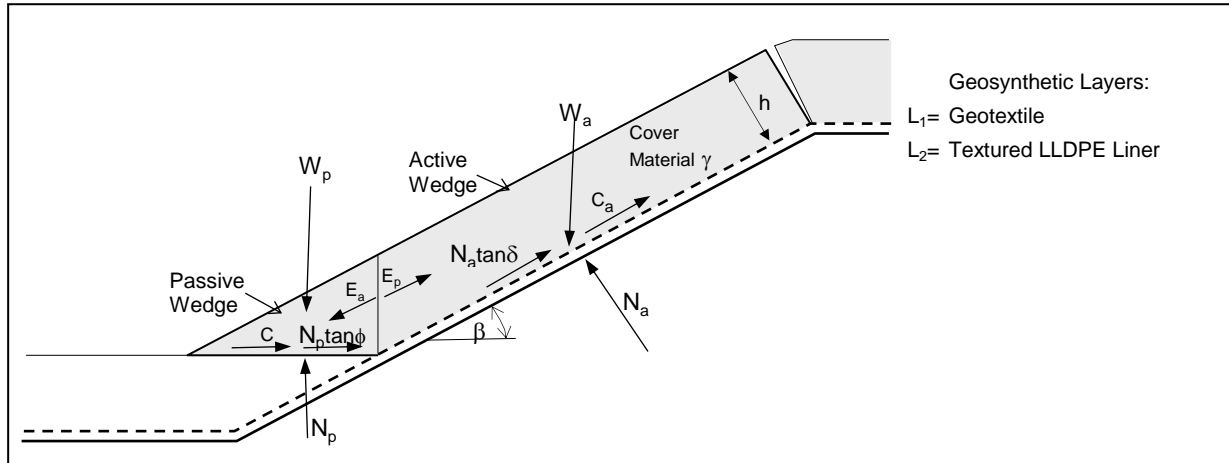


SLOPE STABILITY CALCULATION

UNIFORM COVER THICKNESS, FINITE SLOPE METHOD Jones & Dixon



INPUT DATA TO SHADED BOXES

β	Slope angle (°)	18.43	(1 in 3)
h	Thickness of the cover material (m)	1.00	
γ	Unit weight of cover material (kN/m ³)	18	
h_w	Thickness of saturated cover material (m)	0	
γ_s	Saturated unit weight of the cover material (kN/m ³)	21	
δ_u	Interface friction angle at the upper interface of material L ₁ (°)	40	
α_u	Apparent adhesion at upper interface of material L ₁ (kPa)	1	
δ_1	Interface friction angle at the lower interface of material L ₁ (°)	27	
α_1	Apparent adhesion at lower interface of material L ₁ (kPa)	4	
δ_2	Interface friction angle between L ₂ and subgrade (°)	30	
α_2	Apparent adhesion between L ₂ and subgrade (kPa)	3	
c	Cohesion of cover soil (kPa)	0	
ϕ	Angle of internal friction of cover soil (°)	30	
L	Slope length (m)	60	

FACTOR OF SAFETY CALCULATION:

H	Slope height	18.97	
W_a	Total weight of active wedge	1049.99	
W_p	Total weight of passive wedge	30.01	
N_a	Effective force normal to the failure plane of the active wedge (kN/m)	996.14	
U_n	Resultant of the pore pressures acting perpendicular to the slope (kN/m)	0.00	
U_h	Resultant of the pore pressures acting on the interwedge surfaces (kN/m)	0.00	
U_v	Resultant of the vertical pore pressures acting on the passive wedge (kN/m)	0.00	
a		314.93	
b		-927.83	
c		163.52	
FS	Factor of safety (Cover soil/L ₁ interface)	2.76	
T_1	Tensile force in the geosynthetic material L ₁ (kN)	-428.57	no tension
a		314.93	
b		-787.13	
c		136.45	
FS	Factor of safety (L ₁ /L ₂ interface)	2.31	

References: Robert M Koerner "Designing with Geosynthetic" 1990 Fourth Edition; Jones & Dixon "The stability of geosynthetic landfill lining systems".

Note: This calculation method requires interface friction angle and apparent adhesion. FS-values without apparent adhesion will be reduced to a great extent and will produce misleading results. The placement of the cover soil on the slope should always be from the toe upward to the crest.

Horizontal part of the toe with collector drain should be constructed first. Gravitational forces of the cover soil and live load of the construction plant are compacting previously placed soil. This is creating passive wedge that is providing support for the active wedge.