

In terms of a general failure criterion for soils, the Mohr circle in shear stress–normal stress space defines stable, failure and “inaccessible” conditions. Figure 6.15 illustrates the zones of stability and failure. The mathematical expression for failure using the Mohr–Coulomb criterion is defined as:

$$|\tau_f| \geq c' + \sigma'_n \tan \phi' \quad 6.4$$

where  $\tau_f$  is the effective shear stress at failure  
 $c'$  is the effective (drained) cohesion  
 $\sigma'_n$  is the effective (drained) normal stress at failure  
 $\phi'$  is the effective (drained) friction angle.

For fine-grained (cohesive) soils the effective shear behaviour depends on the degree of overconsolidation (see equation 3.10 and Figure 3.8). Normally consolidated cohesive soils typically exhibit no effective cohesion, while over consolidated soils exhibit some small to moderate effective cohesion. Figure 6.16 illustrates this effective shear strength behaviour.

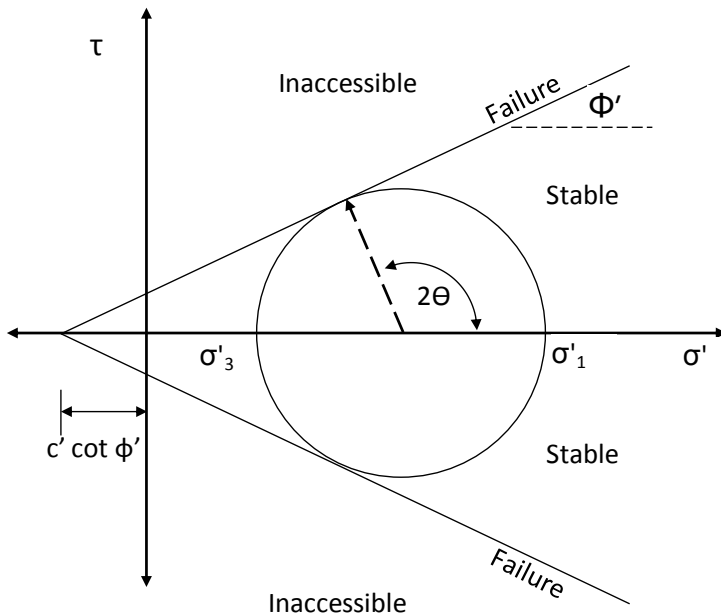


Figure 6.15 Failure and stable zones in Mohr circles.