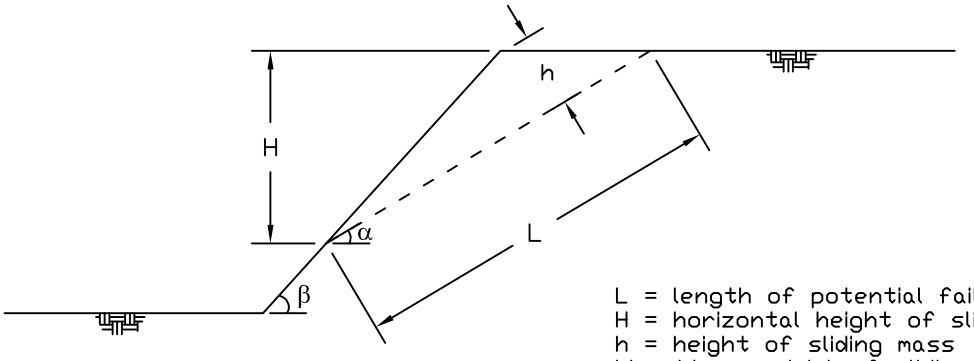
SLOPE STABILITY ANALYSIS (WEDGE METHOD)



L = length of potential failure plane
H = horizontal height of sliding mass
h = height of sliding mass
W = $\frac{Lh\gamma}{2}$ = weight of sliding mass
c = cohesion along failure plane
ϕ = angle of internal friction along failure plane
α = angle of potential failure surface
β = angle of slope
γ = unit weight of soil within sliding mass

SLIDING FORCES

$Fs = W\sin\alpha$

SLIDING RESISTANCE

$Rs = cL + W\cos\alpha\tan\phi$

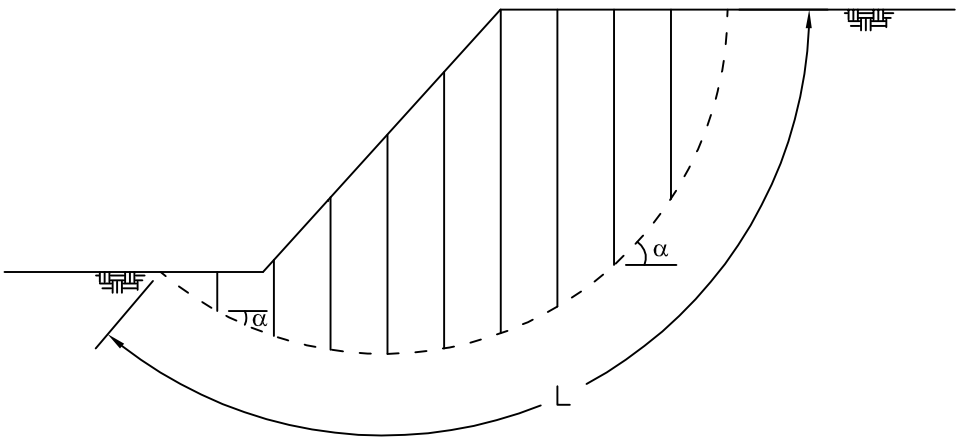
FACTOR OF SAFETY

$$FS = \frac{cL + W\cos\alpha\tan\phi}{W\sin\alpha}$$

ANALYSIS

Calculate factor of safety (FS) for multiple slip planes by using various horizontal heights of sliding mass (H) and angles of potential failure surface (α) until the lowest factor of safety is determined. Acceptable factor of safety for static slope conditions is usually equal to or greater than 1.5.

SLOPE STABILITY ANALYSIS (METHOD OF SLICES)



SLIDING FORCES

$Fs = \Sigma(W_i\sin\alpha_i)$

SLIDING RESISTANCE

$Rs = cL + [\Sigma(W_i\cos\alpha_i)]\tan\phi$

FACTOR OF SAFETY

$$FS = \frac{cL + [\Sigma(W_i\cos\alpha_i)]\tan\phi}{\Sigma(W_i\sin\alpha_i)}$$

L = length of potential failure surface
W = γA = weight of individual soil slice
c = cohesion along failure surface
ϕ = angle of internal friction along failure surface
α = angle between horizontal plane and failure surface of individual slice. If horizontal plane is above the failure plane of the slice (i.e. left side of the circle) then a is α negative value.
γ = unit weight of soil within sliding mass
A = area of individual slice

ANALYSIS

Calculate factor of safety (FS) for multiple slip surfaces by using various circle locations and radii until the lowest factor of safety is determined. The potential sliding mass is divided into slices, usually 10 slices. The above equations account for the summation (Σ) of all individual slice weights and slice angles (α). Acceptable factor of safety for static slope conditions is usually equal to or greater than 1.5.