Study Summary

Principles of Tailings Dam Design

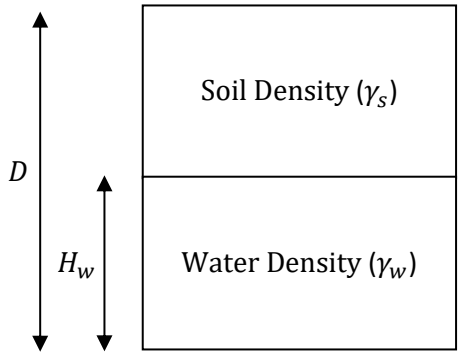
Hydraulic Gradient	$Hydraulic\ Gradient\ (i)\ = \frac{(h_1 - h_2)}{L}$	$h_1 =$ height of water at point 1(m) $h_2 =$ height of water at point 2 (m) $L =$ length of the flow path (m)
Density	$Density\ (\rho) = \frac{Mass\ _{(Soil)}}{Volume\ _{(Soil+Water)}}$	
Void Ratio	$Void\ Ratio\ (e) = \frac{Volume\ _{(Voids\ or\ Water)}}{Volume\ _{(Soil)}}$	
Permeability	$Permeability\ (k) = \frac{Q}{iA}$	$k =$ permeability (m/s) $Q =$ flow (m^3/s) $i =$ hydraulic gradient across the soil $A =$ area of the flow path (m^2)
Overconsolidation Ratio (OCR)	$OCR = \frac{Historical\ Load}{Normal\ Overburden\ Load}$ $If\ OCR = 1, the\ soil\ is\ normally\ consolidated$ $If\ OCR = > 1, the\ soil\ is\ overconsolidated$	**Historical Load** The weight or vertical stress of a pre-existing landform above a soil layer. **Normal Overburden Load** The weight or vertical stress of the current soil load above a soil layer.

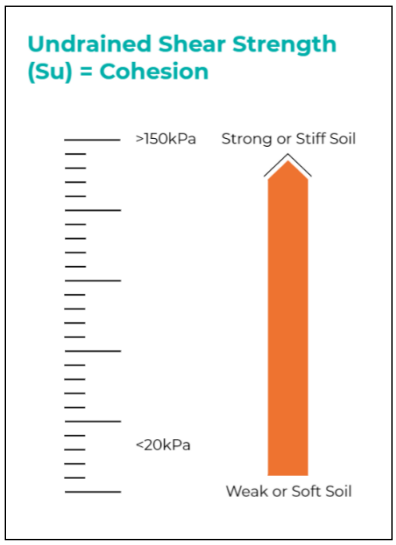
Shear Strength Ratio

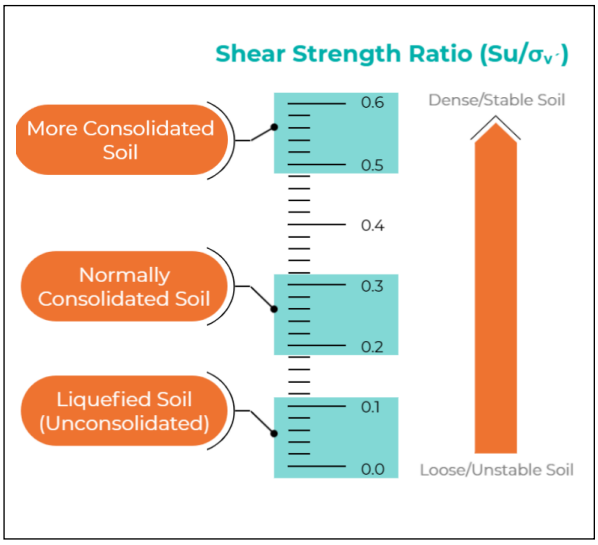
$$Shear\ Strength\ Ratio = \frac{Undrained\ Shear\ Strength\ (Su)}{Effective\ Overburden\ Pressure\ (\sigma_v')}$$

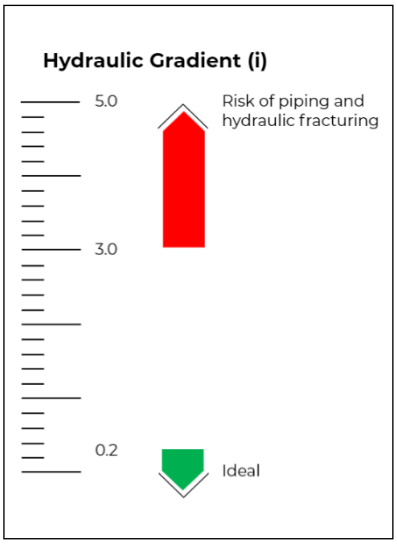
$$Effective\ Overburden\ Pressure\ (\sigma_v') = Total\ Pressure\ on\ Soil\ \ (\sigma_v)\ - Pore\ Pressure\ (u)$$

$\sigma_v = \gamma_s\ x\ D$
$u = \gamma_w\ x\ H_w$

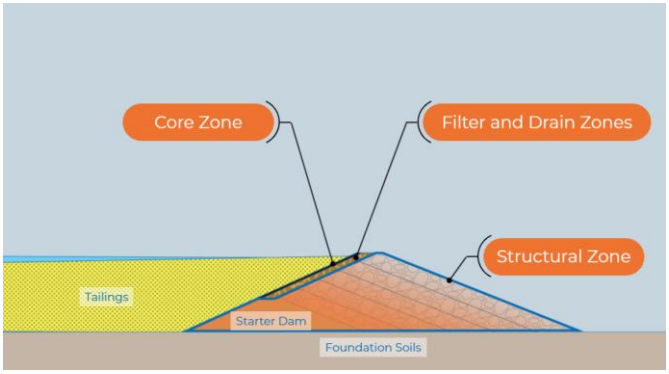




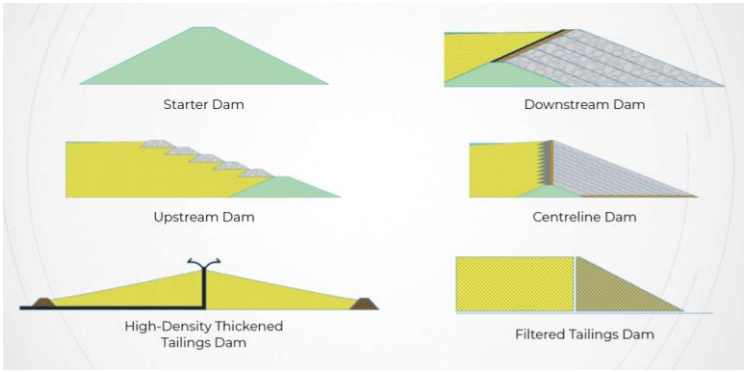




Tailing Dam Zones



Types of Tailings Dams



Upstream Dam Construction Methods