

Slope Section C4 - Current, Post Drain and Final Profile Stability If the Geotextile is Retained and Overlain by Soils

Calculates stability of veneer covered slope

Model C4.2a1 Current
1 in 3.5 Saturated

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment		Wb	200	kN	
length of track		w	3	m	
width of track		b	0.6	m	
influence factor		I	0		- 0 if no plant loading
track pressure		q	55.56	kN/m ²	
equivalent equipment force on geomembrane		We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio		(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope		Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:	Lower material		formation	Formation	LLDPE	Geotextile (HPS3)
	Upper material		geotextile	LLDPE	Geotextile (HPS3)	Soils
height of slope base (actual)	H	m	24.00	93.00	93.00	93.00
lining thickness	T1	m	1.00	1.00	1.00	1.00
slope of liner (actual)	Cot(alpha)		3.00	3.50	3.50	3.50
dry density	Gamdry-1	kN/m ³	18.00	18.00	18.00	18.00
saturated density	Gamsat-1	kN/m ³	20.00	21.00	21.00	21.00
saturated thickness interface	Tw	m	0.00	0.00	1.00	1.00
saturated thickness cover soil			1.30	0.00	0.00	0.00
interface cohesion	C1	kN/m ²	0.00	0.00	1.00	1.90
interface friction angle	Phi-1	deg	30.00	30.00	40.00	42.70
soil cohesion	C2	kN/m ²	0.00	0.00	0.00	0.00
soil friction angle	Phi-2	deg	35.00	30.00	30.00	30.00
active thrust at top of slope	Pa	kN	0.00	0.00	0.00	0.00
reinforcement	Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force		kN	0.00	0.00	0.00	0.00
slope of liner	alpha	rads	0.42	0.28	0.28	0.28
length of interface	L1	m	75.89	338.53	338.53	338.53
length of soil	L2	m	3.16	3.64	3.64	3.64
weight of upper wedge	W1	kN	1366.40	6093.45	6093.45	6093.45
weight of lower wedge	W2	kN	35.63	34.07	34.07	34.07
pwp on interface	U'	kN	0.00	0.00	3193.16	3193.16
pwp in cover soil	U''	kN	24.87	0.00	0.00	0.00
Disturbing Force	D+Pa-Tr	kN	432.00	1674.00	1674.00	1674.00
Resisting Forces	T1	kN	748.25	3382.70	2575.43	3103.17
	Ts	kN	20.83	19.67	19.67	19.67
Factor of Safety	Fs		1.73	2.03	1.55	1.87
FoS greater than 1.3 reported in the SRA			YES	YES	YES	YES
Ignore lower wedge	Fs = T1/D		1.73	2.02	1.54	1.85
	Lower material	formation	Formation	LLDPE	Geotextile (HPS3)	
	Upper material	geotextile	LLDPE	Geotextile (HPS3)	Soils	

Critical Interface

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weight of equipment		Wb	200	kN	
length of track		w	3	m	
width of track		b	0.6	m	
influence factor		I	0		- 0 if no plant loading
track pressure		q	55.56	kN/m ²	
equivalent equipment force on geomembrane		We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio		(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope		Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:	Lower material		Formation	Formation	LLDPE	Geotextile (HPS3)
	Upper material		geotextile	LLDPE	Geotextile (HPS3)	Soils
height of slope base (actual)	H	m	24.00	93.00	93.00	93.00
lining thickness	T1	m	0.00	1.00	1.00	1.00
slope of liner (actual)	Cot(alpha)		3.00	3.00	3.00	3.00
dry density	Gamdry-1	kN/m ³	18.00	18.00	18.00	18.00
saturated density	Gamsat-1	kN/m ³	20.00	21.00	21.00	21.00
saturated thickness interface	Tw	m	0.00	0.00	1.00	1.00
saturated thickness cover soil			0.00	0.00	0.00	0.00
interface cohesion	C1	kN/m ²	0.00	0.00	1.00	1.90
interface friction angle	Phi-1	deg	30.00	30.00	40.00	42.70
soil cohesion	C2	kN/m ²	0.00	0.00	0.00	0.00
soil friction angle	Phi-2	deg	30.00	30.00	30.00	30.00
active thrust at top of slope	Pa	kN	0.00	0.00	0.00	0.00
reinforcement	Tr	kN	0.00	0.00	0.00	0.00

Calculations

nett active force		kN	0.00	0.00	0.00	0.00
slope of liner	alpha	rads	0.32	0.32	0.32	0.32
length of interface	L1	m	75.89	294.09	294.09	294.09
length of soil	L2	m	3.16	3.16	3.16	3.16
weight of upper wedge	W1	kN	1366.14	5293.65	5293.65	5293.65
weight of lower wedge	W2	kN	35.63	30.00	30.00	30.00
pwp on interface	U'	kN	0.00	0.00	2736.99	2736.99
pwp in cover soil	U''	kN	24.87	0.00	0.00	0.00
Disturbing force	D+Pa-Tr	kN	432.00	1674.00	1674.00	1674.00
Resisting Forces	T1	kN	748.25	2899.45	2211.44	2667.32
	Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety	Fs		1.78	1.74	1.33	1.60
FoS greater than 1.3 reported in the SRA			YES	YES	YES	YES
Ignore lower wedge	Fs = T1/D		1.73	1.73	1.32	1.59
	Lower material	Formation	Formation	LLDPE	Geotextile (HPS3)	
	Upper material	geotextile	LLDPE	Geotextile (HPS3)	Soils	

Critical Interface

Slope Section C4 - Current, Post Drain and Final Profile Stability If the Geotextile is Retained and Overlain by Soils

[Calculates stability of veneer covered slope](#)

Model C4.2a2

Current

1 in 3.5

0.7 Saturated

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment		Wb	200	kN	
length of track		w	3	m	
width of track		b	0.6	m	
influence factor		I	0		- 0 if no plant loading
track pressure		q	55.56	kN/m ²	
equivalent equipment force on geomembrane		We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio		(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope		Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysisData Input

Interface details:	Lower material	formation	Formation	LLDPE	Geotextile (HPS3)
	Upper material	geotextile	LLDPE	Geotextile (HPS3)	Soils
height of slope base (<i>actual</i>)	H	m	24.00	93.00	93.00
lining thickness	T1	m	1.00	1.00	1.00
slope of liner (<i>actual</i>)	Cot(alpha)		3.00	3.50	3.50
dry density	Gamdry-1	kN/m ³	18.00	18.00	18.00
saturated density	Gamsat-1	kN/m ³	20.00	21.00	21.00
saturated thickness interface	Tw	m	0.00	0.70	0.70
saturated thickness cover soil			0.00	0.00	0.00
interface cohesion	C1	kN/m ²	0.00	0.00	1.90
interface friction angle	Phi-1	deg	30.00	30.00	42.70
soil cohesion	C2	kN/m ²	0.00	0.00	0.00
soil friction angle	Phi-2	deg	30.00	30.00	30.00
active thrust at top of slope	Pa	kN	0.00	0.00	0.00
reinforcement	Tr	kN	0.00	0.00	0.00

Calculations

nett active force		kN	0.00	0.00	0.00
slope of liner	alpha	rads	0.32	0.28	0.28
length of interface	L1	m	75.89	338.53	338.53
length of soil	L2	m	3.16	3.64	3.64
weight of upper wedge	W1	kN	1365.10	6093.45	6093.45
weight of lower wedge	W2	kN	35.63	34.07	34.07
pwp on interface	U'	kN	0.00	0.00	2235.21
pwp in cover soil	U''	kN	24.87	0.00	0.00
Disturbing force	D+Pa-Tr	kN	1674.00	1674.00	1674.00
Resisting Forces	T1	kN	748.25	3382.70	3987.14
	Ts	kN	20.83	19.67	19.67
Factor of Safety	Fs		2.03	2.03	2.39
<i>FoS greater than 1.3 reported in the SRA</i>			YES	YES	YES
Ignore lower wedge	Fs = T1/D		1.73	2.02	2.38
	Lower material	formation	Formation	LLDPE	Geotextile (HPS3)
	Upper material	geotextile	LLDPE	Geotextile (HPS3)	Soils

Critical Interface

Slope Section C4 - Current, Post Drain and Final Profile Stability If the Geotextile is Retained and Overlain by Soils

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Model C4.2b2 Current
1 in 3 0.7 Saturated

Construction plant loading(after Koerner & Soong (1998) 6th Int Conf on Geosynthetics)

weight of equipment		Wb	200	kN	
length of track		w	3	m	
width of track		b	0.6	m	
influence factor		I	0		- 0 if no plant loading
track pressure		q	55.56	kN/m ²	
equivalent equipment force on geomembrane		We	0.00	kN/m	- add to weight of upper wedge
acceleration ratio		(a/g)	0		- 0 if pushing up slope
dynamic force parallel to slope		Fe	0.00	kN/m	- apply as active thrust

Vertical component of inter-slice force neglected to simplify analysis

Data Input

Interface details:	Lower material	Formation	LLDPE	Geotextile (HPS3)
	Upper material	geotextile	LLDPE	Geotextile (HPS3)
height of slope base (actual)	H	m	24.00	93.00
lining thickness	T1	m	1.00	1.00
slope of liner (actual)	Cot(alpha)		3.00	3.00
dry density	Gamdry-1	kN/m ³	18.00	18.00
saturated density	Gamsat-1	kN/m ³	20.00	21.00
saturated thickness interface	Tw	m	0.00	0.70
saturated thickness cover soil			0.00	0.00
interface cohesion	C1	kN/m ²	0.00	1.00
interface friction angle	Phi-1	deg	30.00	40.00
soil cohesion	C2	kN/m ²	0.00	0.00
soil friction angle	Phi-2	deg	30.00	30.00
active thrust at top of slope	Pa	kN	0.00	0.00
reinforcement	Tr	kN	0.00	0.00

Calculations

nett active force		kN	0.00	0.00	0.00	0.00
slope of liner	alpha	rads	0.32	0.32	0.32	0.32
length of interface	L1	m	75.89	294.09	294.09	294.09
length of soil	L2	m	3.16	3.16	3.16	3.16
weight of upper wedge	W1	kN	1365.10	5293.65	5293.65	5293.65
weight of lower wedge	W2	kN	30.00	30.00	30.00	30.00
pwp on interface	U'	kN	0.00	0.00	1915.89	1915.89
pwp in cover soil	U''	kN	24.87	0.00	0.00	0.00
Disturbing Force	D+Pa-Tr	kN	1674.00	1674.00	1674.00	1674.00
Resisting Forces	T1	kN	748.25	2899.45	2900.43	3425.01
	Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety	Fs		1.74	1.74	1.74	2.06
FoS greater than 1.3 reported in the SRA			YES	YES	YES	YES
Ignore lower wedge	Fs = T1/D		1.73	1.73	1.73	2.05
	Lower material	Formation	LLDPE	Geotextile (HPS3)		
	Upper material	geotextile	LLDPE	Geotextile (HPS3)	Soils	

Critical Interface