Slope Section C5 - Current, Post Drain and Final Profile Stability If the Geotextile isd Retained and Overlain by Soils

[Calculates stability of veneer covered slope]

Model C5.2a1
1 in 2.7

Current, Past Drain and Final 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	
track pressure			q	55.56	kN/m2
equivalent equipment force on geomembrane			We	0.00	kN/m
acceleration ratio			(a/g)	0	
dynamic force parallel to slope			Fe	0.00	kN/m

- 0 if no plant loading
- add to weight of upper wedge
- 0 if pushing up slope
- 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	*LLDPE*	*Geotextile (HPS3)*	*Soils*
height of slope base *(actual)*				H	m	*30.00*	*30.00*	*30.00*
lining thickness				T1	m	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*				Cot(alpha)		*2.70*	*2.70*	*2.70*
dry density				Gamdry-1	kN/m3	18.00	18.00	18.00
saturated density				Gamsat-1	kN/m3	21.00	21.00	21.00
saturated thickness interface				Tw	m	0.00	*1.00*	*1.00*
saturated thickness cover soil						*0.00*	*0.00*	*0.00*
interface cohesion				C1	kN/m2	0.00	1.00	1.90
interface friction angle				Phi-1	deg	30.00	40.00	42.70
soil cohesion				C2	kN/m2	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	0.35	0.35	0.35
length of interface			L1	m	86.38	86.38	86.38
length of soil			L2	m	2.88	2.88	2.88
weight of upper wedge			W1	kN	1554.79	1554.79	1554.79
weight of lower wedge			W2	kN	27.63	27.63	27.63
pwp on interface			U'	kN	0.00	794.61	794.61
pwp in cover soil			U''	kN	0.00	0.00	0.00
Disturbing force			D+Pa-Tr	kN	540.00	540.00	540.00
Resisting Forces			T1	kN	841.78	643.03	776.28
			Ts	kN	15.95	15.95	15.95
Factor of Safety			**Fs**		**1.59**	**1.22**	**1.47**
FoS greater than 1.3 reported in the SRA					*YES*	*YES*	*YES*
Ignore lower wedge			Fs = T1/D		1.56	1.19	1.44
			Lower material		*Formation*	*LLDPE*	*Geotextile (HPS3)*
			Upper material		*LLDPE*	*Geotextile (HPS3)*	*Soils*

Critical Interface

Slope Section C5 - Current, Post Drain and Final Profile Stability If the Geotextile isd Retained and Overlain by Soils

Calculates stability of veneer covered slope

Model C5.2b1
1 in 3

Current, Past Drain and Final 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/m2	
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:				formation	Formation	LLDPE	Geotextile (HPS3)
		Lower material					
		Upper material		geotextile	LLDPE	Geotextile (HPS3)	Soils
height of slope base *(actual)*		H	m	24.00	30.00	30.00	30.00
lining thickness		T1	m	1.00	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/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	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/m2	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/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	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	94.87	94.87	94.87
length of soil		L2	m	3.16	3.16	3.16	3.16
weight of upper wedge		W1	kN	1366.10	1707.63	1707.63	1707.63
weight of lower wedge		W2	kN	35.63	30.00	30.00	30.00
pwp on interface		U'	kN	0.00	0.00	882.90	882.90
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	540.00	540.00	540.00
Resisting Forces		T1	kN	748.25	935.31	713.37	860.43
		Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety		**Fs**		1.78	**1.77**	**1.35**	**1.63**
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 C5 - Current, Post Drain and Final Profile Stability If the Geotextile isd Retained and Overlain by Soils

Calculates stability of veneer covered slope

Model C5.2a2
1 in 2.7

Current, Past Drain and Final
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/m2	
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	*30.00*	*30.00*	*30.00*
lining thickness		T1	m	1.00	*1.00*	*1.00*	*1.00*
slope of liner *(actual)*		Cot(alpha)		3.00	*2.70*	*2.70*	*2.70*
dry density		Gamdry-1	kN/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.70*	*0.70*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	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/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	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	0.35	0.35	0.35
length of interface		L1	m	75.89	86.38	86.38	86.38
length of soil		L2	m	3.16	2.88	2.88	2.88
weight of upper wedge		W1	kN	1366.10	1554.79	1554.79	1554.79
weight of lower wedge		W2	kN	35.63	27.63	27.63	27.63
pwp on interface		U'	kN	0.00	0.00	556.23	556.23
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	540.00	540.00	540.00
Resisting Forces		T1	kN	748.25	841.78	843.05	996.25
		Ts	kN	20.83	15.95	15.95	15.95
Factor of Safety		**Fs**		1.78	**1.59**	**1.59**	**1.88**
FoS greater than 1.3 reported in the SRA				YES	*YES*	*YES*	*YES*
Ignore lower wedge		Fs = T1/D		1.73	1.56	1.56	1.84
		Lower material		formation	*Formation*	*LLDPE*	*Geotextile (HPS3)*
		Upper material		geotextile	*LLDPE*	*Geotextile (HPS3)*	*Soils*

Critical Interface

Slope Section C5 - Current, Post Drain and Final Profile Stability If the Geotextile isd Retained and Overlain by Soils

Calculates stability of veneer covered slope

Model C5.2b2
1 in 3

Current, Past Drain and Final
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/m2
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:					*Formation*	*LLDPE*	*Geotextile (HPS3)*
		Lower material		*formation*	*Formation*	*LLDPE*	*Geotextile (HPS3)*
		Upper material		*geotextile*	*LLDPE*	*Geotextile (HPS3)*	*Soils*
height of slope base *(actual)*		H	m	24.00	*30.00*	*30.00*	*30.00*
lining thickness		T1	m	1.00	*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/m3	18.00	18.00	18.00	18.00
saturated density		Gamsat-1	kN/m3	20.00	21.00	21.00	21.00
saturated thickness interface		Tw	m	0.00	0.00	*0.70*	*0.70*
saturated thickness cover soil				1.30	*0.00*	*0.00*	*0.00*
interface cohesion		C1	kN/m2	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/m2	5.00	0.00	0.00	0.00
soil friction angle		Phi-2	deg	25.00	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	94.87	94.87	94.87
length of soil		L2	m	3.16	3.16	3.16	3.16
weight of upper wedge		W1	kN	1366.10	1707.63	1707.63	1707.63
weight of lower wedge		W2	kN	35.63	30.00	30.00	30.00
pwp on interface		U'	kN	0.00	0.00	618.03	618.03
pwp in cover soil		U''	kN	24.87	0.00	0.00	0.00
Disturbing force		D+Pa-Tr	kN	432.00	540.00	540.00	540.00
Resisting Forces		T1	kN	748.25	935.31	935.62	1104.84
		Ts	kN	20.83	17.32	17.32	17.32
Factor of Safety		**Fs**		1.78	**1.77**	**1.77**	**2.08**
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*	*Formation*	*LLDPE*	*Geotextile (HPS3)*
		Upper material		*geotextile*	*LLDPE*	*Geotextile (HPS3)*	*Soils*

Critical Interface