APPENDIX E

Stability Analysis

URS	PROJECT: IP-Riegelwood Cell 2 Liner System				JOB NO. 31826746	
	SUBJECT: Final Cover Veneer Stability Calculation				SHEET NO. 1 of 2	
CALCULATION SHEET	ORIGINATED BY: Lenore Gaier	DATE: 5/19/2009	CHECKED BY: Rich Lowe	DATE: 6/1/2009	CALC. NO.	REV. NO.

Determine the minimum interface friction angle for the components of the final cover

Reference: Matasovic, N. (1991), "Selection of Method for Seismic Slope Stability Analysis," Proc. 2nd International Conference on Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics, St. Louis, Vol. 2 pp. 1057-1062.

Treat the final cover as an infinite slope and use the following equation

$$FS = \frac{c/(\partial * z * \cos^2\beta) + \tan\Phi[1-u/(\partial * z)] - k_s * \tan\beta * \tan\Phi}{k_s + \tan\beta}$$

where:

FS = Factory of Safety; FS (static) = 1.5, FS (dynamic) = 1.0
ks = Seismic Coefficient (= 0 for Static Stability) (Dynamic see attached map)
∂ = Unit Weight of Slope Material(s)
c = Cohesion
Φ = Interface Friction Angle of Assumed Failure Surface (degrees)
u = Pore Pressure (above geomembrane)
$u = \partial_w(z-d_w)$ (for pore pressure)
∂_w = Unit Weight of Water (62.4 psf)
z = Depth to Failure Surface
d_w = Depth to Seepage Surface (= z if slope is Dry)
β = Slope Angle of Cover

Given:

FS =	To be calculated	
ks =	0	Static Conditions
	0.125	Dynamic Conditions
∂ =	120	psf
c =	0	
Φ =	will vary	degrees
u =	0	
z =	2	ft
β =	14	degrees

See drawing for cover cross-section dimensions/slope

URS	PROJECT				JOB NO.	
	IP-Riegelwood Cell 2 Liner System				31826746	
	SUBJECT				SHEET NO.	
	Final Cover Veneer Stability Calculation				2 of 2	
CALCULATION SHEET	ORIGINATED BY	DATE	CHECKED BY	DATE	CALC. NO.	REV. NO.
	Lenore Gaier	5/19/2009	Rich Lowe	6/1/2009		

Calculate Static FS against sliding:

Interface Friction Angle	Resisting Force	Driving Force	FS	Comment
18	0.32	0.25	1.30	No Good
19	0.34	0.25	1.38	No Good
20	0.36	0.25	1.46	No Good
21	0.38	0.25	1.54	GOOD

Calculate Dynamic FS against sliding:

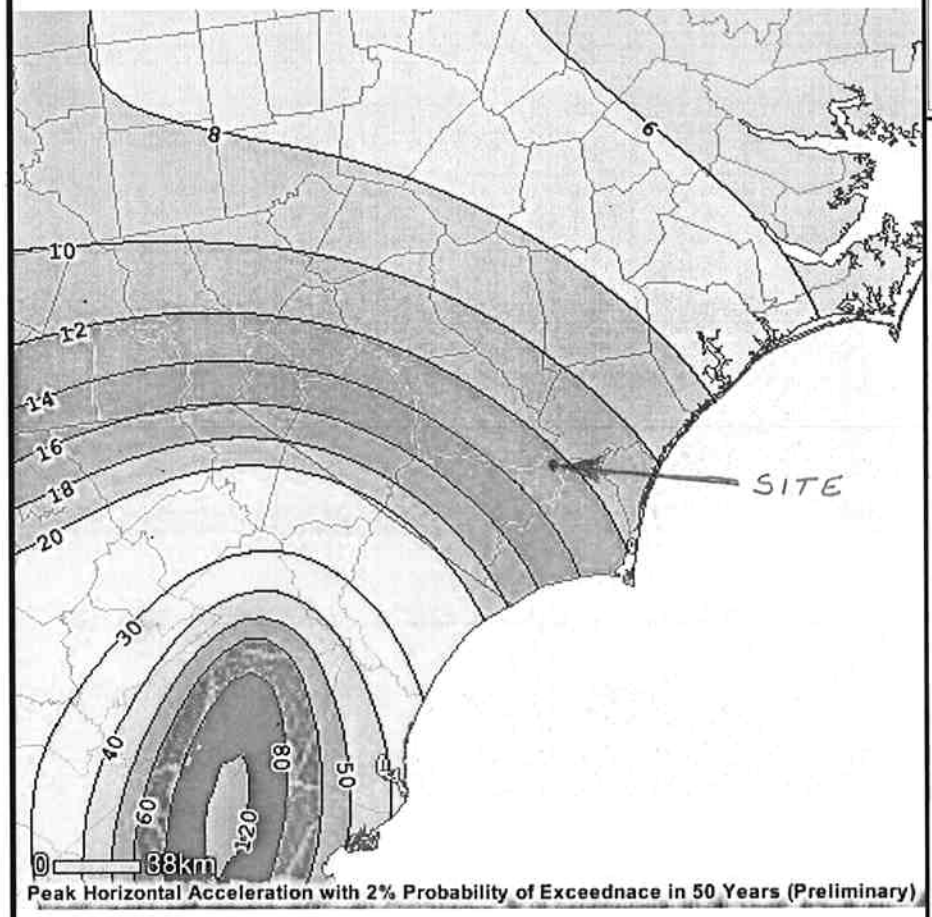
Interface Friction Angle	Resisting Force	Driving Force	FS	Comment
18	0.31	0.37	0.84	No Good
19	0.33	0.37	0.89	No Good
20	0.35	0.37	0.94	No Good
21	0.37	0.37	0.99	GOOD
22	0.39	0.37	1.05	GOOD

RW

Therefore all the interface friction angles for the final cover must have a angle greater than 21 degrees.

The interface friction angle test results table outlines the friction angle between the different interfaces used in Cell 1. All the highlighted numbers are for 150 psf load, the best representation for a final cover. All the interface friction angles in the table are greater than 21 degrees. Therefore if similar material is used to construct the final cover the interface friction angles will meet the specification requirements.

USGS Seismic Hazard Maps



Legend

%g contour labels

%g contours

States

Counties

%g intervals

- > 200
- 160-200
- 120-160
- 80-120
- 60-80
- 50-60
- 40-50
- 30-40
- 20-30
- 18-20
- 16-18
- 14-16
- 12-14
- 10-12
- 8-10
- 6-8
- 4-6
- 2-4
- 0-2

HOLTRACHEM PROPERTY

ACCESS ROAD SEE DETAIL B/G2

PERIMETER DRAINAGE CHANNEL TYPE C SEE DETAIL C/G6

CHANNEL TRANSITION POINT

CHANNEL TRANSITION POINT

PERIMETER DRAINAGE CHANNEL TYPE B SEE DETAIL C/G6

A/G1

CHANNEL TRANSITION POINT

ANCHOR TRENCH SEE DETAIL E/G3

PERIMETER DRAINAGE CHANNEL TYPE A SEE DETAIL C/G6

CHANNEL TRANSITION POINT

DOWN PIPE SEE DETAIL D/G7

GRADE BREAK

FINAL COVER DRAINAGE SWALE SEE DETAIL A/G7

4:1, (TYP.)

5% (TYP.)

DIVERSION BERM SEE DETAIL A/G7

PERIMETER DRAINAGE CHANNEL TYPE B SEE DETAIL C/G6

2% (TYP.)

5% (TYP.)

FINAL COVER DRAINAGE SWALE SEE DETAIL A/G7

GRADE BREAK

4:1(TYP.)

EXISTING CULVERT

DOWN PIPE SEE DETAIL D/G7

SPILLWAY SEE DETAIL A/G8

PROPOSED ACCESS ROAD SEE DETAIL B/G2

PERIMETER DRAINAGE CHANNEL TYPE C SEE DETAIL C/G6

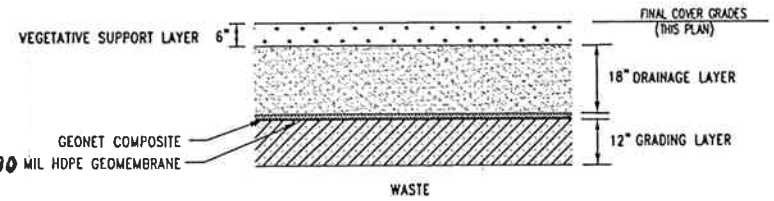
B/G1

EXISTING LANDFILL (NCDENR PERMIT NO. 24-02)

PERIMETER TYPE B SEE DETAIL

DOWN PIPE SEE DETAIL D/G7

SPILLWAY SEE DETAIL A/G8

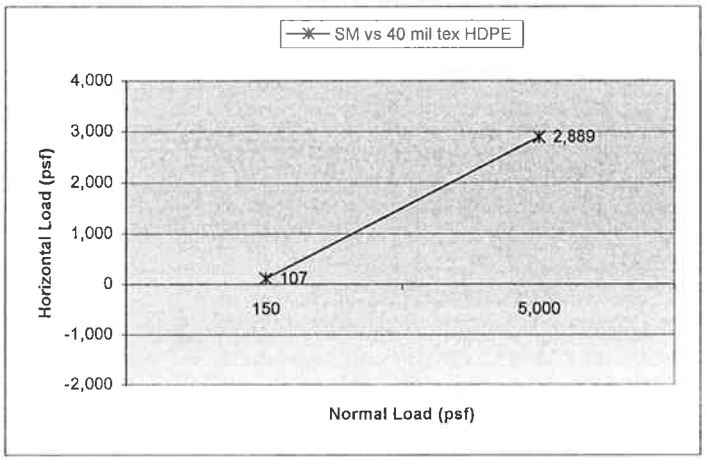


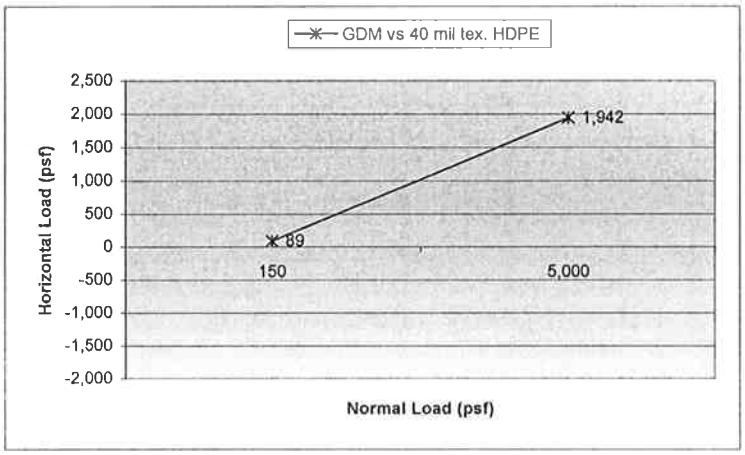
INTERNATIONAL PAPER RELIABILITY ENGINEERING CALCULATION SHEET	PROJECT Riegelwood mill landfill 2003				TECH. JOB NO.	
	SUBJECT Interface Friction Test Results Summary				SHEET NO.	
	ORIGINATED BY Rich Lowe	DATE 4/7/2005	CHECKED BY	DATE	CALC. NO.	REV. NO.

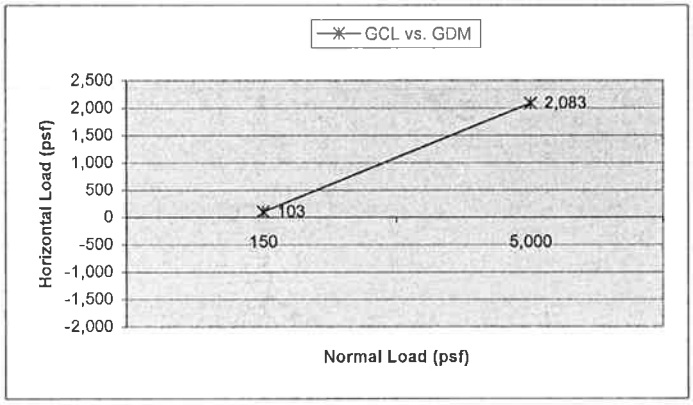
Interface Friction Test Results

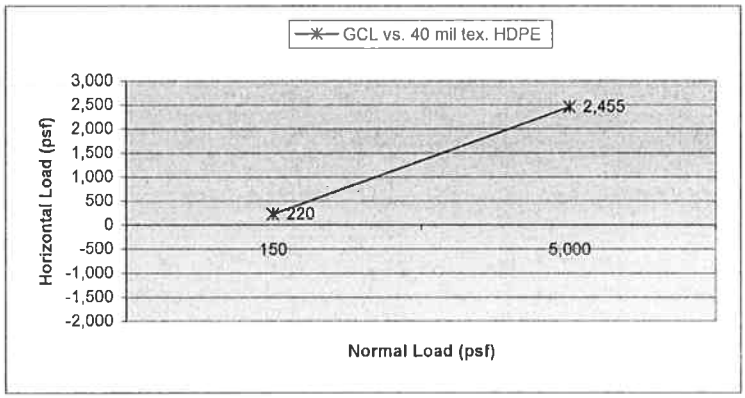
normal load	150	5,000	calculated	
Interface	psf load (95 psf min req. result)	psf load (2,000 min. req. result)	cohesion psf	friction angle
south pond soil vs. SM vs 40 mil tex HDPE	107	2,889	21.0	29.84
Geonet Drainage media GDM vs 40 mil tex. HDPE	89	1,942	31.7	30.68 20.91
GCL vs. GDM	103	2,083	41.8	22.21
GCL vs. 40 mil tex. HDPE	220	2,455	150.9	24.74
south pond soil SM vs GDM	104	3,232	7.3	34.73 32.82
gooseneck borrow SM vs. GDM	135	2,895	49.6	41.99 29.64
gooseneck borrow SM vs. 40 mil tex. HDPE	153	3,029	64.1	45.57 30.67

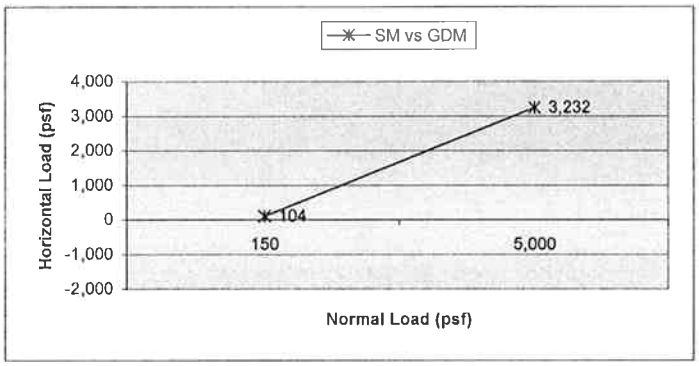
Data obtained from Cell 1 as-built report

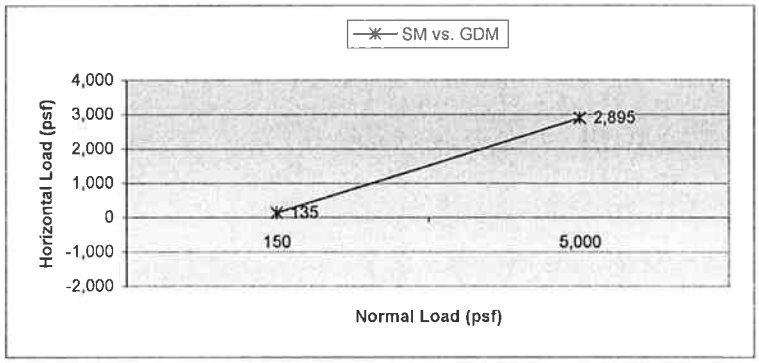

SM vs 40 mil tex HDPE
Horizontal Load (psf)
4,000
3,000
2,000
1,000
0
-1,000
-2,000
2,889
107
150
5,000
Normal Load (psf)

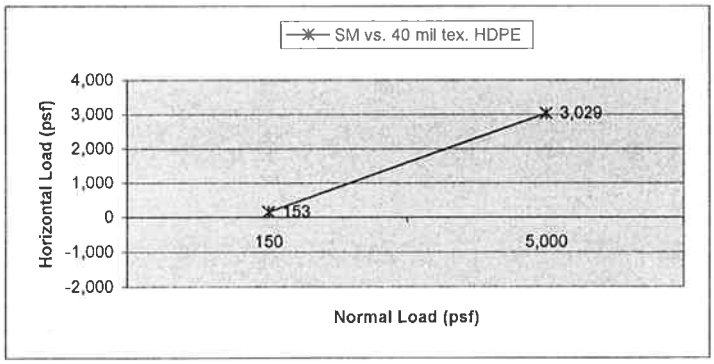

GDM vs 40 mil tex. HDPE
Horizontal Load (psf)
2,500
2,000
1,500
1,000
500
0
-500
-1,000
-1,500
-2,000
1,942
89
150
5,000
Normal Load (psf)


GCL vs. GDM
Horizontal Load (psf)
2,500
2,000
1,500
1,000
500
0
-500
-1,000
-1,500
-2,000
2,083
103
150
5,000
Normal Load (psf)


GCL vs. 40 mil tex. HDPE
Horizontal Load (psf)
3,000
2,500
2,000
1,500
1,000
500
0
-500
-1,000
-1,500
-2,000
2,455
220
150
5,000
Normal Load (psf)


SM vs GDM
Horizontal Load (psf)
4,000
3,000
2,000
1,000
0
-1,000
-2,000
3,232
104
150
5,000
Normal Load (psf)


SM vs. GDM
Horizontal Load (psf)
4,000
3,000
2,000
1,000
0
-1,000
-2,000
2,895
135
150
5,000
Normal Load (psf)


SM vs. 40 mil tex. HDPE
Horizontal Load (psf)
4,000
3,000
2,000
1,000
0
-1,000
-2,000
3,029
153
150
5,000
Normal Load (psf)

2. Carbon black dispersion required all 10 views in categories 1, 2 or 3 (no category 4 views).

The manufacturer's conformance tests showed all rolls tested met or exceeded the Project Specifications. The Manufacturer's Quality Control Certificates were obtained for all rolls of geomembrane delivered to the site. Lists were also obtained including resin batch/lot numbers for each roll. Each certificate was reviewed for conformance with the geomembrane and resin properties outlined in the project specification. Manufacturer's quality control certificates for each roll are presented in **Appendix 7.2**.

7.3 Interface Friction Tests (All)

The contractor was also required to perform interface friction tests on the geosynthetics and the site soil. Interface friction tests for all materials are summarized in **Table7.2**.

Table 7.2: Interface Friction (ASTM D 5321) Test Summary

Interface	150 psf Load (95 psf min req. Result)	5,000 psf Load (2,000 min. req. Result)
South Ponds Soil vs. 40 mil Geomembrane	107	2,889
Geonet Drainage Media vs. 40-mil Geomembrane	89	1,942
GCL vs. Geonet Drainage Media	103	2,083
GCL vs. 40-mil Geomembrane	220	2,455
South Ponds Soil vs. Geonet Drainage Media	104	3,232
Gooseneck Soil vs. Geocomposite	135	2,895
Gooseneck Soil vs. 40-mil Geomembrane	153	3,029

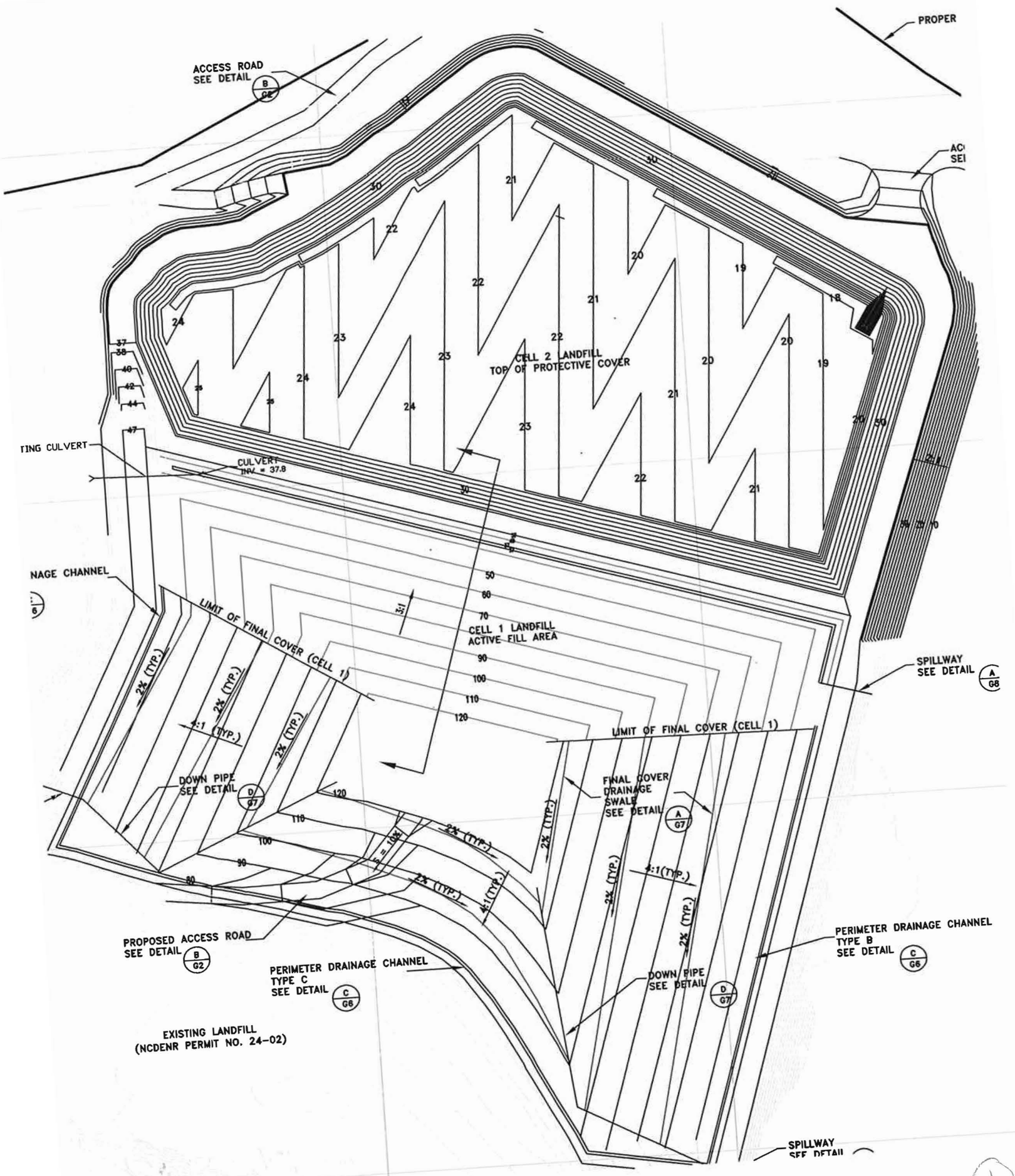
The shear strength values for the geonet drainage media against the geomembrane were below the required values. However, the friction angles represented by those results (30.6° and 21.2°) were higher than the value of 20° used in the stability analysis to give a factor of safety of 1.5. Therefore, the geomembrane was accepted for use with the geocomposite.

7.4 Geomembrane Conformance Testing

In addition to the tests performed by the manufacturer, CQA tests were required for the same properties at a frequency of one test every 200,000 square feet, or one test per lot. CQA

OPERATIONAL SLOPE STABILITY ANALYSIS

DESCRIPTION	PAGE
Operational Drawing Showing Cross-Section Location	1
Soil, Cohesion and Friction Φ Data	2
Maximum Acceleration Chart for Seismic Analysis	3
Cross-Section Showing Failure Surfaces	4
PCSTABL6 Analysis for Trial 1	5
PCSTABL6 Analysis for Trial 2	18
PCSTABL6 Analysis for Trial 3	31
PCSTABL6 Analysis for Trial 4	44


PROPER
ACCESS ROAD
SEE DETAIL
B
G2
CELL 2 LANDFILL
TOP OF PROTECTIVE COVER
TING CULVERT
CULVERT
INV = 37.8
NAGE CHANNEL
LIMIT OF FINAL COVER (CELL 1)
3:1
CELL 1 LANDFILL
ACTIVE FILL AREA
2% (TYP.)
4:1 (TYP.)
DOWN PIPE
SEE DETAIL
D
G7
SPILLWAY
SEE DETAIL
A
G8
LIMIT OF FINAL COVER (CELL 1)
FINAL COVER
DRAINAGE
SWALE
SEE DETAIL
A
G7
PROPOSED ACCESS ROAD
SEE DETAIL
B
G2
PERIMETER DRAINAGE CHANNEL
TYPE C
SEE DETAIL
C
G6
PERIMETER DRAINAGE CHANNEL
TYPE B
SEE DETAIL
C
G6
DOWN PIPE
SEE DETAIL
D
G7
EXISTING LANDFILL
(NCDENR PERMIT NO. 24-02)
SPILLWAY

1

URS	PROJECT				JOB NO.	
	IP-Riegelwood Cell 2 Liner Design/Permit Plans					
	SUBJECT				SHEET NO.	
	Slope Stability Analysis - Undrained Analysis				2	
CALCULATION SHEET	ORIGINATED BY	DATE	CHECKED BY	DATE	CALC. NO.	REV. NO.
	Rich Lowe	5/27/2009				

	Landfilled Materials	Ben Use Primary	Protective Cover	Geosynth	Nat Sand	Pee Dee
Moist Den (pcf)	60	60	120	60	120	125
Sat Den (pcf)	63	63	125	60	125	130
cohesion (psf)	430	430	0	31.7	0	720
friction Φ (deg)	8	8	34	21	32	5
source	(1)	(2)	(3)	(4)	(5)	(6)

(1) Low average of 2001 Virginia Geotechnical Tests for Joyce Engr

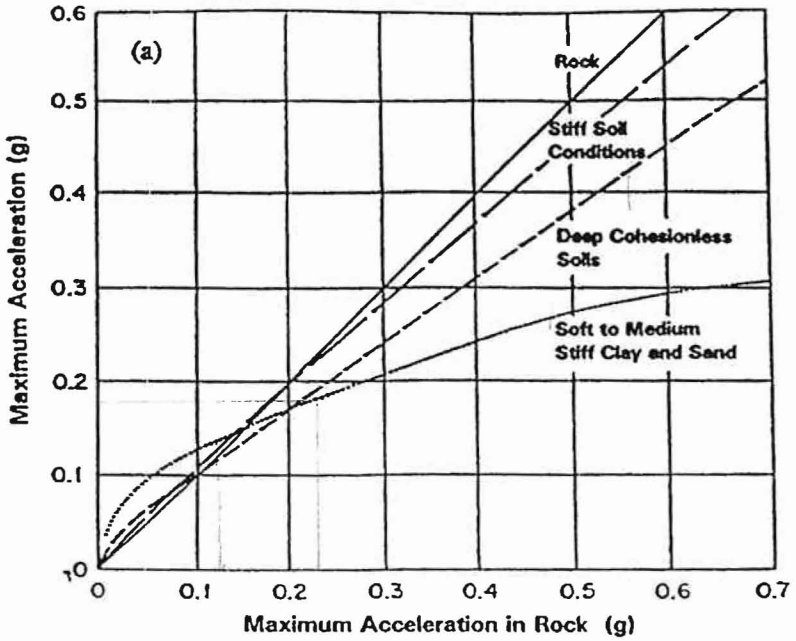
(2) Low average of 2001 Virginia Geotechnical Tests for Joyce Engr

(3) 1991 RMT Borrow direct shear test results quoted by S&ME in 1993

(4) 2003 Cell 1 Interface friction testing (GDM/HDPET interface) GNRA

(5) Upper existing embankment sand properties from S&ME 1993

(6) Undrained strength test results on Pee Dee from S&ME 1993



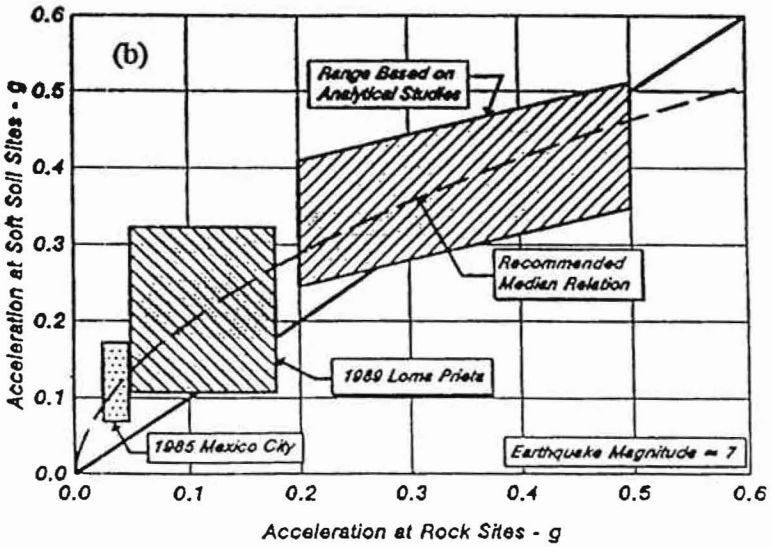
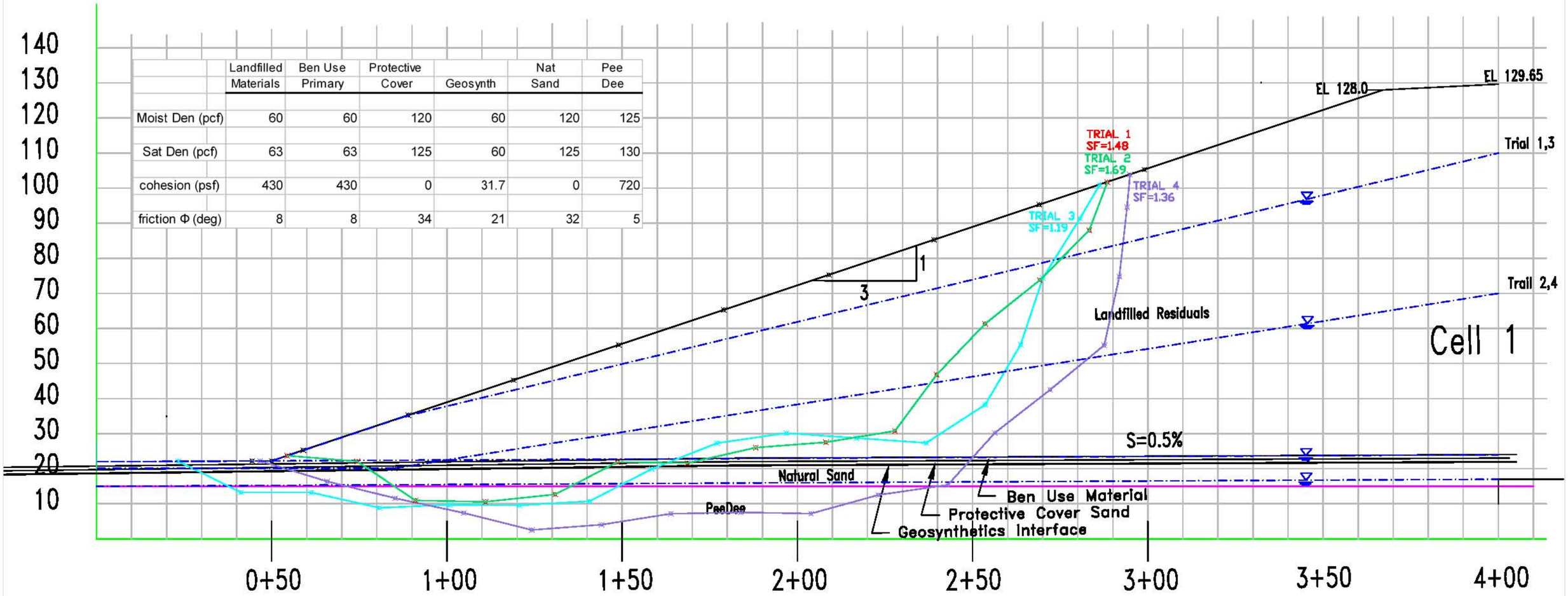


Figure 4.4 Relationship Between Maximum Acceleration on Rock and Other Local Site Conditions: (a) Seed and Idriss (1982); (b) Idriss (1990).

3

IP RIEGELWOOD
INTERMEDIATE SLOPE
CROSS-SECTION

	Landfilled Materials	Ben Use Primary	Protective Cover	Geosynth	Nat Sand	Pee Dee
Moist Den (pcf)	60	60	120	60	120	125
Sat Den (pcf)	63	63	125	60	125	130
cohesion (psf)	430	430	0	31.7	0	720
friction Φ (deg)	8	8	34	21	32	5



NOT TO SCALE

Trail 1

** PCSTABL6 **

by
Purdue University

modified by
Peter J. Bosscher
University of Wisconsin-Madison

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

PROBLEM DESCRIPTION Intermediate Cover 3:1 Trial 1

BOUNDARY COORDINATES

3 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	22.00	50.00	22.25	2
2	50.00	22.25	367.25	128.00	1
3	367.25	128.00	400.00	128.20	1
4	50.00	22.25	400.00	24.00	2
5	0.00	21.00	400.00	23.00	3
6	0.00	20.10	400.00	22.10	4
7	0.00	20.00	400.00	22.00	5
8	0.00	15.00	400.00	15.00	6

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	60.0	63.0	430.0	8.0	0.00	0.0	1
2	60.0	63.0	430.0	8.0	0.00	0.0	1
3	120.0	125.0	0.0	34.0	0.00	0.0	2
4	60.0	60.0	31.7	21.0	0.00	0.0	2
5	120.0	125.0	0.0	32.0	0.00	0.0	3
6	125.0	130.0	720.0	5.0	0.00	0.0	3

3 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	50.00	22.25
3	88.25	35.00
4	400.00	110.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	400.00	24.00

Piezometric Surface No. 3 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	15.00
2	400.00	17.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Irregular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 100.00 ft.
and X = 300.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.44	23.73
2	74.38	22.10
3	90.99	10.96
4	110.99	10.59
5	130.88	12.70
6	148.63	21.90
7	168.63	21.62
8	188.14	26.02
9	208.08	27.55
10	227.82	30.79
11	239.75	46.84
12	253.55	61.32
13	269.19	73.79
14	283.27	87.98
15	288.46	101.74

*** 1.478 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	41.25	13.23
3	61.25	13.21
4	80.77	8.87
5	100.76	9.72
6	120.75	9.57
7	140.72	10.74
8	158.48	19.95
9	177.07	27.31
10	196.87	30.16
11	216.82	28.74
12	236.77	27.36
13	253.56	38.24
14	263.74	55.45

15	270.06	74.42
16	280.65	91.39
17	286.25	101.00

*** 1.508 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	46.67	22.23
2	65.80	16.41
3	85.21	11.58
4	104.77	7.41
5	124.17	2.54
6	144.11	4.05
7	163.87	7.18
8	183.86	7.57
9	203.86	7.21
10	223.14	12.54
11	242.93	15.39
12	256.33	30.24
13	272.11	42.53
14	287.56	55.23
15	291.86	74.77
16	294.07	94.64
17	294.90	103.88

*** 1.613 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.93	18.10
3	62.33	13.25
4	82.31	14.07
5	102.31	14.15
6	122.24	12.50
7	142.10	10.12
8	161.89	13.01
9	181.21	18.19
10	200.74	22.51
11	219.84	28.43
12	234.58	41.95
13	248.49	56.32
14	261.35	71.64
15	273.75	87.33
16	277.18	97.98

*** 1.628 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	28.92
2	89.95	30.28
3	109.86	32.22
4	129.79	30.61
5	149.22	25.84
6	168.78	21.70
7	187.47	28.82
8	204.82	38.77
9	219.60	52.25
10	225.62	71.32
11	230.73	82.49

*** 1.656 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.11	15.23
3	57.26	2.17
4	77.26	2.11
5	94.97	11.41
6	114.91	9.95
7	134.44	5.61
8	153.72	0.33
9	173.66	1.87
10	193.56	3.89
11	213.07	8.31
12	224.50	24.72
13	235.02	41.73
14	244.32	59.43
15	252.76	77.57
16	269.26	88.87
17	272.82	96.52

*** 1.671 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	37.74	8.24
3	56.42	1.10
4	76.32	3.07
5	92.98	14.14
6	109.84	24.90
7	129.44	28.86
8	149.42	27.98
9	169.29	30.25
10	188.34	24.15
11	207.73	29.06
12	219.95	44.89
13	236.67	55.87
14	248.57	71.94
15	262.54	86.25
16	271.25	96.00

*** 1.696 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.11	22.16
2	47.90	11.29
3	65.45	1.69
4	85.38	0.02
5	104.63	5.42
6	124.18	1.21
7	143.63	5.88
8	157.16	20.61
9	175.02	29.61
10	189.16	43.75
11	204.77	56.25
12	219.79	69.46
13	222.98	79.91

*** 1.840 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	26.32
2	76.42	12.24
3	96.42	12.13
4	116.37	10.71
5	136.05	14.31
6	155.18	20.11
7	174.56	25.08
8	193.26	32.17
9	205.81	47.74
10	216.84	64.42
11	225.70	80.82

*** 1.845 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.89	22.19
2	53.03	8.05
3	72.35	2.88
4	92.25	4.89
5	111.82	0.75
6	131.67	3.18
7	149.71	11.80
8	164.36	25.42
9	182.63	33.55
10	194.92	49.33
11	204.85	66.69
12	206.99	74.58

*** 1.858 ***

```
          Y            A     X     I     S            F     T

          0.00     50.00    100.00    150.00    200.00    250.00

X      0.00 +--**-----+---------+---------+---------+---------+
            -   .
            - . .
            - ..2
            ... 8
            -.724
      50.00 ..8.*
            6..2 1
            8..3. 5
            679.1.
            8.24..
            .017..5W
A    100.00 ..24.....
            031..75...
            ..2.......
            83.4.......
            .6.1 .5....
            -32.........
X    150.00 6.0.157.....
            - .42..... ..
            -3..107. ....
            6 .  28. ... .
            - 3.4 50......
            -6.  19 .80....
I    200.00 +3   42    ....
            -  .. 1 5.98.0.0
            - 6   2 .75 .98..
            -  3 61  ..  .5.8
            -    2  4  7.   5.
            -  3     1  6. .
S    250.00 +      .2  41 7 6.
            -     3   .   4  ..
            -          2   1 76.
            -        3       4 64
            -                 1 2
            -          3   3   313
      300.00 +
            -
            -
            -
            -
            -
F    350.00 +
            -
            -                        *
            -
            -
            -
T    400.00 +  ***                W   *
```

Trail 2

** PCSTABL6 **

by
Purdue University

modified by
Peter J. Bosscher
University of Wisconsin-Madison

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

PROBLEM DESCRIPTION Intermediate Cover 3:1 Trial 2

BOUNDARY COORDINATES

3 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	22.00	50.00	22.25	2
2	50.00	22.25	367.25	128.00	1
3	367.25	128.00	400.00	128.20	1
4	50.00	22.25	400.00	24.00	2
5	0.00	21.00	400.00	23.00	3
6	0.00	20.10	400.00	22.10	4
7	0.00	20.00	400.00	22.00	5
8	0.00	15.00	400.00	15.00	6

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	60.0	63.0	430.0	8.0	0.00	0.0	1
2	60.0	63.0	430.0	8.0	0.00	0.0	1
3	120.0	125.0	0.0	34.0	0.00	0.0	2
4	60.0	60.0	31.7	21.0	0.00	0.0	2
5	120.0	125.0	0.0	32.0	0.00	0.0	3
6	125.0	130.0	720.0	5.0	0.00	0.0	3

3 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 3 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	20.10
2	85.00	20.10
3	400.00	70.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	400.00	24.00

Piezometric Surface No. 3 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	15.00
2	400.00	17.00

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Irregular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 100.00 ft.
and X = 300.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.44	23.73
2	74.38	22.10
3	90.99	10.96
4	110.99	10.59
5	130.88	12.70
6	148.63	21.90
7	168.63	21.62
8	188.14	26.02
9	208.08	27.55
10	227.82	30.79
11	239.75	46.84
12	253.55	61.32
13	269.19	73.79
14	283.27	87.98
15	288.46	101.74

*** 1.689 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	41.25	13.23
3	61.25	13.21
4	80.77	8.87
5	100.76	9.72
6	120.75	9.57
7	140.72	10.74
8	158.48	19.95
9	177.07	27.31
10	196.87	30.16
11	216.82	28.74
12	236.77	27.36
13	253.56	38.24
14	263.74	55.45

15	270.06	74.42
16	280.65	91.39
17	286.25	101.00

*** 1.752 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.93	18.10
3	62.33	13.25
4	82.31	14.07
5	102.31	14.15
6	122.24	12.50
7	142.10	10.12
8	161.89	13.01
9	181.21	18.19
10	200.74	22.51
11	219.84	28.43
12	234.58	41.95
13	248.49	56.32
14	261.35	71.64
15	273.75	87.33
16	277.18	97.98

*** 1.778 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	46.67	22.23
2	65.80	16.41
3	85.21	11.58
4	104.77	7.41
5	124.17	2.54
6	144.11	4.05
7	163.87	7.18
8	183.86	7.57
9	203.86	7.21
10	223.14	12.54
11	242.93	15.39
12	256.33	30.24
13	272.11	42.53
14	287.56	55.23
15	291.86	74.77
16	294.07	94.64
17	294.90	103.88

*** 1.784 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.11	15.23
3	57.26	2.17
4	77.26	2.11
5	94.97	11.41
6	114.91	9.95
7	134.44	5.61
8	153.72	0.33
9	173.66	1.87
10	193.56	3.89
11	213.07	8.31
12	224.50	24.72
13	235.02	41.73
14	244.32	59.43
15	252.76	77.57
16	269.26	88.87
17	272.82	96.52

*** 1.799 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.11	22.16
2	47.90	11.29
3	65.45	1.69
4	85.38	0.02
5	104.63	5.42
6	124.18	1.21
7	143.63	5.88
8	157.16	20.61
9	175.02	29.61
10	189.16	43.75
11	204.77	56.25
12	219.79	69.46
13	222.98	79.91

*** 1.982 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	37.74	8.24
3	56.42	1.10
4	76.32	3.07
5	92.98	14.14
6	109.84	24.90
7	129.44	28.86
8	149.42	27.98
9	169.29	30.25
10	188.34	24.15
11	207.73	29.06
12	219.95	44.89
13	236.67	55.87
14	248.57	71.94
15	262.54	86.25
16	271.25	96.00

*** 1.995 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.89	22.19
2	53.03	8.05
3	72.35	2.88
4	92.25	4.89
5	111.82	0.75
6	131.67	3.18
7	149.71	11.80
8	164.36	25.42
9	182.63	33.55
10	194.92	49.33
11	204.85	66.69
12	206.99	74.58

*** 2.008 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	26.32
2	76.42	12.24
3	96.42	12.13
4	116.37	10.71
5	136.05	14.31
6	155.18	20.11
7	174.56	25.08
8	193.26	32.17
9	205.81	47.74
10	216.84	64.42
11	225.70	80.82

*** 2.028 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	28.92
2	89.95	30.28
3	109.86	32.22
4	129.79	30.61
5	149.22	25.84
6	168.78	21.70
7	187.47	28.82
8	204.82	38.77
9	219.60	52.25
10	225.62	71.32
11	230.73	82.49

*** 2.063 ***

```
            Y            A     X     I     S            F     T

            0.00     50.00    100.00    150.00    200.00    250.00

X      0.00 +--**-----+---------+---------+---------+---------+
            -   .
            - . .
            - ..2
            ... 6
            -.723
      50.00 ..6.*
            5..2 1
            6..4. 0
            579.1.
            6.23W.
            .817..0
A    100.00 ..23.....
            841..70...
            ..2.......
            64.3.......
            .5.1 .7....
            -42.........
X    150.00 5.8.107.....
            - .32..... ..
            -4..187. ....
            5 .  26. ... .
            - 4.3 08......
            -5.  19 .68....
I    200.00 +4   32    ....
            -  .. 1 0.96.8.8
            - 5   2 .70 .96..
            -  4 51  ..  .0.6
            -    2  3  7.   0.
            -  4     1  5. .
S    250.00 +      .2  31 7 5.
            -     4   .   3  ..
            -          2   1 75.
            -        4       3 53
            -                 1 2
            -          4   4   414
     300.00 +
            -
            -
            -
            -
            -
F    350.00 +
            -
            -                        *
            -
            -
            -
T    400.00 +  ***        W           *
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Trail 3

** PCSTABL6 **

by
Purdue University

modified by
Peter J. Bosscher
University of Wisconsin-Madison

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

PROBLEM DESCRIPTION Intermed. Cover Trial 1 Seis g=.07

BOUNDARY COORDINATES

3 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	22.00	50.00	22.25	2
2	50.00	22.25	367.25	128.00	1
3	367.25	128.00	400.00	128.20	1
4	50.00	22.25	400.00	24.00	2
5	0.00	21.00	400.00	23.00	3
6	0.00	20.10	400.00	22.10	4
7	0.00	20.00	400.00	22.00	5
8	0.00	15.00	400.00	15.00	6

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	60.0	63.0	430.0	8.0	0.00	0.0	1
2	60.0	63.0	430.0	8.0	0.00	0.0	1
3	120.0	125.0	0.0	34.0	0.00	0.0	2
4	60.0	60.0	31.7	21.0	0.00	0.0	2
5	120.0	125.0	0.0	32.0	0.00	0.0	3
6	125.0	130.0	720.0	5.0	0.00	0.0	3

3 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 4 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	50.00	22.25
3	88.25	35.00
4	400.00	110.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	400.00	24.00

Piezometric Surface No. 3 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	15.00
2	400.00	17.00

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0 psf

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Irregular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 100.00 ft.
and X = 300.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	41.25	13.23
3	61.25	13.21
4	80.77	8.87
5	100.76	9.72
6	120.75	9.57
7	140.72	10.74
8	158.48	19.95
9	177.07	27.31
10	196.87	30.16
11	216.82	28.74
12	236.77	27.36
13	253.56	38.24
14	263.74	55.45
15	270.06	74.42
16	280.65	91.39
17	286.25	101.00

*** 1.191 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.44	23.73
2	74.38	22.10
3	90.99	10.96
4	110.99	10.59
5	130.88	12.70
6	148.63	21.90
7	168.63	21.62
8	188.14	26.02
9	208.08	27.55
10	227.82	30.79
11	239.75	46.84
12	253.55	61.32

13	269.19	73.79
14	283.27	87.98
15	288.46	101.74

*** 1.196 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	46.67	22.23
2	65.80	16.41
3	85.21	11.58
4	104.77	7.41
5	124.17	2.54
6	144.11	4.05
7	163.87	7.18
8	183.86	7.57
9	203.86	7.21
10	223.14	12.54
11	242.93	15.39
12	256.33	30.24
13	272.11	42.53
14	287.56	55.23
15	291.86	74.77
16	294.07	94.64
17	294.90	103.88

*** 1.230 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.11	15.23
3	57.26	2.17
4	77.26	2.11
5	94.97	11.41
6	114.91	9.95
7	134.44	5.61
8	153.72	0.33
9	173.66	1.87
10	193.56	3.89
11	213.07	8.31
12	224.50	24.72
13	235.02	41.73
14	244.32	59.43
15	252.76	77.57
16	269.26	88.87
17	272.82	96.52

*** 1.283 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.93	18.10
3	62.33	13.25
4	82.31	14.07
5	102.31	14.15
6	122.24	12.50
7	142.10	10.12
8	161.89	13.01
9	181.21	18.19
10	200.74	22.51
11	219.84	28.43
12	234.58	41.95
13	248.49	56.32
14	261.35	71.64
15	273.75	87.33
16	277.18	97.98

*** 1.293 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	37.74	8.24
3	56.42	1.10
4	76.32	3.07
5	92.98	14.14
6	109.84	24.90
7	129.44	28.86
8	149.42	27.98
9	169.29	30.25
10	188.34	24.15
11	207.73	29.06
12	219.95	44.89
13	236.67	55.87
14	248.57	71.94
15	262.54	86.25
16	271.25	96.00

*** 1.339 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	28.92
2	89.95	30.28
3	109.86	32.22
4	129.79	30.61
5	149.22	25.84
6	168.78	21.70
7	187.47	28.82
8	204.82	38.77
9	219.60	52.25
10	225.62	71.32
11	230.73	82.49

*** 1.343 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.11	22.16
2	47.90	11.29
3	65.45	1.69
4	85.38	0.02
5	104.63	5.42
6	124.18	1.21
7	143.63	5.88
8	157.16	20.61
9	175.02	29.61
10	189.16	43.75
11	204.77	56.25
12	219.79	69.46
13	222.98	79.91

*** 1.409 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.89	22.19
2	53.03	8.05
3	72.35	2.88
4	92.25	4.89
5	111.82	0.75
6	131.67	3.18
7	149.71	11.80
8	164.36	25.42
9	182.63	33.55
10	194.92	49.33
11	204.85	66.69
12	206.99	74.58

*** 1.427 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	26.32
2	76.42	12.24
3	96.42	12.13
4	116.37	10.71
5	136.05	14.31
6	155.18	20.11
7	174.56	25.08
8	193.26	32.17
9	205.81	47.74
10	216.84	64.42
11	225.70	80.82

*** 1.482 ***

```
          Y            A     X     I     S            F     T

          0.00     50.00    100.00    150.00    200.00    250.00

X      0.00 +--**-----+---------+---------+---------+---------+
            -   .
            - . .
            - ..1
            ... 8
            -.615
      50.00 ..8.*
            4..1 2
            8..3. 7
            460.2.
            8.15..
            .926..7W
A    100.00 ..15.....
            932..67...
            ..1.......
            83.5.......
            .4.2 .6....
            -31.........
X    150.00 4.9.276.....
            - .51..... ..
            -3..296. ....
            4 .  18. ... .
            - 3.5 79......
            -4.  20 .89....
I    200.00 +3   51    ....
            -  .. 2 7.08.9.9
            - 4   1 .67 .08..
            -  3 42  ..  .7.8
            -    1  4  6.   7.
            -  3     2  4. .
S    250.00 +      .1  52 6 4.
            -     3   .   5  ..
            -          1   1 64.
            -        3       5 45
            -                 1 1
            -          3   3   323
      300.00 +
            -
            -
            -
            -
            -
F    350.00 +
            -
            -                        *
            -
            -
            -
T    400.00 +  ***               W   *
```

Trail 4

** PCSTABL6 **

by
Purdue University

modified by
Peter J. Bosscher
University of Wisconsin-Madison

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

PROBLEM DESCRIPTION Intermediate Cover Trial 2 Seis g=.07

BOUNDARY COORDINATES

3 Top Boundaries
8 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	22.00	50.00	22.25	2
2	50.00	22.25	367.25	128.00	1
3	367.25	128.00	400.00	128.20	1
4	50.00	22.25	400.00	24.00	2
5	0.00	21.00	400.00	23.00	3
6	0.00	20.10	400.00	22.10	4
7	0.00	20.00	400.00	22.00	5
8	0.00	15.00	400.00	15.00	6

ISOTROPIC SOIL PARAMETERS

6 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	60.0	63.0	430.0	8.0	0.00	0.0	1
2	60.0	63.0	430.0	8.0	0.00	0.0	1
3	120.0	125.0	0.0	34.0	0.00	0.0	2
4	60.0	60.0	31.7	21.0	0.00	0.0	2
5	120.0	125.0	0.0	32.0	0.00	0.0	3
6	125.0	130.0	720.0	5.0	0.00	0.0	3

3 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 3 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	20.10
2	85.00	20.10
3	400.00	70.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	22.00
2	400.00	24.00

Piezometric Surface No. 3 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	0.00	15.00
2	400.00	17.00

A Horizontal Earthquake Loading Coefficient
Of0.070 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of0.000 Has Been Assigned

Cavitation Pressure = 0.0 psf

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Irregular Surfaces, Has Been Specified.

100 Trial Surfaces Have Been Generated.

10 Surfaces Initiate From Each Of 10 Points Equally Spaced Along The Ground Surface Between X = 0.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 100.00 ft.
and X = 300.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = 0.00 ft.

20.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial Failure Surfaces Examined. They Are Ordered - Most Critical First.

* * Safety Factors Are Calculated By The Modified Janbu Method * *

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	46.67	22.23
2	65.80	16.41
3	85.21	11.58
4	104.77	7.41
5	124.17	2.54
6	144.11	4.05
7	163.87	7.18
8	183.86	7.57
9	203.86	7.21
10	223.14	12.54
11	242.93	15.39
12	256.33	30.24
13	272.11	42.53
14	287.56	55.23
15	291.86	74.77
16	294.07	94.64
17	294.90	103.88

*** 1.361 ***

Failure Surface Specified By 15 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	54.44	23.73
2	74.38	22.10
3	90.99	10.96
4	110.99	10.59
5	130.88	12.70
6	148.63	21.90
7	168.63	21.62
8	188.14	26.02
9	208.08	27.55
10	227.82	30.79
11	239.75	46.84
12	253.55	61.32

13	269.19	73.79
14	283.27	87.98
15	288.46	101.74

*** 1.366 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.11	15.23
3	57.26	2.17
4	77.26	2.11
5	94.97	11.41
6	114.91	9.95
7	134.44	5.61
8	153.72	0.33
9	173.66	1.87
10	193.56	3.89
11	213.07	8.31
12	224.50	24.72
13	235.02	41.73
14	244.32	59.43
15	252.76	77.57
16	269.26	88.87
17	272.82	96.52

*** 1.377 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	41.25	13.23
3	61.25	13.21
4	80.77	8.87
5	100.76	9.72
6	120.75	9.57
7	140.72	10.74
8	158.48	19.95
9	177.07	27.31
10	196.87	30.16
11	216.82	28.74
12	236.77	27.36
13	253.56	38.24
14	263.74	55.45
15	270.06	74.42
16	280.65	91.39
17	286.25	101.00

*** 1.384 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	42.93	18.10
3	62.33	13.25
4	82.31	14.07
5	102.31	14.15
6	122.24	12.50
7	142.10	10.12
8	161.89	13.01
9	181.21	18.19
10	200.74	22.51
11	219.84	28.43
12	234.58	41.95
13	248.49	56.32
14	261.35	71.64
15	273.75	87.33
16	277.18	97.98

*** 1.412 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.11	22.16
2	47.90	11.29
3	65.45	1.69
4	85.38	0.02
5	104.63	5.42
6	124.18	1.21
7	143.63	5.88
8	157.16	20.61
9	175.02	29.61
10	189.16	43.75
11	204.77	56.25
12	219.79	69.46
13	222.98	79.91

*** 1.513 ***

Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	38.89	22.19
2	53.03	8.05
3	72.35	2.88
4	92.25	4.89
5	111.82	0.75
6	131.67	3.18
7	149.71	11.80
8	164.36	25.42
9	182.63	33.55
10	194.92	49.33
11	204.85	66.69
12	206.99	74.58

*** 1.537 ***

Failure Surface Specified By 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	23.33	22.12
2	37.74	8.24
3	56.42	1.10
4	76.32	3.07
5	92.98	14.14
6	109.84	24.90
7	129.44	28.86
8	149.42	27.98
9	169.29	30.25
10	188.34	24.15
11	207.73	29.06
12	219.95	44.89
13	236.67	55.87
14	248.57	71.94
15	262.54	86.25
16	271.25	96.00

*** 1.573 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.22	26.32
2	76.42	12.24
3	96.42	12.13
4	116.37	10.71
5	136.05	14.31
6	155.18	20.11
7	174.56	25.08
8	193.26	32.17
9	205.81	47.74
10	216.84	64.42
11	225.70	80.82

*** 1.625 ***

Failure Surface Specified By 13 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	31.11	22.16
2	45.31	8.07
3	64.94	4.23
4	84.57	0.38
5	104.18	4.33
6	123.51	9.46
7	143.42	11.27
8	163.29	13.57
9	179.09	25.82
10	194.90	38.08
11	210.63	50.44
12	222.91	66.22
13	224.16	80.30

*** 1.635 ***

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          Y           A     X     I     S           F     T

          0.00     50.00    100.00    150.00    200.00    250.00

X      0.00 +--**-----+---------+---------+---------+---------+
            -   .
            - . .
            - ..3
            ... 6
            -.835
      50.00 ..6.*
            3..4 2
            60.1. .
            379.2.
            6.15W.
            .728...
A    100.00 ..45.....
            712..8....
            ..3.......
            6105.......
            .3.2 .8....
            -14.........
X    150.00 3.7.2.8.....
            - .54..... ..
            -1.0278. ....
            3 .  46. ... .
            - 1.5 .7......
            -3.  29 067....
I    200.00 +1   54    ....
            -  .. 2 ..96.7.7
            - 3   4 .8. .96..
            -  1 32  ..  0..6
            -    4  3  8.   ..
            -  1     2  3. .
S    250.00 +      .4  52 8 3.
            -     1   .   5  ..
            -          4   2 83.
            -        1       5 35
            -                 2 4
            -          1   1   121
     300.00 +
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F    350.00 +
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            -                         *
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T    400.00 +  ***        W           *
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