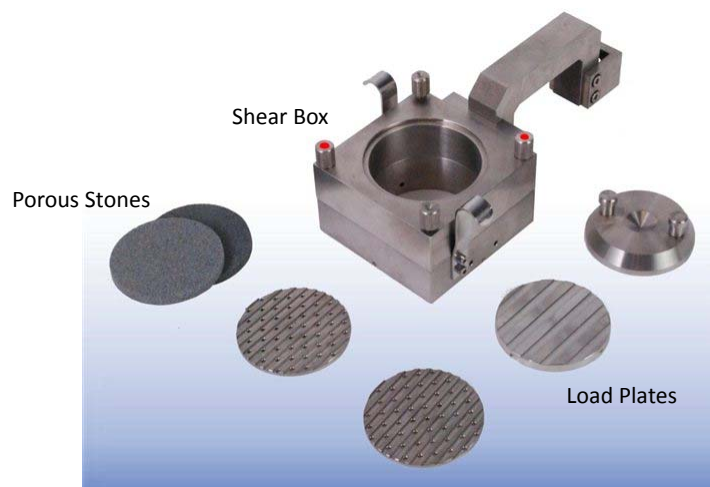


Figure 10.3 Diagram of direct shear test arrangement

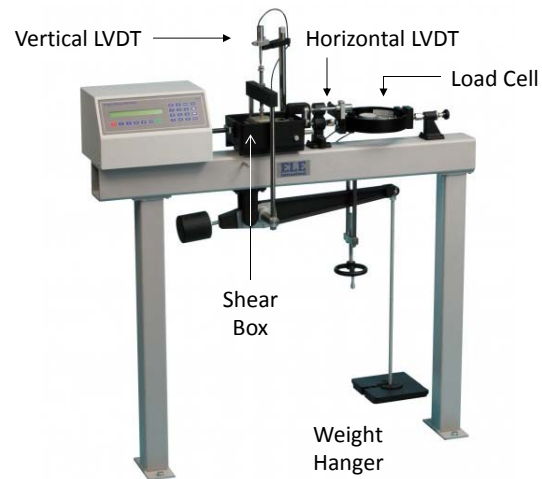
Direct Shear Test



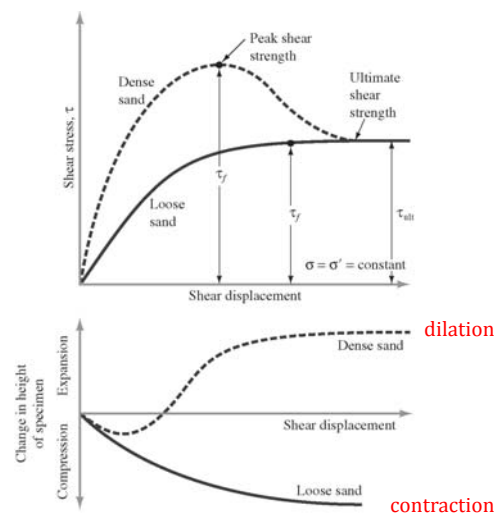
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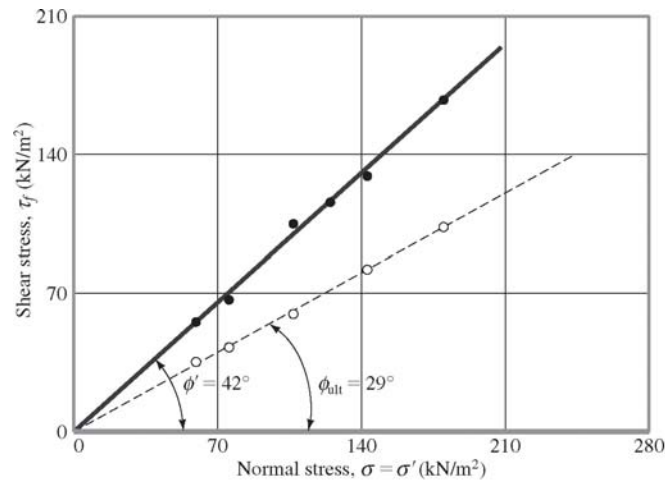
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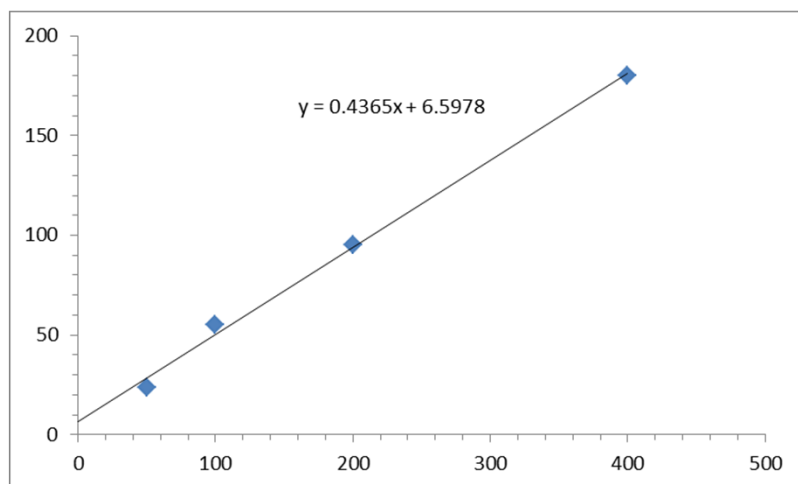
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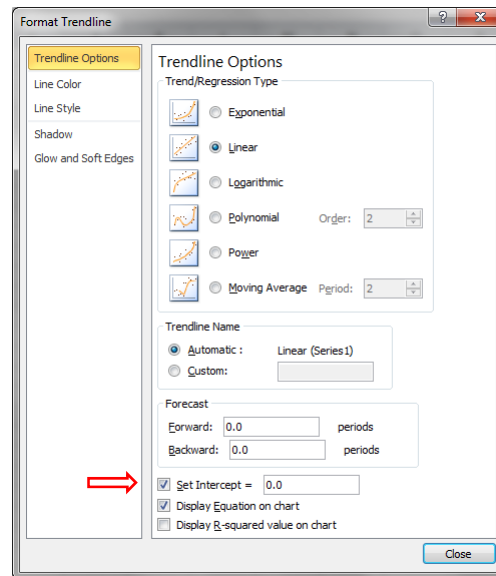


Direct Shear Test

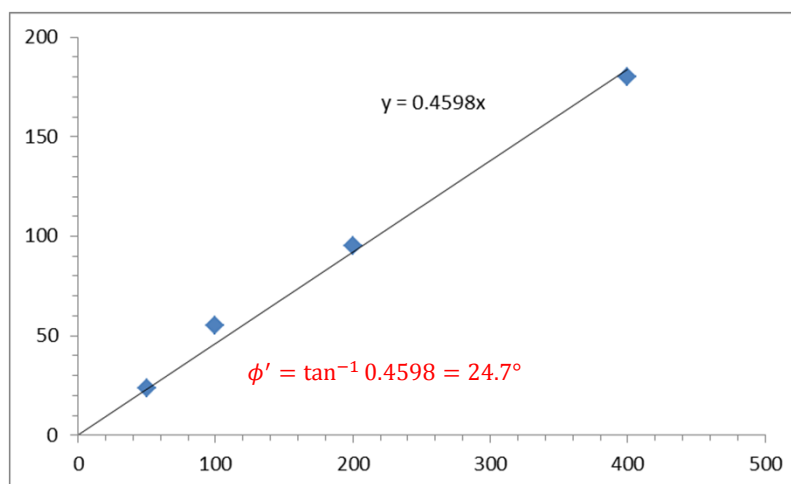


Direct Shear Test

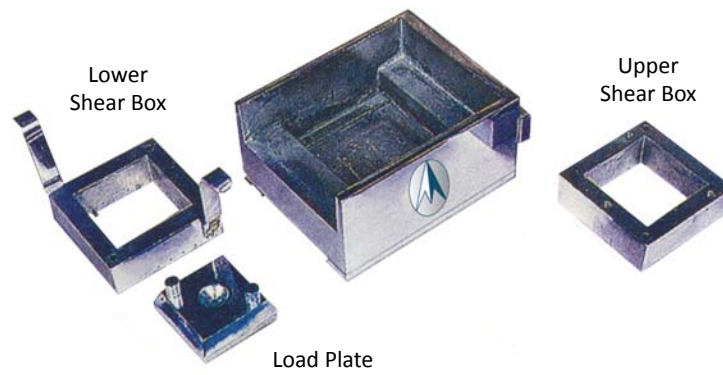




Direct Shear Test



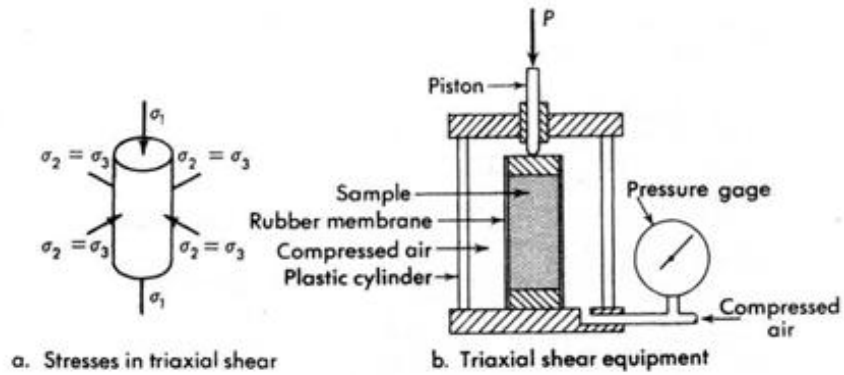
Direct Shear Test



Triaxial Shear Test

Chapter 10.5

Triaxial Shear Test



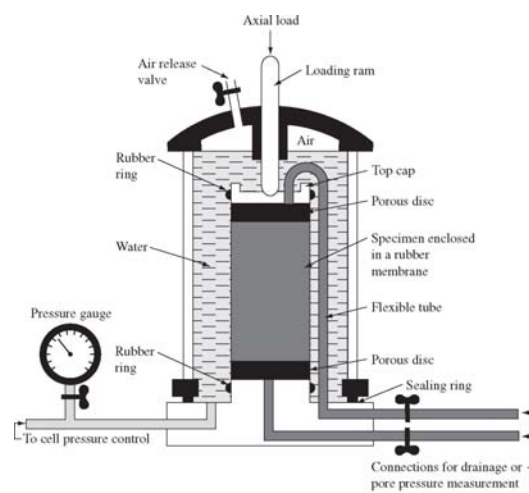
Triaxial Shear Test



Triaxial Shear Test

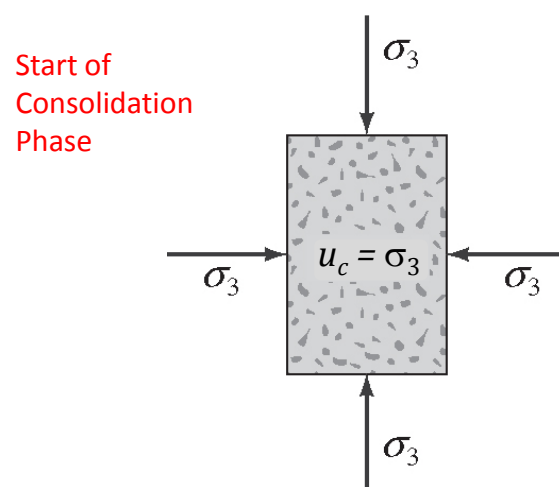


Triaxial Shear Test



Consolidated-Drained Test

Consolidated-Drained Test



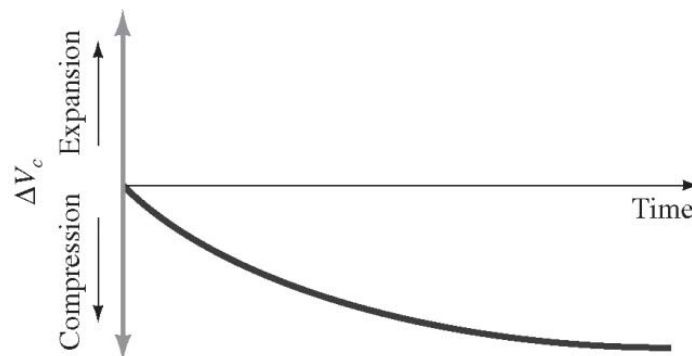
Consolidated-Drained Test

$$B = \frac{u_c}{\sigma_3}$$

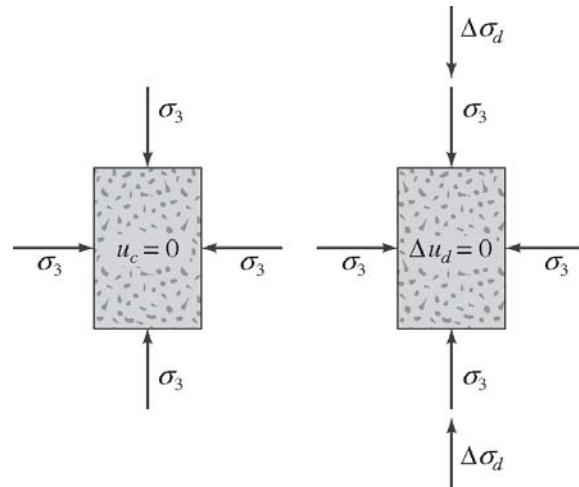
Table 8.2 Theoretical values of B at complete saturation

Type of soil	Theoretical value
Normally consolidated soft clay	0.9998
Lightly overconsolidated soft clays and silts	0.9988
Overconsolidated stiff clays and sands	0.9877
Very dense sands and very stiff clays at high confining pressures	0.9130

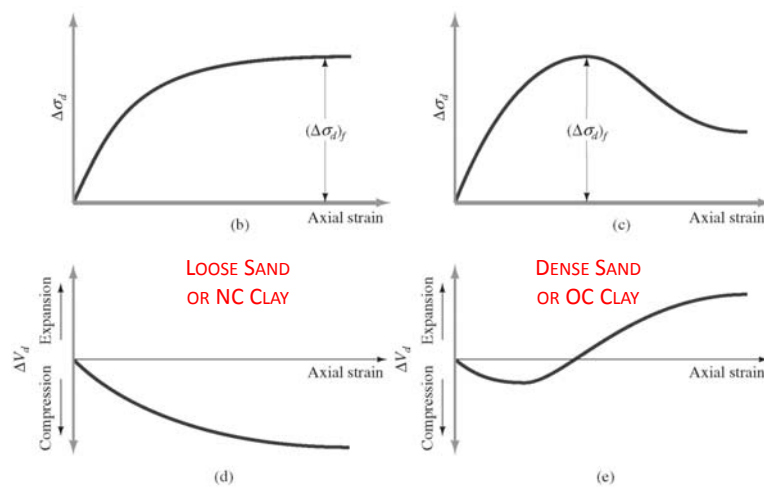
Consolidated-Drained Test

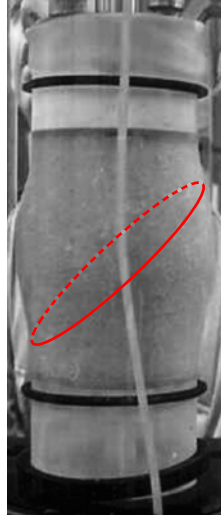


Consolidated-Drained Test

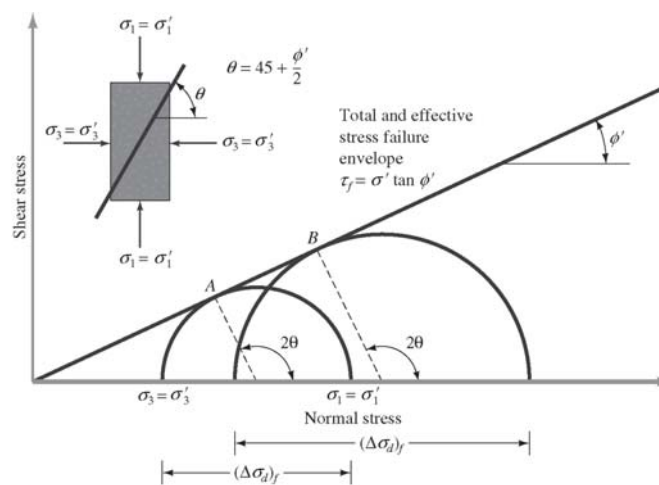


Consolidated-Drained Test

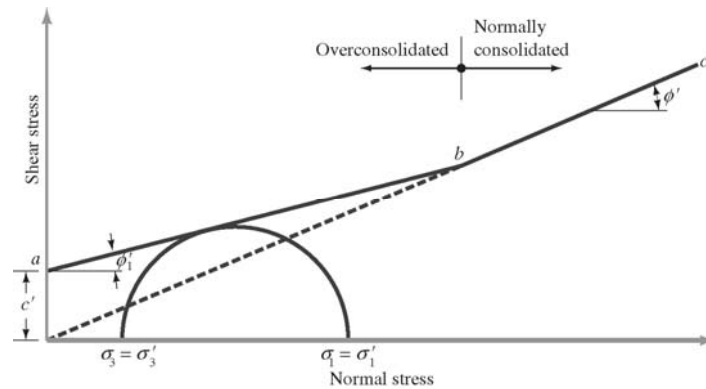




Consolidated-Drained Test



Consolidated-Drained Test



Example

Example 10.2

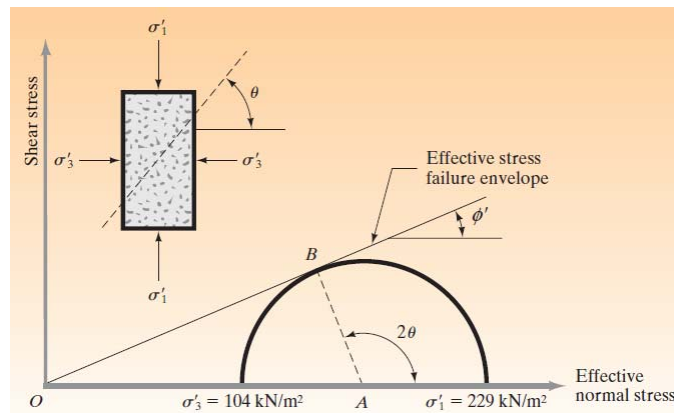
For a normally consolidated clay, these are the results of a drained triaxial test:

chamber confining pressure = 104 kN/m²

deviator stress at failure = 125 kN/m^2

- Find the angle of friction, ϕ' .
- Determine the angle θ that the failure plane makes with the major principal plane.

Example



Example

Example 10.4

We have the results of two drained triaxial tests on a saturated clay:

$$\text{Specimen I: } \sigma_3 = 70 \text{ kN/m}^2 \\ (\Delta\sigma_d)_f = 130 \text{ kN/m}^2$$

$$\text{Specimen II: } \sigma_3 = 160 \text{ kN/m}^2 \\ (\Delta\sigma_d)_f = 223.5 \text{ kN/m}^2$$

Determine the shear strength parameters.

Example

