FORMULAE – LECTURE 6

Critical State Concept

Specific volume	$v = 1 + e$
Over-consolidation ratio	$OCR = \frac{p'_0}{p'}$
Normal compression line (NCL) in $v - \ln(p')$ plane	$v = N - \lambda \cdot \ln(p')$
Unloading-reloading line (URL) in $v - \ln(p')$ plane	$v = v_k - \kappa \cdot \ln(p')$
Critical state line (CSL) in $q - p'$ plane	$q = M \cdot p'$
CSL in $v - \ln(p')$ plane	$v = \Gamma - \lambda \cdot \ln(p')$
Peak shear strength envelope in $q - p'$ plane	$q = a_{peak} + M_{peak} \cdot p'$
Peak shear strength envelope in $\tau - \sigma'_n$ plane	$\tau = c'_{peak} + \sigma'_n \cdot \tan(\varphi'_{peak})$
Peak shear strength angle	$\varphi'_{peak} = \sin^{-1}\left(\frac{3 \cdot M_{peak}}{6 + M_{peak}}\right)$
Peak intercept cohesion	$c'_{peak} = \frac{a_{peak}}{M_{peak}} \cdot \tan(\varphi'_{peak})$
CSL in $\tau - \sigma'_n$ plane	$\tau = \sigma'_n \cdot \tan(\varphi'_{cv})$
Critical shear strength angle	$\varphi'_{cv} = \sin^{-1}\left(\frac{3 \cdot M}{6 + M}\right)$