

ANEXO

**ESTUDO DE ESTABILIDADE DO MACIÇO DE
RESÍDUOS**

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1. INTRODUÇÃO

O objeto do presente relatório é o aterro sanitário a ser construído pela no Município de Americana, para deposição de resíduos classificados como lixo doméstico. Essa deposição se dará em aterro sanitário de construção controlada, projetado a fim de atender à legislação pertinente, evitando dessa forma a ocorrência de danos ao meio ambiente, a contaminação do solo e de águas subterrâneas, e o lançamento de líquidos percolados do interior do aterro sanitário nos cursos d'água próximos. A figura 1, a seguir apresenta a planta de implantação desse aterro em sua fase final.

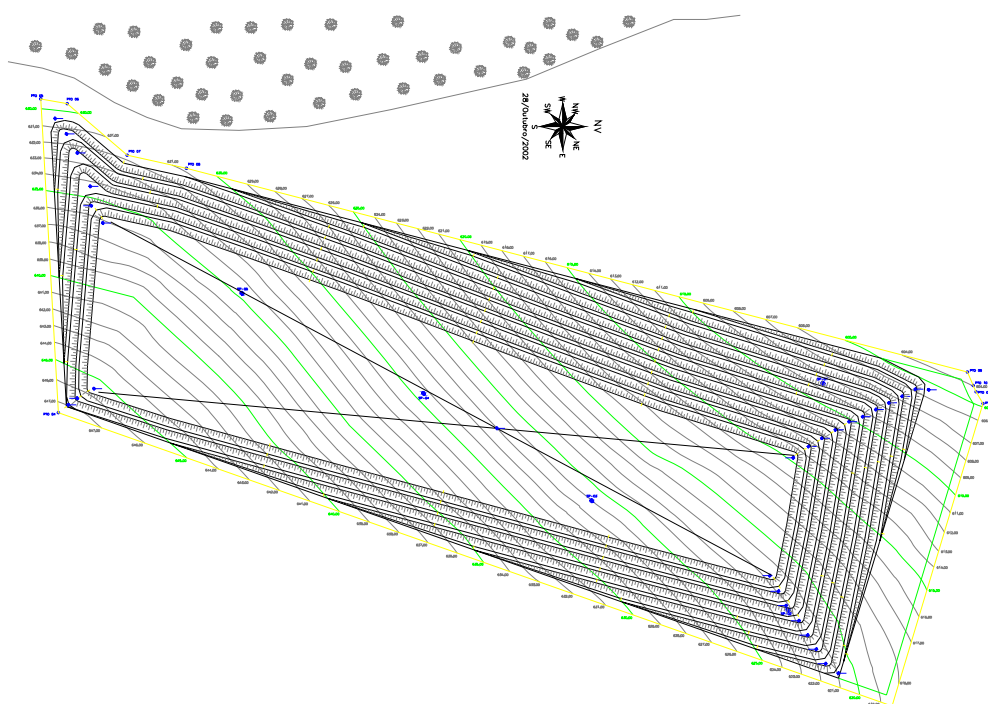


Fig. 1 Aterro Sanitário de Americana - Planta de Situação

Esta memória de cálculo tem por objetivo, tratar dos aspectos de segurança do aterro sanitário no que diz respeito à sua estabilidade geotécnica incluindo os materiais de fundação, onde estão projetados cortes a serem executados sobre a topografia natural. Apresentam-se análises de estabilidade do aterro para a fase final de implantação do aterro. As análises de estabilidade foram efetuadas utilizando-se o programa "STABL5M", desenvolvido na Universidade de Purdue, Indiana, EUA, que se baseia nos métodos de Bishop, Janbu e Spencer.

2. CONDIÇÕES GEOLÓGICO-GEOTÉCNICAS

O relevo do local de implantação do aterro apresenta ondulação suave com morros amplos de baixa declividade, variando desde a cota 647,0 m até a cota 605,0 m no ponto mais baixo, na extremidade Noroeste do aterro.

No local de implantação do aterro sanitário foram realizadas 13 sondagens de simples reconhecimento (SPT) num total de 233,50 m de sondagem, para caracterização da geologia local.

A área destinada ao aterro sanitário encontra-se na borda da Bacia do Paraná, sobre solos residuais de Arenito, com evolução pedológica decrescente com a profundidade. Localmente foram detectados solos coluvionares superficiais. Os solos resultantes da decomposição de arenitos apresentam-se como areias argilosas quando mais maduros, e como areias siltosas quando mais jovens. O perfil estratigráfico típico, detectado nas sondagens realizadas, mostra uma camada de solo superficial coluvionar, pedologicamente evoluído e laterizado, com 3 a 8 m de espessura, subjacente ao solo residual que possui compactação crescente com a profundidade.

As sondagens realizadas prosseguiram até o limite de penetrabilidade à percussão, embora não tenham determinado o topo rochoso por lavagem por tempo conforme recomendado pela ABGE. A profundidade máxima atingida foi de 26,06 m que corresponde à cota 602,58 m na sondagem SPb 10, a cota mais baixa prospectada foi de 597,92 m atingida na sondagem SPb 13.

Apenas três sondagens realizadas (SPb 10, 12 e 13) identificaram o nível do lençol freático variando da cota 605,29 m à cota 600,93 m, do centro para a vertente Noroeste do aterro, o que atesta a elevada permeabilidade tanto do solo residual quanto do maciço rochoso abaixo.

3. GEOMETRIA DO TALUDE

A figura 2, a seguir apresenta o corte 1, utilizado na pesquisa numérica do círculo crítico das análises de estabilidade do aterro sanitário.

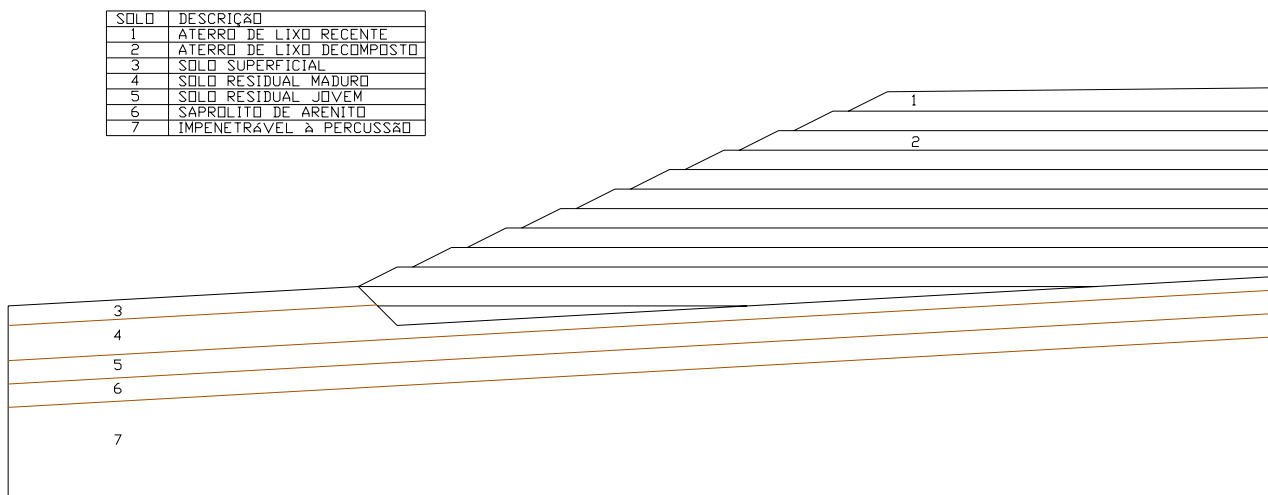


Figura 2 - Corte 1 – crítico para análises de estabilidade.

Esta geometria apresenta o aterro de lixo compactado disposto em células com 5 m de altura com talude com inclinação 2H:1V interrompidos por uma berma com 4,0 m de largura destinada melhorar sua condição de estabilidade e a reduzir a velocidade de escoamento de águas superficiais. A cota de topo do aterro sanitário é 655,00 m, com suave inclinação para permitir o escoamento superficial das águas de chuva em direção aos tardozeiros do aterro. A cota de fundação do aterro é 10 m abaixo da superfície do terreno, a plataforma do fundo da cava está na cota 595,00 m na extremidade Noroeste e acompanha a declividade natural da encosta em direção à extremidade Sudeste, a inclinação da escavação dessa cava é de 1H:1V.

4. HIPÓTESES DE CÁLCULO

Foi realizada uma verificação das condições de estabilidade geotécnica do maciço proposto com base nas geometrias da superfície do Aterro e da linha de escavação das fundações estabelecidas em projeto. Os parâmetros geotécnicos dos materiais envolvidos (coesão, ângulo de atrito e peso específico) foram definidos com base em dados obtidos na literatura técnica específica e em experiência técnica de projetos similares. Os valores dos níveis piezométricos (níveis d'água) utilizados na análise foram os determinados nas sondagens realizadas, acrescidos de 2 m para incluir o efeito da sazonalidade no N.A. . Os níveis de percolados e chorume no aterro foram avaliados em três situações distintas:

- Caso 1 – Condição de perfeito funcionamento do sistema de drenagem interna do aterro;
- Caso 2 – Condição de drenagem interna deficiente, com o nível piezométrico interno a até 30% da altura do talude;
- Caso 3 – Condição de drenagem interna muito deficiente, com o nível piezométrico interno a até 50% da altura do talude.

A condição de drenagem interna admitida como muito ineficiente representa a posição da linha freática de chorume no maciço para uma permeabilidade média de 5×10^{-5} cm/s, em condições de escoamento laminar (e atendendo aos requisitos de validade da Lei de Darcy).

Os parâmetros geotécnicos adotados para as análises de estabilidade estão indicados na Tabela 1. Tais parâmetros são típicos de materiais semelhantes, encontrados na literatura técnica específica (SOWERS, 1973; SARGEMAN e RAJAMANI, 1986; CINTRA e ALBIERO, 1993; BENVENUTO et al., 1994, BOSCOV e ABREU, 2000). Os valores utilizados na presente análise, selecionados com base na experiência em projetos similares, podem ser considerados como representativos para as condições do projeto.

Material	(kN/m ³)	' (°)	c' (kPa)
Lixo Compactado Recente	7,5 a 10,5	20 a 32	10 a 12
Lixo Compactado Decomposto	8,5 a 13,5	26 a 27	10 a 25
Solo Superficial	17,0	27	5
Solo Residual Maduro	18,0	30	10
Solo Residual Jovem	19,0	33	10
Saprolito de Arenito	20,0	45	5

Tabela 1 - Parâmetros Geotécnicos

Os resultados das análises das condições de estabilidade permitiram determinar valores de fatores de segurança nominais para seções do maciço admitidas como críticas. A análise do fator de segurança do aterro foi feita para um corte plano de um talude por equilíbrio limite conforme os princípios de estabilidade preconizados nos métodos de Bishop simplificado, Spencer e Janbu. Considera-se como satisfatório um fator de segurança igual ou maior que 1,5 nesses métodos para garantir condições de equilíbrio e deformações aceitáveis.

Verificou-se a estabilidade do talude apresentado no corte 1, de maior altura (70 m). Foram feitas análises considerando uma implantação contínua do aterro sanitário. Em virtude do tempo esperado de vida útil do aterro, e baseado em dados bibliográficos, considerou-se que células de lixo 10 m abaixo da cota de topo de operação do aterro já deverão estar em fase de decomposição (material 2), ao passo que nas duas células acima dessa posição o lixo pode ser considerado como de deposição recente (material 1), o que representa a situação mais crítica a curto prazo. Efetuou-se também uma análise do lixo decomposto já com o alteamento final, simulando uma situação a longo prazo. A tabela 2, a seguir apresenta os casos de análise.

Análise	Altura do Talude	Material	N.A.
Caso 1	70,0 m	Lixo Recente	Observado
Caso 2	70,0 m	Lixo Recente	Drenagem interna ineficiente
Caso 3	70,0 m	Lixo Recente	Drenagem interna muito ineficiente
Caso 4	70,0 m	Lixo Decomposto	Observado
Caso 5	70,0 m	Lixo Decomposto	Drenagem interna ineficiente
Caso 6	70,0 m	Lixo Decomposto	Drenagem interna muito ineficiente

Tabela 2 - Análises efetuadas

5. RESULTADOS OBTIDOS

O resumo dos fatores de segurança Obtidos nas análises de estabilidade realizadas está apresentado na tabela 3, a seguir. Os relatórios de saída do programa STABL5M para cada caso estão apresentados em anexo no final deste relatório.

Análise	FS obtido (superfície circular)
Caso 1	1,79 a 2,10
Caso 2	1,63 a 2,02
Caso 3	1,39 a 1,88
Caso 4	1,82 a 2,03
Caso 5	1,65 a 1,91
Caso 6	1,42 a 1,77

Tabela 3 - Fatores de Segurança obtidos nas análise de estabilidade

Pode-se observar através dos resultados obtidos que os taludes apresentam fatores de segurança adequados para as diversas hipóteses de níveis piezométricos, exceto em um caso de cálculo (drenagem interna muito ineficiente). Isso reflete a necessidade de se efetuar o monitoramento contínuo do aterro durante a operação e após seu encerramento. A figura 3, a seguir, mostra alguns dos círculos críticos de escorregamento dos diversos casos analisados.

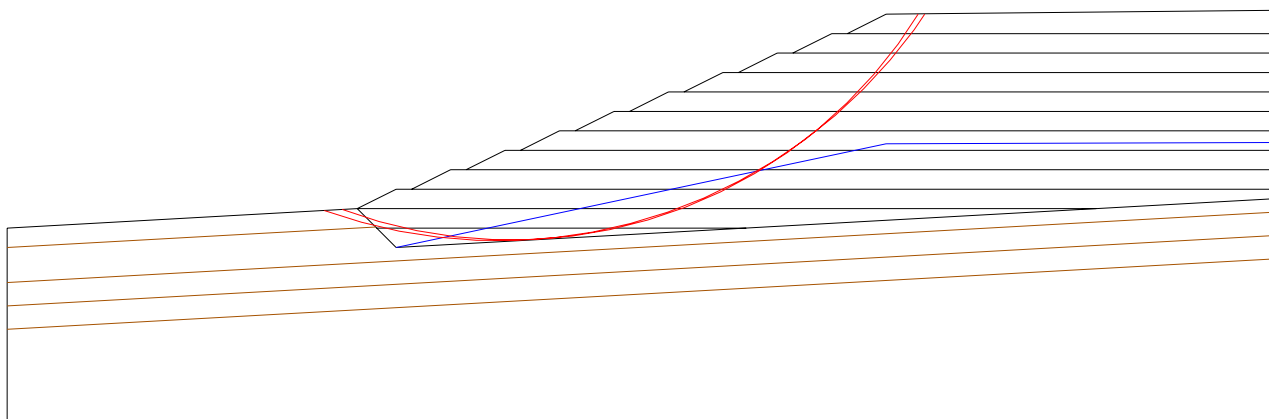


Figura 3. Círculos críticos pesquisados

6. CONCLUSÕES E RECOMENDAÇÕES

As análises de estabilidade efetuadas revelam que a geometria do talude adotada atende aos requisitos de fator de segurança, ou seja estão acima do valor recomendado pela Norma da Associação Brasileira de Normas Técnicas - ABNT NBR-11.682 - "Estabilidade de Taludes", de setembro de 1991 (antiga norma NB 1315) – igual ou maior que 1,50.

Os parâmetros de lixo compactado recente e decomposto apresentam faixas de variação bastante amplas. Para ambos, adotaram-se valores dos parâmetros de resistência dentro de uma faixa provável, estimada e compatível com os valores de literatura. Os valores da envoltória de resistência adotados, são propositadamente representativos do primeiro quartil dos valores encontrados na literatura técnica dada a grande variabilidade tanto na composição do lixo urbano quanto de sua energia de compactação. Dessa forma, os valores dos fatores de segurança calculados refletem essa variação.

Vale ressaltar que a estabilidade do aterro depende não só dos parâmetros geotécnicos e do fator tempo, mas também dos sistemas de drenagem dos líquidos percolados e dos drenos para saída de gases. Tanto o chorume quanto os gases são responsáveis pela geração de pressões internas ao maciço do aterro sanitário, que são fatores que podem vir a causar instabilidade. Portanto, sistemas de drenagem do chorume e drenos para saída dos gases eficazes são de suma importância para a estabilidade do maciço de aterro sanitário.

Ressalta-se também a necessidade de instalação de instrumentos de medição do desempenho do maciço (tais como piezômetros, placas de medição de recalque e inclinômetros), bem como leitura periódica de suas medições para previsão de possíveis acidentes advindos de qualquer sistema com mal funcionamento.

7. REFERÊNCIAS

- BENVENUTO, C. e CUNHA, M. A. - “Escorregamento em Massa de Lixo no Aterro Sanitário Bandeirante - São Paulo - SP”- II Simpósio sobre Barragens de Rejeito e Disposição de Resíduos - REGEO/91 - 1991.
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- SOWERS, G. F. (1973) - “Settlement of Waste Disposal Fills” - VIII International Conference on Soil Mechanics and Foundation Engineering. Vol. 2.2 - pp 207-210.

ANEXO

Listagem do Programa STABL5M

1	2	326.00	600.00
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by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ3a.txt
Output Filename: americ3a.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (americ3a.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right Below Bnd	Soil Type
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

No.	Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Pressure Constant (psf)	Surface No.
1	CLAY	120	110	1000	20	1000	1000	1
2	SAND	110	100	0	30	1000	1000	2
3	GRAVEL	130	120	0	40	1000	1000	3
4	SILT	115	105	500	15	1000	1000	4
5	CLAY	125	115	1200	25	1000	1000	5
6	SAND	112	102	0	35	1000	1000	6
7	GRAVEL	135	125	0	45	1000	1000	7
8	SILT	118	108	600	18	1000	1000	8
9	CLAY	122	112	1100	22	1000	1000	9
10	SAND	114	104	0	32	1000	1000	10
11	GRAVEL	132	122	0	42	1000	1000	11
12	SILT	116	106	550	16	1000	1000	12
13	CLAY	124	114	1150	24	1000	1000	13
14	SAND	111	101	0	31	1000	1000	14
15	GRAVEL	131	121	0	41	1000	1000	15
16	SILT	117	107	580	17	1000	1000	16
17	CLAY	123	113	1180	23	1000	1000	17
18	SAND	113	103	0	33	1000	1000	18
19	GRAVEL	133	123	0	43	1000	1000	19
20	SILT	119	109	620	19	1000	1000	20
21	CLAY	126	116	1250	26	1000	1000	21
22	SAND	110	100	0	30	1000	1000	22
23	GRAVEL	130	120	0	40	1000	1000	23
24	SILT	115	105	520	15	1000	1000	24
25	CLAY	125	115	1120	25	1000	1000	25
26	SAND	112	102	0	35	1000	1000	26
27	GRAVEL	135	125	0	45	1000	1000	27
28	SILT	118	108	650	18	1000	1000	28
29	CLAY	122	112	1160	22	1000	1000	29
30	SAND	114	104	0	32	1000	1000	30
31	GRAVEL	132	122	0	42	1000	1000	31
32	SILT	116	106	560	16	1000	1000	32
33	CLAY	124	114	1190	24	1000	1000	33
34	SAND	111	101	0	31	1000	1000	34
35	GRAVEL	131	121	0	41	1000	1000	35
36	SILT	117	107	590	17	1000	1000	36
37	CLAY	123	113	1210	23	1000	1000	37
38	SAND	113	103	0	33	1000	1000	38
39	GRAVEL	133	123	0	43	1000	1000	39
40	SILT	119	109	630	19	1000	1000	40
41	CLAY	126	116	1260	26	1000	1000	41
42	SAND	110	100	0	30	1000	1000	42
43	GRAVEL	130	120	0	40	1000	1000	43
44	SILT	115	105	530	15	1000	1000	44
45	CLAY	125	115	1170	25	1000	1000	45
46	SAND	112	102	0	35	1000	1000	46
47	GRAVEL	135	125	0	45	1000	1000	47
48								

1	7.5	7.5	10.0	20.0	.00	.0	1
2	8.5	8.5	10.0	26.0	.00	.0	1
3	17.0	17.0	5.0	27.0	.00	.0	1
4	18.0	18.0	10.0	30.0	.00	.0	1
5	18.0	18.0	10.0	33.0	.00	.0	1
6	19.0	19.0	5.0	45.0	.00	.0	1
7	21.0	21.0	20.0	45.0	.00	.0	1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right
1	.00	550.00	326.00	550.00

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

Janbus Empirical Coef. is being used for the case of c & ϕ both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between $X = 80.00$ ft.
and $X = 100.00$ ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is $Y = .00$ ft.

10.00 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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.21	604.90
2	98.16	603.98
3	108.16	603.62
4	118.16	603.81
5	128.13	604.55
6	138.04	605.84
7	147.87	607.68
8	157.59	610.06
9	167.15	612.98
10	176.54	616.41
11	185.73	620.36
12	194.68	624.82
13	203.38	629.76
14	211.78	635.17
15	219.88	641.04
16	227.64	647.35
17	235.03	654.08
18	235.94	655.00

*** 1.794 ***

Individual data on the 37 slices

Slice No.	Width Ft(m)	Water Force Lbs(kg)	Water Force Top Lbs(kg)	Tie Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Surcharge Hor Ver Lbs(kg) Lbs(kg)
1	1.8	4.0	.0	.0	.0	.0	.0
2	8.2	186.0	.0	.0	.0	.0	.0
3	1.8	87.3	.0	.0	.0	.0	.0
4	4.0	209.3	.0	.0	.0	.0	.0
5	4.2	259.5	.0	.0	.0	.0	.0
6	5.8	489.9	.0	.0	.0	.0	.0
7	4.0	381.8	.0	.0	.0	.0	.0
8	.2	14.8	.0	.0	.0	.0	.0
9	9.8	1118.2	.0	.0	.0	.0	.0
10	.1	16.8	.0	.0	.0	.0	.0
11	3.9	500.2	.0	.0	.0	.0	.0
12	6.0	825.0	.0	.0	.0	.0	.0
13	4.0	598.5	.0	.0	.0	.0	.0

14	4.0	613.4	.0	.0	.0	.0	.0	.0	.0
15	1.9	286.0	.0	.0	.0	.0	.0	.0	.0
16	8.1	1332.5	.0	.0	.0	.0	.0	.0	.0
17	1.6	271.4	.0	.0	.0	.0	.0	.0	.0
18	2.4	401.5	.0	.0	.0	.0	.0	.0	.0
19	7.2	1209.9	.0	.0	.0	.0	.0	.0	.0
20	2.8	503.2	.0	.0	.0	.0	.0	.0	.0
21	4.0	688.5	.0	.0	.0	.0	.0	.0	.0
22	2.5	425.6	.0	.0	.0	.0	.0	.0	.0
23	7.5	1275.2	.0	.0	.0	.0	.0	.0	.0
24	1.7	294.1	.0	.0	.0	.0	.0	.0	.0
25	2.3	368.1	.0	.0	.0	.0	.0	.0	.0
26	6.7	1051.8	.0	.0	.0	.0	.0	.0	.0
27	3.3	519.1	.0	.0	.0	.0	.0	.0	.0
28	4.0	583.5	.0	.0	.0	.0	.0	.0	.0
29	1.4	165.0	.0	.0	.0	.0	.0	.0	.0
30	8.4	966.3	.0	.0	.0	.0	.0	.0	.0
31	.2	23.8	.0	.0	.0	.0	.0	.0	.0
32	4.0	396.6	.0	.0	.0	.0	.0	.0	.0
33	3.9	329.7	.0	.0	.0	.0	.0	.0	.0
34	6.1	456.1	.0	.0	.0	.0	.0	.0	.0
35	1.6	102.1	.0	.0	.0	.0	.0	.0	.0
36	7.4	237.5	.0	.0	.0	.0	.0	.0	.0
37	.9	3.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.61	603.71
3	106.59	603.17
4	116.59	603.20
5	126.57	603.80
6	136.51	604.96
7	146.36	606.68
8	156.09	608.96
9	165.68	611.79
10	175.10	615.16
11	184.31	619.06
12	193.28	623.47
13	201.99	628.39
14	210.41	633.79
15	218.50	639.66
16	226.25	645.98
17	233.63	652.73
18	235.84	655.00

*** 1.795 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.18	604.84
2	97.11	603.65
3	107.09	603.04
4	117.09	603.01
5	127.07	603.56
6	137.01	604.70
7	146.86	606.41
8	156.60	608.70
9	166.18	611.55
10	175.59	614.95
11	184.77	618.90
12	193.72	623.37
13	202.38	628.36
14	210.74	633.85
15	218.77	639.82
16	226.43	646.24
17	233.71	653.10
18	235.50	655.00

*** 1.795 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.74	604.99
2	99.71	604.13
3	109.70	603.83
4	119.70	604.09
5	129.67	604.90
6	139.57	606.28
7	149.38	608.20

8	159.07	610.68
9	168.61	613.69
10	177.96	617.23
11	187.10	621.29
12	196.00	625.85
13	204.63	630.90
14	212.96	636.43
15	220.97	642.42
16	228.64	648.84
17	235.20	655.00

*** 1.795 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.18	604.84
2	97.10	603.56
3	107.07	602.87
4	117.07	602.78
5	127.06	603.29
6	137.00	604.40
7	146.85	606.10
8	156.59	608.38
9	166.17	611.24
10	175.56	614.67
11	184.73	618.66
12	193.65	623.19
13	202.28	628.24
14	210.59	633.80
15	218.56	639.85
16	226.14	646.36
17	233.33	653.32
18	234.87	655.00

*** 1.796 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.26	605.13
2	100.21	604.12
3	110.20	603.68
4	120.19	603.83
5	130.17	604.56
6	140.08	605.86
7	149.90	607.74
8	159.60	610.19
9	169.14	613.19
10	178.49	616.75
11	187.61	620.84
12	196.48	625.45
13	205.07	630.57
14	213.35	636.18
15	221.29	642.27
16	228.86	648.80
17	235.26	655.00

*** 1.796 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.72	604.93
2	98.69	604.12
3	108.68	603.87
4	118.68	604.17
5	128.64	605.02
6	138.54	606.42
7	148.35	608.36
8	158.04	610.84
9	167.57	613.86
10	176.93	617.40
11	186.07	621.44
12	194.98	625.99
13	203.62	631.02
14	211.97	636.53
15	220.00	642.48

1

Y A X I S F T

X .00 +-----+-----+-----+-----L-***-----+

-	..
-	**
-	..1*
4.10 +	..1**
-	..11*
-	...1**
-	...1*
-	..1

X 432.30 +

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864.60 +

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T 1152.80.

Run Date:
Time of Run:
Run By:
Input Data Filename: americ3c.txt
Output Filename: americ3c.sai

BOUNDARY COORDINATES

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right Below Bnd	Soil Type
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Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.62	604.70
2	94.57	603.74
3	104.56	603.32
4	114.56	603.45
5	124.54	604.11
6	134.47	605.31
7	144.31	607.04
8	154.06	609.31
9	163.66	612.09
10	173.10	615.39
11	182.35	619.20
12	191.37	623.50
13	200.16	628.28
14	208.67	633.53
15	216.88	639.23
16	224.78	645.37
17	232.33	651.93
18	235.51	655.00

1

Point No.	X-Surf (ft)	Y-Surf (ft)
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1	85.64	604.76
2	95.61	603.94
3	105.60	603.66
4	115.60	603.90
5	125.57	604.67
6	135.49	605.97
7	145.32	607.79
8	155.04	610.13
9	164.63	612.98
10	174.05	616.33
11	183.28	620.17
12	192.30	624.50
13	201.07	629.30
14	209.58	634.55
15	217.80	640.25
16	225.70	646.37
17	233.27	652.91
18	235.45	655.00

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.73	604.54
3	110.73	604.25
4	120.73	604.52
5	130.69	605.34
6	140.60	606.72
7	150.41	608.65
8	160.10	611.12
9	169.64	614.13
10	178.99	617.66
11	188.13	621.71
12	197.04	626.27
13	205.67	631.31
14	214.01	636.82
15	222.03	642.80
16	229.71	649.21
17	235.91	655.00

*** 1.798 ***

10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

1

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.
Type Unit Wt. Unit Wt. Intercept Angle Pressure Constant Surface
No. (pcf) (pcf) (psf) (deg) Param. (psf) No.

1	10.5	10.5	12.0	32.0	.00	.0	1
2	13.5	13.5	25.0	27.0	.00	.0	1
3	17.0	17.0	5.0	27.0	.00	.0	1
4	18.0	18.0	10.0	30.0	.00	.0	1
5	18.0	18.0	10.0	33.0	.00	.0	1
6	19.0	19.0	5.0	45.0	.00	.0	1
7	21.0	21.0	20.0	45.0	.00	.0	1

1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

1

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary X-Left Y-Left X-Right Y-Right
No. (ft) (ft) (ft) (ft)

1	.00	550.00	326.00	550.00
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1

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

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 16 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	83.08	604.62
2	92.93	602.91
3	102.88	601.93
4	112.88	601.66
5	122.87	602.13
6	132.80	603.31
7	142.62	605.21
8	152.27	607.81
9	161.71	611.11
10	170.89	615.08
11	179.75	619.71
12	188.26	624.97
13	196.37	630.83
14	204.02	637.25
15	211.20	644.22
16	216.62	650.31

*** 2.104 ***

Individual data on the 34 slices

Slice No.	Width Ft(m)	Water Force Lbs(kg)	Water Force Top Lbs(kg)	Tie Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Force Hor Lbs(kg)	Surcharge Ver Lbs(kg)	Load Lbs(kg)
1	6.9	93.0	.0	.0	.0	.0	.0	.0	.0
2	2.9	101.6	.0	.0	.0	.0	.0	.0	.0
3	7.1	541.2	.0	.0	.0	.0	.0	.0	.0
4	2.9	308.6	.0	.0	.0	.0	.0	.0	.0
5	1.1	122.0	.0	.0	.0	.0	.0	.0	.0
6	8.9	1251.4	.0	.0	.0	.0	.0	.0	.0
7	1.1	197.2	.0	.0	.0	.0	.0	.0	.0
8	4.0	712.4	.0	.0	.0	.0	.0	.0	.0
9	4.9	933.6	.0	.0	.0	.0	.0	.0	.0
10	5.1	1128.2	.0	.0	.0	.0	.0	.0	.0
11	4.0	919.3	.0	.0	.0	.0	.0	.0	.0
12	.8	182.5	.0	.0	.0	.0	.0	.0	.0
13	9.2	2298.2	.0	.0	.0	.0	.0	.0	.0
14	.6	165.1	.0	.0	.0	.0	.0	.0	.0
15	3.4	883.3	.0	.0	.0	.0	.0	.0	.0
16	6.3	1659.2	.0	.0	.0	.0	.0	.0	.0
17	3.7	1037.2	.0	.0	.0	.0	.0	.0	.0
18	4.0	1090.0	.0	.0	.0	.0	.0	.0	.0
19	1.7	453.1	.0	.0	.0	.0	.0	.0	.0
20	8.3	2240.4	.0	.0	.0	.0	.0	.0	.0
21	.9	241.2	.0	.0	.0	.0	.0	.0	.0
22	3.1	802.5	.0	.0	.0	.0	.0	.0	.0
23	5.8	1416.0	.0	.0	.0	.0	.0	.0	.0
24	4.2	1027.0	.0	.0	.0	.0	.0	.0	.0
25	4.0	887.2	.0	.0	.0	.0	.0	.0	.0
26	.3	53.5	.0	.0	.0	.0	.0	.0	.0
27	8.1	1560.2	.0	.0	.0	.0	.0	.0	.0
28	1.6	288.6	.0	.0	.0	.0	.0	.0	.0
29	4.0	600.7	.0	.0	.0	.0	.0	.0	.0
30	2.0	193.4	.0	.0	.0	.0	.0	.0	.0
31	7.2	532.3	.0	.0	.0	.0	.0	.0	.0
32	.8	43.2	.0	.0	.0	.0	.0	.0	.0
33	4.0	110.5	.0	.0	.0	.0	.0	.0	.0
34	.6	1.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.51	604.47
2	90.37	602.80
3	100.32	601.76
4	110.31	601.37
5	120.31	601.62
6	130.27	602.51
7	140.15	604.04
8	149.91	606.20
9	159.52	608.98
10	168.92	612.38
11	178.09	616.37
12	186.98	620.95
13	195.56	626.09
14	203.79	631.77
15	211.64	637.97
16	219.07	644.65
17	226.06	651.81
18	228.80	655.00

*** 2.108 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.86	602.70
3	100.80	601.56
4	110.79	601.08
5	120.78	601.28
6	130.75	602.15
7	140.63	603.69
8	150.38	605.89
9	159.97	608.73
10	169.34	612.21
11	178.46	616.32
12	187.29	621.02
13	195.78	626.31
14	203.89	632.15
15	211.59	638.53
16	218.85	645.41
17	225.63	652.76
18	227.44	655.00

*** 2.108 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	83.08	604.62
2	92.95	603.04
3	102.91	602.16
4	112.91	601.97
5	122.90	602.48
6	132.83	603.68
7	142.65	605.56
8	152.32	608.12
9	161.78	611.35
10	171.00	615.22
11	179.93	619.73
12	188.52	624.84
13	196.74	630.54
14	204.54	636.80
15	211.89	643.58
16	218.75	650.85
17	219.47	651.74

*** 2.109 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.62	604.70
2	94.45	602.86
3	104.38	601.75
4	114.38	601.37
5	124.37	601.73
6	134.31	602.82
7	144.14	604.64
8	153.82	607.17
9	163.28	610.42
10	172.47	614.34
11	181.35	618.94
12	189.87	624.17
13	197.99	630.02
14	205.65	636.45
15	212.81	643.42
16	219.45	650.90
17	220.46	652.23

*** 2.109 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.41	602.82
3	102.35	601.72
4	112.34	601.29
5	122.34	601.53
6	132.29	602.44
7	142.17	604.01
8	151.92	606.24
9	161.50	609.11
10	170.86	612.62
11	179.97	616.75
12	188.78	621.48
13	197.25	626.79
14	205.35	632.65
15	213.04	639.05
16	220.29	645.94
17	227.06	653.30
18	228.42	655.00

*** 2.109 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.51	604.47
2	90.36	602.72
3	100.30	601.65
4	110.29	601.27
5	120.29	601.59
6	130.24	602.59
7	140.10	604.27
8	149.81	606.64
9	159.34	609.67
10	168.64	613.35
11	177.66	617.66
12	186.37	622.58
13	194.71	628.10
14	202.65	634.18
15	210.15	640.79
16	217.18	647.91
17	221.22	652.61

*** 2.109 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.91	602.97
3	100.87	602.07
4	110.86	601.81
5	120.86	602.20
6	130.80	603.22
7	140.66	604.88
8	150.40	607.17
9	159.97	610.09
10	169.33	613.60
11	178.44	617.72
12	187.27	622.41
13	195.79	627.65
14	203.95	633.43
15	211.72	639.73
16	219.07	646.51
17	225.97	653.74
18	227.03	655.00

*** 2.110 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.38	602.70
3	102.31	601.49

T 1152.80 +

Failure Surface Specified By 17 Coordinate Points

*** 2.111 ***

Y A X I S F T

X .00 +-----+-----+-----+-----L***-----+

A 288.20 +
-
- L ** *

1 576.40 +

864.60 +

$$F = 1008.70 +$$

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ4a.txt
Output Filename: americ4a.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric4a.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant Surface No.
1	7.5	7.5	10.0	20.0	.00	.0 1
2	8.5	8.5	10.0	26.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 2
4	18.0	18.0	10.0	30.0	.00	.0 2
5	18.0	18.0	10.0	33.0	.00	.0 2
6	19.0	19.0	5.0	45.0	.00	.0 2
7	21.0	21.0	20.0	45.0	.00	.0 2

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00

3	100.00	595.00
4	226.00	621.00
5	326.00	622.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.23	602.13
3	109.92	599.69
4	119.79	598.08
5	129.76	597.30
6	139.76	597.37
7	149.72	598.28
8	159.57	600.02
9	169.23	602.59
10	178.64	605.97
11	187.74	610.13
12	196.45	615.04
13	204.72	620.67
14	212.48	626.97
15	219.68	633.91
16	226.27	641.43
17	232.21	649.48
18	235.60	655.00

*** 1.629 ***

Individual data on the 38 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Top Lbs(kg)	Water Bot Lbs(kg)	Tie Force Lbs(kg)	Tie Norm Lbs(kg)	Earthquake Force Lbs(kg)	Surcharge Tan Lbs(kg)	Hor Load Lbs(kg)	Ver Load Lbs(kg)
-----------	----------------	----------------------------	-------------------------	-------------------------	-------------------------	------------------------	--------------------------------	-----------------------------	------------------------	------------------------

1	9.2	305.5	.0	.0	.0	.0	.0	.0	.0
2	.2	15.1	.0	.0	.0	.0	.0	.0	.0
3	3.8	267.5	.0	.0	.0	.0	.0	.0	.0
4	5.9	556.0	.0	.0	.0	.0	.0	.0	.0
5	4.1	506.6	.0	.0	.0	.0	.0	.0	.0
6	3.1	423.4	.0	.0	.0	.0	.0	.0	.0
7	.9	130.9	.0	1.6	.0	.0	.0	.0	.0
8	1.8	262.4	.0	12.0	.0	.0	.0	.0	.0
9	8.2	1408.6	.0	175.3	.0	.0	.0	.0	.0
10	1.8	339.0	.0	62.2	.0	.0	.0	.0	.0
11	2.2	431.7	.0	89.1	.0	.0	.0	.0	.0
12	7.8	1623.0	.0	385.0	.0	.0	.0	.0	.0
13	2.2	513.1	.0	131.4	.0	.0	.0	.0	.0
14	4.0	926.4	.0	248.9	.0	.0	.0	.0	.0
15	3.7	879.9	.0	247.8	.0	.0	.0	.0	.0
16	6.3	1579.8	.0	442.0	.0	.0	.0	.0	.0
17	3.6	918.5	.0	256.1	.0	.0	.0	.0	.0
18	.4	110.2	.0	31.9	.0	.0	.0	.0	.0
19	9.2	2427.8	.0	652.0	.0	.0	.0	.0	.0
20	.8	209.7	.0	53.1	.0	.0	.0	.0	.0
21	4.0	1068.1	.0	261.1	.0	.0	.0	.0	.0
22	4.6	1224.6	.0	271.2	.0	.0	.0	.0	.0
23	5.4	1432.7	.0	264.7	.0	.0	.0	.0	.0
24	3.7	976.3	.0	138.8	.0	.0	.0	.0	.0
25	.3	66.4	.0	8.6	.0	.0	.0	.0	.0
26	8.1	2021.3	.0	130.8	.0	.0	.0	.0	.0
27	.4	94.2	.0	.0	.0	.0	.0	.0	.0
28	1.6	382.9	.0	.0	.0	.0	.0	.0	.0
29	4.0	936.5	.0	.0	.0	.0	.0	.0	.0
30	2.7	528.2	.0	.0	.0	.0	.0	.0	.0
31	7.3	1341.5	.0	.0	.0	.0	.0	.0	.0
32	.5	83.1	.0	.0	.0	.0	.0	.0	.0
33	3.5	563.6	.0	.0	.0	.0	.0	.0	.0
34	3.7	518.4	.0	.0	.0	.0	.0	.0	.0
35	6.3	754.0	.0	.0	.0	.0	.0	.0	.0
36	.3	28.0	.0	.0	.0	.0	.0	.0	.0
37	5.9	424.9	.0	.0	.0	.0	.0	.0	.0
38	3.4	70.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.630 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.20	601.79
3	105.94	599.53
4	115.83	598.05
5	125.81	597.35
6	135.81	597.45
7	145.77	598.33
8	155.63	599.99
9	165.33	602.43
10	174.80	605.63
11	183.99	609.56
12	192.85	614.21
13	201.31	619.54
14	209.32	625.52
15	216.84	632.12
16	223.81	639.29
17	230.19	646.99
18	235.83	655.00

*** 1.636 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.07	601.51
3	100.80	599.21
4	110.68	597.66
5	120.65	596.85
6	130.65	596.80
7	140.62	597.51
8	150.52	598.96
9	160.27	601.16
10	169.83	604.09
11	179.15	607.73
12	188.16	612.07
13	196.82	617.07
14	205.07	622.72
15	212.88	628.97
16	220.19	635.79
17	226.97	643.14
18	233.17	650.98
19	235.88	655.00

*** 1.638 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.61	601.57
3	103.33	599.23
4	113.20	597.64
5	123.17	596.83
6	133.17	596.80
7	143.14	597.55
8	153.03	599.08
9	162.76	601.37
10	172.29	604.42
11	181.55	608.19
12	190.48	612.68
13	199.04	617.85
14	207.17	623.67
15	214.82	630.11
16	221.95	637.13
17	228.51	644.68
18	234.46	652.71
19	235.89	655.00

*** 1.638 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.64	601.66
3	103.38	599.39
4	113.26	597.89
5	123.24	597.17
6	133.24	597.22
7	143.20	598.05
8	153.07	599.65
9	162.79	602.02
10	172.29	605.13
11	181.52	608.98
12	190.43	613.53
13	198.95	618.76
14	207.04	624.64
15	214.65	631.12
16	221.73	638.19
17	228.24	645.78
18	234.14	653.85
19	234.85	655.00

*** 1.641 ***

1

Failure Surface Specified By 19 Coordinate Points

*** 1.642 ***

*** 1.645 ***

*** 1.648 ***

3	115.14	601.24
4	124.91	599.13
5	134.84	597.95
6	144.84	597.72
7	154.81	598.44
8	164.67	600.10
9	174.33	602.69
10	183.70	606.19
11	192.69	610.57
12	201.23	615.77
13	209.23	621.77
14	216.63	628.50
15	223.35	635.90
16	229.35	643.90
17	234.55	652.44
18	235.79	655.00

*** 1.649 ***

Y A X I S F T

.00	144.10	288.20	432.30	576.40	720.50
-----	--------	--------	--------	--------	--------

X .00 +-----+-----+-----+-----L***-----+

-	4
-	**
-	.11*
144.10 +	.11**
-	..1.*
-	..11**
-	..W1*
-	..1

A 288.20 +
-
- L **W *

X 432.30 +

1 576.40 +

S 720.50 +

864.60 +

F 1008.70 +

T 1152.80 +

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ4c.txt
Output Filename: americ4c.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (americ4c.DAT)

No.	(ft)	(ft)	(ft)	(ft)
1	.00	550.00	326.00	550.00

1

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

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

Janbus Empirical Coef. is being used for the case of c & ϕ both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between $X = 80.00$ ft.
and $X = 100.00$ ft.

Each Surface Terminates Between $X = 216.00$ ft.
and $X = 236.00$ ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is $Y = .00$ ft.

10.00 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

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Total Saturated Cohesion Friction Pore Pressure Piez.
Type Unit Wt. Unit Wt. Intercept Angle Pressure Constant Surface
No. (pcf) (pcf) (psf) (deg) Param. (psf) No.

1	10.5	10.5	12.0	32.0	.00	.0	1
2	13.5	13.5	25.0	27.0	.00	.0	1
3	17.0	17.0	5.0	27.0	.00	.0	2
4	18.0	18.0	10.0	30.0	.00	.0	2
5	18.0	18.0	10.0	33.0	.00	.0	2
6	19.0	19.0	5.0	45.0	.00	.0	2
7	21.0	21.0	20.0	45.0	.00	.0	2

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.47	601.21
3	100.17	598.79
4	110.05	597.25
5	120.03	596.61
6	130.03	596.86
7	139.96	598.02
8	149.75	600.06
9	159.32	602.98
10	168.58	606.74
11	177.47	611.33
12	185.90	616.70
13	193.83	622.80
14	201.17	629.59
15	207.86	637.02
16	213.87	645.02
17	217.37	650.69

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

*** 2.015 ***

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Individual data on the 38 slices

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00
3	100.00	595.00
4	226.00	621.00
5	326.00	622.00

Slice No.	Width Ft(m)	Water Force Lbs(kg)	Water Force Top Lbs(kg)	Tie Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Surcharge Ver Load Lbs(kg)	Surcharge Load Lbs(kg)
1	9.0	276.3	.0	.0	.0	.0	.0	.0	.0
2	.5	24.3	.0	13.0	.0	.0	.0	.0	.0
3	4.4	338.7	.0	56.6	.0	.0	.0	.0	.0
4	5.1	638.2	.0	.0	.0	.0	.0	.0	.0
5	.2	26.0	.0	.0	.0	.0	.0	.0	.0
6	3.8	594.6	.0	.0	.0	.0	.0	.0	.0
7	6.1	1126.9	.0	.0	.0	.0	.0	.0	.0
8	.7	140.0	.0	.0	.0	.0	.0	.0	.0
9	3.3	759.9	.0	14.5	.0	.0	.0	.0	.0
10	4.0	979.2	.0	56.4	.0	.0	.0	.0	.0
11	2.0	516.8	.0	44.9	.0	.0	.0	.0	.0
12	8.0	2291.2	.0	253.6	.0	.0	.0	.0	.0
13	2.0	634.5	.0	82.5	.0	.0	.0	.0	.0
14	2.0	612.6	.0	86.0	.0	.0	.0	.0	.0
15	8.0	2626.6	.0	382.4	.0	.0	.0	.0	.0
16	2.0	722.5	.0	106.6	.0	.0	.0	.0	.0
17	4.0	1411.6	.0	208.9	.0	.0	.0	.0	.0
18	3.8	1330.1	.0	195.5	.0	.0	.0	.0	.0
19	6.2	2313.6	.0	313.4	.0	.0	.0	.0	.0
20	3.3	1232.2	.0	150.3	.0	.0	.0	.0	.0
21	.7	248.3	.0	30.3	.0	.0	.0	.0	.0
22	8.6	3144.0	.0	296.3	.0	.0	.0	.0	.0
23	1.4	528.0	.0	34.2	.0	.0	.0	.0	.0

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary X-Left Y-Left X-Right Y-Right

24	4.0	1430.5	.0	59.4	.0	.0	.0	.0	.0
25	2.4	808.5	.0	9.5	.0	.0	.0	.0	.0
26	1.1	381.6	.0	.0	.0	.0	.0	.0	.0
27	6.5	2201.5	.0	.0	.0	.0	.0	.0	.0
28	1.9	614.8	.0	.0	.0	.0	.0	.0	.0
29	2.1	636.4	.0	.0	.0	.0	.0	.0	.0
30	5.8	1643.8	.0	.0	.0	.0	.0	.0	.0
31	4.2	1083.4	.0	.0	.0	.0	.0	.0	.0
32	3.2	720.9	.0	.0	.0	.0	.0	.0	.0
33	.8	168.5	.0	.0	.0	.0	.0	.0	.0
34	5.9	781.8	.0	.0	.0	.0	.0	.0	.0
35	4.1	399.3	.0	.0	.0	.0	.0	.0	.0
36	1.9	122.0	.0	.0	.0	.0	.0	.0	.0
37	2.1	73.0	.0	.0	.0	.0	.0	.0	.0
38	1.4	11.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.48	601.25
3	100.18	598.83
4	110.06	597.26
5	120.04	596.55
6	130.03	596.71
7	139.98	597.75
8	149.80	599.64
9	159.42	602.38
10	168.76	605.94
11	177.76	610.30
12	186.35	615.43
13	194.46	621.28
14	202.03	627.81
15	209.00	634.98
16	215.32	642.73
17	220.95	650.99
18	222.11	653.05

*** 2.017 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.01	601.30
3	101.71	598.87
4	111.59	597.31
5	121.56	596.65
6	131.56	596.89
7	141.50	598.02
8	151.29	600.03
9	160.87	602.91
10	170.15	606.64
11	179.06	611.19
12	187.52	616.51
13	195.47	622.57
14	202.85	629.32
15	209.60	636.70
16	215.66	644.66
17	220.40	652.20

*** 2.018 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.51	604.47
2	89.99	601.29
3	99.71	598.91
4	109.58	597.35
5	119.56	596.63
6	129.56	596.75
7	139.51	597.70
8	149.35	599.49
9	159.01	602.09
10	168.41	605.49
11	177.49	609.67
12	186.20	614.60
13	194.46	620.24
14	202.21	626.55
15	209.41	633.49
16	216.01	641.01
17	221.95	649.05

18 225.44 654.72

*** 2.020 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.54	601.41
3	101.27	599.09
4	111.16	597.60
5	121.14	596.95
6	131.14	597.16
7	141.08	598.22
8	150.90	600.13
9	160.52	602.86
10	169.87	606.40
11	178.89	610.72
12	187.50	615.80
13	195.65	621.59
14	203.28	628.05
15	210.34	635.14
16	216.76	642.80
17	222.51	650.99
18	224.37	654.18

*** 2.026 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	83.08	604.62
2	92.56	601.43
3	102.28	599.09
4	112.17	597.61
5	122.15	596.99
6	132.15	597.25
7	142.08	598.38
8	151.88	600.38
9	161.47	603.22
10	170.77	606.89
11	179.72	611.36
12	188.24	616.59
13	196.28	622.54
14	203.76	629.18
15	210.63	636.44
16	216.85	644.27
17	222.36	652.62
18	222.77	653.38

*** 2.027 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.09	601.55
3	101.84	599.30
4	111.73	597.86
5	121.71	597.23
6	131.71	597.41
7	141.66	598.42
8	151.49	600.24
9	161.14	602.85
10	170.55	606.24
11	179.65	610.40
12	188.38	615.28
13	196.67	620.86
14	204.49	627.10
15	211.77	633.96
16	218.46	641.39
17	224.52	649.34
18	228.14	655.00

*** 2.030 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.59	601.50
3	103.32	599.20
4	113.22	597.81
5	123.21	597.33
6	133.20	597.78
7	143.11	599.13
8	152.85	601.39
9	162.34	604.53
10	171.51	608.53
11	180.27	613.35
12	188.55	618.95
13	196.29	625.29
14	203.41	632.31
15	209.85	639.96
16	215.57	648.16
17	216.85	650.43

*** 2.030 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.05	601.43
3	100.79	599.18
4	110.69	597.79
5	120.68	597.29
6	130.67	597.67
7	140.59	598.92
8	150.36	601.05
9	159.91	604.03
10	169.16	607.84
11	178.03	612.45
12	186.46	617.83
13	194.39	623.92
14	201.75	630.69
15	208.48	638.09
16	214.53	646.05
17	217.49	650.74

*** 2.030 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.10	601.58
3	101.85	599.35
4	111.74	597.89
5	121.72	597.23
6	131.72	597.37
7	141.68	598.30
8	151.53	600.02
9	161.21	602.52
10	170.66	605.78
11	179.83	609.79
12	188.64	614.51
13	197.05	619.91
14	205.01	625.97
15	212.46	632.65
16	219.35	639.89
17	225.64	647.66
18	230.67	655.00

*** 2.031 ***

1

Y A X I S F T

.00 144.10 288.20 432.30 576.40 720.50

X .00 +-----+-----+-----+-----L-***-----+

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-
-
1
**
-
.1.*
144.10 + .21**
-
..19*
-
...1**
-
..W1*
-
..0
A 288.20 +
-
L **W *
-
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X 432.30 +
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I 576.40 +
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S 720.50 +
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864.60 +
-
-
-
-
F 1008.70 +
-
-
-
-
T 1152.80 +

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ5a.txt
Output Filename: americ5a.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric4a.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant No.
1	7.5	7.5	10.0	20.0	.00	.0 1
2	8.5	8.5	10.0	26.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 2
4	18.0	18.0	10.0	30.0	.00	.0 2
5	18.0	18.0	10.0	33.0	.00	.0 2
6	19.0	19.0	5.0	45.0	.00	.0 2
7	21.0	21.0	20.0	45.0	.00	.0 2

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00

3	100.00	595.00
4	226.00	630.00
5	326.00	631.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.23	602.13
3	109.92	599.69
4	119.79	598.08
5	129.76	597.30
6	139.76	597.37
7	149.72	598.28
8	159.57	600.02
9	169.23	602.59
10	178.64	605.97
11	187.74	610.13
12	196.45	615.04
13	204.72	620.67
14	212.48	626.97
15	219.68	633.91
16	226.27	641.43
17	232.21	649.48
18	235.60	655.00

*** 1.393 ***

Individual data on the 38 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Top Lbs(kg)	Tie Force Lbs(kg)	Tie Bot Lbs(kg)	Earthquake Force Lbs(kg)	Norm Tan Lbs(kg)	Hor Ver Load Lbs(kg)
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1	9.2	305.5	.0	.0	.0	.0	.0	.0	.0
2	.2	15.1	.0	.0	.0	.0	.0	.0	.0
3	3.8	267.5	.0	.0	.0	.0	.0	.0	.0
4	5.9	556.0	.0	.0	.0	.0	.0	.0	.0
5	4.1	506.6	.0	.0	.0	.0	.0	.0	.0
6	.3	41.9	.0	.0	.0	.0	.0	.0	.0
7	3.7	512.4	.0	29.4	.0	.0	.0	.0	.0
8	1.8	262.4	.0	35.5	.0	.0	.0	.0	.0
9	8.2	1408.6	.0	308.1	.0	.0	.0	.0	.0
10	1.8	339.0	.0	96.4	.0	.0	.0	.0	.0
11	2.2	431.7	.0	135.3	.0	.0	.0	.0	.0
12	7.8	1623.0	.0	570.8	.0	.0	.0	.0	.0
13	2.2	513.1	.0	192.6	.0	.0	.0	.0	.0
14	4.0	926.4	.0	366.7	.0	.0	.0	.0	.0
15	3.7	879.9	.0	367.0	.0	.0	.0	.0	.0
16	6.3	1579.8	.0	667.2	.0	.0	.0	.0	.0
17	3.6	918.5	.0	396.3	.0	.0	.0	.0	.0
18	.4	110.2	.0	49.8	.0	.0	.0	.0	.0
19	9.2	2427.8	.0	1066.8	.0	.0	.0	.0	.0
20	.8	209.7	.0	91.5	.0	.0	.0	.0	.0
21	4.0	1068.1	.0	467.7	.0	.0	.0	.0	.0
22	4.6	1224.6	.0	526.3	.0	.0	.0	.0	.0
23	5.4	1432.7	.0	590.4	.0	.0	.0	.0	.0
24	3.7	976.3	.0	379.6	.0	.0	.0	.0	.0
25	.3	66.4	.0	26.7	.0	.0	.0	.0	.0
26	8.4	2115.5	.0	744.5	.0	.0	.0	.0	.0
27	1.6	382.9	.0	116.5	.0	.0	.0	.0	.0
28	4.0	936.5	.0	248.3	.0	.0	.0	.0	.0
29	2.7	528.2	.0	125.7	.0	.0	.0	.0	.0
30	6.4	1185.6	.0	136.1	.0	.0	.0	.0	.0
31	.9	155.9	.0	.0	.0	.0	.0	.0	.0
32	.5	83.1	.0	.0	.0	.0	.0	.0	.0
33	3.5	563.6	.0	.0	.0	.0	.0	.0	.0
34	3.7	518.4	.0	.0	.0	.0	.0	.0	.0
35	6.3	754.0	.0	.0	.0	.0	.0	.0	.0
36	.3	28.0	.0	.0	.0	.0	.0	.0	.0
37	5.9	424.9	.0	.0	.0	.0	.0	.0	.0
38	3.4	70.3	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	96.41	608.21
2	105.61	604.28
3	115.14	601.24
4	124.91	599.13
5	134.84	597.95
6	144.84	597.72
7	154.81	598.44
8	164.67	600.10
9	174.33	602.69
10	183.70	606.19
11	192.69	610.57
12	201.23	615.77
13	209.23	621.77
14	216.63	628.50
15	223.35	635.90
16	229.35	643.90
17	234.55	652.44
18	235.79	655.00

*** 1.395 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.90	607.95
2	105.14	604.13
3	114.70	601.20
4	124.49	599.17
5	134.43	598.06
6	144.43	597.89
7	154.40	598.65
8	164.26	600.34
9	173.91	602.94
10	183.28	606.44
11	192.28	610.79
12	200.84	615.97
13	208.87	621.92
14	216.32	628.60
15	223.11	635.94
16	229.18	643.89
17	234.48	652.37
18	235.80	655.00

*** 1.401 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	96.92	608.46
2	106.10	604.49
3	115.62	601.42
4	125.39	599.28
5	135.32	598.10
6	145.31	597.89
7	155.29	598.65
8	165.14	600.36
9	174.78	603.02
10	184.12	606.60
11	193.06	611.07
12	201.54	616.38
13	209.46	622.48
14	216.75	629.32
15	223.35	636.84
16	229.19	644.95
17	234.22	653.60
18	234.86	655.00

*** 1.404 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.405 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.20	601.79
3	105.94	599.53
4	115.83	598.05
5	125.81	597.35
6	135.81	597.45
7	145.77	598.33
8	155.63	599.99
9	165.33	602.43
10	174.80	605.63
11	183.99	609.56
12	192.85	614.21
13	201.31	619.54
14	209.32	625.52
15	216.84	632.12
16	223.81	639.29
17	230.19	646.99
18	235.83	655.00

*** 1.409 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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*** 1.412 ***

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.95	608.97
2	107.02	604.78
3	116.48	601.53
4	126.22	599.26
5	136.14	598.00
6	146.14	597.76
7	156.11	598.55
8	165.95	600.35
9	175.55	603.14
10	184.81	606.90
11	193.64	611.59
12	201.95	617.16
13	209.64	623.55
14	216.65	630.69
15	222.88	638.51
16	228.28	646.92
17	232.37	655.00

*** 1.414 ***

Point No.	X-Surf (ft)	Y-Surf (ft)
1	92.31	606.15
2	101.76	602.88
3	111.45	600.43
4	121.32	598.81
5	131.29	598.04
6	141.29	598.13
7	151.25	599.06
8	161.09	600.84
9	170.74	603.45
10	180.14	606.88
11	189.21	611.09
12	197.88	616.06
13	206.11	621.75
14	213.81	628.12
15	220.95	635.13
16	227.46	642.72
17	233.31	650.83
18	235.80	655.00

*** 1.415 ***

8	166.57	600.77
9	176.19	603.48
10	185.51	607.12
11	194.41	611.67
12	202.82	617.08
13	210.65	623.30
14	217.83	630.27
15	224.28	637.91
16	229.94	646.15
17	234.76	654.91
18	234.79	655.00

*** 1.415 ***

Y A X I S F T

.00	144.10	288.20	432.30	576.40	720.50
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X	.00					-L***
-						
-						
-				**		
			.11*			
144.10 +				.11**		
-				..1.*		
-				..11**		
-				..1W*		
-				..1		

A 288.20 +
-
- L ** W*

X 432.30 +

1 576.40 +

S 720.50 +

864.60 +

F 1008.70 +

T 1152.80 +

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ5c.txt
Output Filename: americ5c.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (americ5c.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

1

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant No.
1	10.5	10.5	12.0	32.0	.00	.0 1
2	13.5	13.5	25.0	27.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 2
4	18.0	18.0	10.0	30.0	.00	.0 2
5	18.0	18.0	10.0	33.0	.00	.0 2
6	19.0	19.0	5.0	45.0	.00	.0 2
7	21.0	21.0	20.0	45.0	.00	.0 2

1

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00
3	100.00	595.00
4	226.00	630.00
5	326.00	631.00

1

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

1

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced Along The Ground Surface Between X = 80.00 ft. and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft. and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

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 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.07	601.51
3	100.80	599.21
4	110.68	597.66
5	120.65	596.85
6	130.65	596.80
7	140.62	597.51
8	150.52	598.96
9	160.27	601.16
10	169.83	604.09
11	179.15	607.73
12	188.16	612.07
13	196.82	617.07
14	205.07	622.72
15	212.88	628.97
16	220.19	635.79
17	226.97	643.14
18	233.17	650.98
19	235.88	655.00

*** 1.879 ***

Individual data on the 41 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Force Top Lbs(kg)	Tie Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Earthquake Force Hor Lbs(kg)	Earthquake Force Ver Lbs(kg)	Surcharge Load Lbs(kg)
1	8.5	226.8	.0	.0	.0	.0	.0	.0	.0
2	1.1	51.9	.0	23.5	.0	.0	.0	.0	.0
3	3.2	222.5	.0	29.6	.0	.0	.0	.0	.0
4	5.8	659.3	.0	.0	.0	.0	.0	.0	.0
5	.8	116.0	.0	.0	.0	.0	.0	.0	.0
6	3.2	476.4	.0	.0	.0	.0	.0	.0	.0
7	6.0	1067.5	.0	.0	.0	.0	.0	.0	.0
8	.7	149.3	.0	1.1	.0	.0	.0	.0	.0
9	3.3	745.7	.0	29.1	.0	.0	.0	.0	.0
10	4.0	959.8	.0	85.8	.0	.0	.0	.0	.0
11	2.6	669.1	.0	87.4	.0	.0	.0	.0	.0
12	7.4	2116.5	.0	348.9	.0	.0	.0	.0	.0
13	2.6	829.6	.0	161.9	.0	.0	.0	.0	.0
14	1.4	422.0	.0	89.4	.0	.0	.0	.0	.0
15	8.6	2905.5	.0	657.3	.0	.0	.0	.0	.0
16	1.4	502.2	.0	118.8	.0	.0	.0	.0	.0
17	4.0	1457.8	.0	359.3	.0	.0	.0	.0	.0
18	4.5	1677.2	.0	430.4	.0	.0	.0	.0	.0
19	5.5	2149.7	.0	553.3	.0	.0	.0	.0	.0
20	4.0	1584.9	.0	413.6	.0	.0	.0	.0	.0
21	.3	106.7	.0	28.6	.0	.0	.0	.0	.0
22	9.6	3859.4	.0	1006.9	.0	.0	.0	.0	.0
23	.2	68.8	.0	17.6	.0	.0	.0	.0	.0
24	4.0	1623.3	.0	416.7	.0	.0	.0	.0	.0
25	5.1	2054.1	.0	508.6	.0	.0	.0	.0	.0
26	4.9	1957.7	.0	454.7	.0	.0	.0	.0	.0

27	4.0	1564.3	.0	336.3	.0	.0	.0	.0	.0
28	.2	60.1	.0	12.6	.0	.0	.0	.0	.0
29	8.7	3234.6	.0	590.0	.0	.0	.0	.0	.0
30	1.2	434.7	.0	63.3	.0	.0	.0	.0	.0
31	4.0	1390.6	.0	164.9	.0	.0	.0	.0	.0
32	3.1	777.8	.0	75.2	.0	.0	.0	.0	.0
33	2.8	691.5	.0	25.6	.0	.0	.0	.0	.0
34	4.1	965.3	.0	.0	.0	.0	.0	.0	.0
35	.9	197.6	.0	.0	.0	.0	.0	.0	.0
36	3.1	641.4	.0	.0	.0	.0	.0	.0	.0
37	4.2	757.9	.0	.0	.0	.0	.0	.0	.0
38	5.8	891.0	.0	.0	.0	.0	.0	.0	.0
39	1.0	126.0	.0	.0	.0	.0	.0	.0	.0
40	6.2	516.9	.0	.0	.0	.0	.0	.0	.0
41	2.7	57.1	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.51	604.47
2	89.99	601.29
3	99.71	598.91
4	109.58	597.35
5	119.56	596.63
6	129.56	596.75
7	139.51	597.70
8	149.35	599.49
9	159.01	602.09
10	168.41	605.49
11	177.49	609.67
12	186.20	614.60
13	194.46	620.24
14	202.21	626.55
15	209.41	633.49
16	216.01	641.01
17	221.95	649.05
18	225.44	654.72

*** 1.882 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.882 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.48	601.25
3	100.18	598.83
4	110.06	597.26
5	120.04	596.55
6	130.03	596.71
7	139.98	597.75
8	149.80	599.64
9	159.42	602.38
10	168.76	605.94
11	177.76	610.30
12	186.35	615.43
13	194.46	621.28
14	202.03	627.81
15	209.00	634.98
16	215.32	642.73

17	220.95	650.99
18	222.11	653.05

*** 1.882 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.60	601.57
3	101.34	599.32
4	111.22	597.80
5	121.19	597.04
6	131.19	597.03
7	141.17	597.77
8	151.05	599.26
9	160.80	601.50
10	170.35	604.46
11	179.65	608.13
12	188.65	612.50
13	197.29	617.53
14	205.53	623.20
15	213.31	629.48
16	220.61	636.32
17	227.36	643.69
18	233.54	651.56
19	235.85	655.00

*** 1.883 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.01	601.30
3	101.71	598.87
4	111.59	597.31
5	121.56	596.65
6	131.56	596.89
7	141.50	598.02
8	151.29	600.03
9	160.87	602.91
10	170.15	606.64
11	179.06	611.19
12	187.52	616.51
13	195.47	622.57
14	202.85	629.32
15	209.60	636.70
16	215.66	644.66
17	220.40	652.20

*** 1.884 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.64	601.66
3	103.38	599.39
4	113.26	597.89
5	123.24	597.17
6	133.24	597.22
7	143.20	598.05
8	153.07	599.65
9	162.79	602.02
10	172.29	605.13
11	181.52	608.98
12	190.43	613.53
13	198.95	618.76
14	207.04	624.64
15	214.65	631.12
16	221.73	638.19
17	228.24	645.78
18	234.14	653.85
19	234.85	655.00

*** 1.885 ***

Y A X I S F T

T 1152.80 +

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ3b.txt
Output Filename: americ3b.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric3a.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant (psf)
1	8.5	8.5	10.0	26.0	.00	.0
2	8.5	8.5	10.0	26.0	.00	.0
3	17.0	17.0	5.0	27.0	.00	.0
4	18.0	18.0	10.0	30.0	.00	.0
5	18.0	18.0	10.0	33.0	.00	.0
6	19.0	19.0	5.0	45.0	.00	.0
7	21.0	21.0	20.0	45.0	.00	.0

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

1

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

1

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.18	604.84
2	97.10	603.56
3	107.07	602.87
4	117.07	602.78
5	127.06	603.29
6	137.00	604.40
7	146.85	606.10
8	156.59	608.38
9	166.17	611.24
10	175.56	614.67
11	184.73	618.66
12	193.65	623.19
13	202.28	628.24
14	210.59	633.80
15	218.56	639.85
16	226.14	646.36
17	233.33	653.32
18	234.87	655.00

*** 1.815 ***

Individual data on the 37 slices

Slice No.	Width Ft(m)	Water Force Lbs(kg)	Water Force Lbs(kg)	Tie Force Lbs(kg)	Tie Force Lbs(kg)	Earthquake Force Lbs(kg)	Surcharge Force Lbs(kg)
1	2.8	12.5	.0	.0	.0	.0	.0
2	7.1	166.2	.0	.0	.0	.0	.0
3	2.9	143.4	.0	.0	.0	.0	.0
4	4.0	230.4	.0	.0	.0	.0	.0
5	3.1	203.5	.0	.0	.0	.0	.0
6	6.9	613.8	.0	.0	.0	.0	.0
7	3.1	318.8	.0	.0	.0	.0	.0
8	.9	96.0	.0	.0	.0	.0	.0
9	9.1	1093.8	.0	.0	.0	.0	.0
10	.9	131.1	.0	.0	.0	.0	.0
11	4.0	556.9	.0	.0	.0	.0	.0
12	5.0	727.8	.0	.0	.0	.0	.0
13	5.0	804.3	.0	.0	.0	.0	.0
14	4.0	659.4	.0	.0	.0	.0	.0

15	.9	139.3	.0	.0	.0	.0	.0	.0	.0
16	9.1	1597.1	.0	.0	.0	.0	.0	.0	.0
17	.6	108.6	.0	.0	.0	.0	.0	.0	.0
18	3.4	612.0	.0	.0	.0	.0	.0	.0	.0
19	6.2	1113.1	.0	.0	.0	.0	.0	.0	.0
20	3.8	719.3	.0	.0	.0	.0	.0	.0	.0
21	4.0	735.3	.0	.0	.0	.0	.0	.0	.0
22	1.6	279.2	.0	.0	.0	.0	.0	.0	.0
23	8.4	1533.3	.0	.0	.0	.0	.0	.0	.0
24	.7	134.3	.0	.0	.0	.0	.0	.0	.0
25	3.3	569.2	.0	.0	.0	.0	.0	.0	.0
26	5.7	944.3	.0	.0	.0	.0	.0	.0	.0
27	4.3	719.0	.0	.0	.0	.0	.0	.0	.0
28	4.0	615.2	.0	.0	.0	.0	.0	.0	.0
29	.3	40.3	.0	.0	.0	.0	.0	.0	.0
30	8.3	1144.2	.0	.0	.0	.0	.0	.0	.0
31	1.4	183.2	.0	.0	.0	.0	.0	.0	.0
32	4.0	462.7	.0	.0	.0	.0	.0	.0	.0
33	2.6	255.5	.0	.0	.0	.0	.0	.0	.0
34	7.4	638.7	.0	.0	.0	.0	.0	.0	.0
35	.1	10.7	.0	.0	.0	.0	.0	.0	.0
36	7.2	315.1	.0	.0	.0	.0	.0	.0	.0
37	1.5	11.0	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.18	604.84
2	97.11	603.65
3	107.09	603.04
4	117.09	603.01
5	127.07	603.56
6	137.01	604.70
7	146.86	606.41
8	156.60	608.70
9	166.18	611.55
10	175.59	614.95
11	184.77	618.90
12	193.72	623.37
13	202.38	628.36
14	210.74	633.85
15	218.77	639.82
16	226.43	646.24
17	233.71	653.10
18	235.50	655.00

*** 1.816 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.61	603.71
3	106.59	603.17
4	116.59	603.20
5	126.57	603.80
6	136.51	604.96
7	146.36	606.68
8	156.09	608.96
9	165.68	611.79
10	175.10	615.16
11	184.31	619.06
12	193.28	623.47
13	201.99	628.39
14	210.41	633.79
15	218.50	639.66
16	226.25	645.98
17	233.63	652.73
18	235.84	655.00

*** 1.816 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	87.18	604.84
2	97.06	603.33
3	107.03	602.44
4	117.02	602.18
5	127.02	602.54
6	136.97	603.52
7	146.84	605.13
8	156.59	607.35

9	166.18	610.18
10	175.57	613.60
11	184.74	617.61
12	193.63	622.18
13	202.22	627.30
14	210.48	632.94
15	218.36	639.09
16	225.84	645.73
17	232.90	652.82
18	234.82	655.00

*** 1.817 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	89.74	604.99
2	99.71	604.13
3	109.70	603.83
4	119.70	604.09
5	129.67	604.90
6	139.57	606.28
7	149.38	608.20
8	159.07	610.68
9	168.61	613.69
10	177.96	617.23
11	187.10	621.29
12	196.00	625.85
13	204.63	630.90
14	212.96	636.43
15	220.97	642.42
16	228.64	648.84
17	235.20	655.00

*** 1.817 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.21	604.90
2	98.16	603.98
3	108.16	603.62
4	118.16	603.81
5	128.13	604.55
6	138.04	605.84
7	147.87	607.68
8	157.59	610.06
9	167.15	612.98
10	176.54	616.41
11	185.73	620.36
12	194.68	624.82
13	203.38	629.76
14	211.78	635.17
15	219.88	641.04
16	227.64	647.35
17	235.03	654.08
18	235.94	655.00

*** 1.817 ***

1

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.72	604.93
2	98.69	604.12
3	108.68	603.87
4	118.68	604.17
5	128.64	605.02
6	138.54	606.42
7	148.35	608.36
8	158.04	610.84
9	167.57	613.86
10	176.93	617.40
11	186.07	621.44
12	194.98	625.99
13	203.62	631.02
14	211.97	636.53
15	220.00	642.48

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ3d.txt
Output Filename: americ3d.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric3d.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right Below Bnd	Soil Type
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant Surface No.
1	13.5	13.5	25.0	27.0	.00	.0 1
2	13.5	13.5	25.0	27.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 1
4	18.0	18.0	10.0	30.0	.00	.0 1
5	18.0	18.0	10.0	33.0	.00	.0 1
6	19.0	19.0	5.0	45.0	.00	.0 1
7	21.0	21.0	20.0	45.0	.00	.0 1

1 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

1

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

1

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

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 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.32	602.44
3	101.21	600.99
4	111.18	600.19
5	121.18	600.05
6	131.17	600.55
7	141.10	601.72
8	150.93	603.52
9	160.63	605.97
10	170.15	609.04
11	179.44	612.73
12	188.47	617.02
13	197.21	621.89
14	205.60	627.32
15	213.63	633.29
16	221.25	639.77
17	228.42	646.73
18	235.13	654.15
19	235.80	655.00

*** 2.032 ***

Individual data on the 38 slices

Slice No.	Width Ft(m)	Water Force Lbs(kg)	Water Force Lbs(kg)	Tie Force Lbs(kg)	Tie Force Lbs(kg)	Earthquake Force Lbs(kg)	Surcharge Force Lbs(kg)	Ver Load Lbs(kg)
1	8.5	164.0	.0	.0	.0	.0	.0	.0
2	1.3	48.9	.0	.0	.0	.0	.0	.0
3	8.7	706.4	.0	.0	.0	.0	.0	.0
4	1.2	146.0	.0	.0	.0	.0	.0	.0
5	2.8	343.3	.0	.0	.0	.0	.0	.0
6	7.2	1096.9	.0	.0	.0	.0	.0	.0
7	2.8	537.6	.0	.0	.0	.0	.0	.0
8	4.0	803.4	.0	.0	.0	.0	.0	.0
9	3.2	674.9	.0	.0	.0	.0	.0	.0
10	6.8	1664.3	.0	.0	.0	.0	.0	.0
11	3.2	834.7	.0	.0	.0	.0	.0	.0
12	.8	218.3	.0	.0	.0	.0	.0	.0
13	9.1	2590.7	.0	.0	.0	.0	.0	.0

14	.9	279.5	.0	.0	.0	.0	.0	.0	.0
15	4.0	1228.6	.0	.0	.0	.0	.0	.0	.0
16	4.9	1543.1	.0	.0	.0	.0	.0	.0	.0
17	5.1	1680.5	.0	.0	.0	.0	.0	.0	.0
18	4.0	1333.6	.0	.0	.0	.0	.0	.0	.0
19	.6	206.6	.0	.0	.0	.0	.0	.0	.0
20	9.4	3184.5	.0	.0	.0	.0	.0	.0	.0
21	.1	51.3	.0	.0	.0	.0	.0	.0	.0
22	3.9	1310.7	.0	.0	.0	.0	.0	.0	.0
23	5.4	1814.8	.0	.0	.0	.0	.0	.0	.0
24	4.6	1541.6	.0	.0	.0	.0	.0	.0	.0
25	4.0	1304.3	.0	.0	.0	.0	.0	.0	.0
26	.5	148.6	.0	.0	.0	.0	.0	.0	.0
27	8.7	2707.7	.0	.0	.0	.0	.0	.0	.0
28	.8	242.2	.0	.0	.0	.0	.0	.0	.0
29	4.0	1150.4	.0	.0	.0	.0	.0	.0	.0
30	3.6	960.9	.0	.0	.0	.0	.0	.0	.0
31	6.4	1614.6	.0	.0	.0	.0	.0	.0	.0
32	1.6	380.8	.0	.0	.0	.0	.0	.0	.0
33	2.4	502.6	.0	.0	.0	.0	.0	.0	.0
34	5.2	975.4	.0	.0	.0	.0	.0	.0	.0
35	4.8	753.2	.0	.0	.0	.0	.0	.0	.0
36	2.4	308.8	.0	.0	.0	.0	.0	.0	.0
37	6.7	412.7	.0	.0	.0	.0	.0	.0	.0
38	.7	3.9	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.81	602.39
3	101.70	600.87
4	111.66	600.02
5	121.66	599.83
6	131.65	600.32
7	141.58	601.47
8	151.42	603.29
9	161.11	605.75
10	170.61	608.86
11	179.89	612.60
12	188.89	616.95
13	197.58	621.89
14	205.93	627.40
15	213.88	633.46
16	221.42	640.04
17	228.49	647.10
18	235.08	654.63
19	235.37	655.00

*** 2.032 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.88	602.69
3	101.80	601.45
4	111.78	600.84
5	121.78	600.87
6	131.76	601.54
7	141.67	602.84
8	151.48	604.77
9	161.15	607.32
10	170.64	610.48
11	179.91	614.24
12	188.92	618.58
13	197.63	623.49
14	206.02	628.94
15	214.04	634.91
16	221.66	641.38
17	228.86	648.32
18	234.95	655.00

*** 2.033 ***

6	130.60	599.97
7	140.54	601.05
8	150.39	602.79
9	160.10	605.17
10	169.63	608.20
11	178.94	611.86
12	187.98	616.12
13	196.72	620.98
14	205.12	626.40
15	213.14	632.38
16	220.75	638.87
17	227.91	645.85
18	234.59	653.29
19	235.93	655.00

*** 2.033 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.00	604.44
2	89.73	602.15
3	99.60	600.51
4	109.55	599.54
5	119.55	599.25
6	129.54	599.62
7	139.48	600.67
8	149.34	602.39
9	159.05	604.76
10	168.58	607.79
11	177.89	611.44
12	186.93	615.72
13	195.66	620.60
14	204.04	626.05
15	212.04	632.05
16	219.62	638.58
17	226.73	645.60
18	233.36	653.09
19	234.84	655.00

*** 2.033 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.56	604.59
2	92.31	602.32
3	102.18	600.73
4	112.13	599.80
5	122.13	599.56
6	132.12	599.99
7	142.06	601.10
8	151.90	602.88
9	161.60	605.32
10	171.11	608.42
11	180.38	612.15
12	189.39	616.50
13	198.07	621.46
14	206.40	626.99
15	214.34	633.07
16	221.84	639.68
17	228.88	646.78
18	235.43	654.35
19	235.92	655.00

*** 2.033 ***

1

Failure Surface Specified By 18 Coordinate Points

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.78	602.28
3	100.65	600.71
4	110.61	599.80
5	120.61	599.55

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.85	602.42
3	103.72	600.84
4	113.68	599.95
5	123.68	599.75
6	133.67	600.24
7	143.60	601.42
8	153.42	603.28

15	217.40	636.89
16	224.83	643.59
17	231.79	650.76
18	235.40	655.00

*** 2.034 ***

Y A X I S F T

.00	144.10	288.20	432.30	576.40	720.50
-----	--------	--------	--------	--------	--------

X .00 +-----+-----+-----+-----L***-----+

-	
-	
-	1
-	**
-	..1*
144.10 +	..1**
-	..11*
-	..61**
-	..41*
-	..1

A 288.20 +
-
- L ** :

X 432.30 +

1 576.40 +

S 720.50 +

864.60 +

F 1008.70 +

T 1152.80 +

*** 2.034 ***

1

Point No.	X-Surf (ft)	Y-Surf (ft)
1	80.00	604.44
2	89.73	602.15
3	99.60	600.53
4	109.56	599.59
5	119.55	599.33
6	129.55	599.75
7	139.48	600.86
8	149.32	602.64
9	159.02	605.08
10	168.53	608.19
11	177.80	611.94
12	186.79	616.31
13	195.47	621.28
14	203.78	626.84
15	211.70	632.95
16	219.18	639.58
17	226.19	646.72
18	232.69	654.31
19	233.21	655.00

*** 2.035 ***

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.98	602.91
3	105.90	601.69
4	115.89	601.13
5	125.89	601.22
6	135.86	601.97
7	145.76	603.38
8	155.55	605.43
9	165.18	608.13
10	174.61	611.45
11	183.80	615.38
12	192.71	619.92
13	201.31	625.03
14	209.55	630.69

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ4b.txt
Output Filename: americ4b.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric4b.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant Surface No.
1	8.5	8.5	10.0	26.0	.00	.0 1
2	8.5	8.5	10.0	26.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 2
4	18.0	18.0	10.0	30.0	.00	.0 2
5	18.0	18.0	10.0	33.0	.00	.0 2
6	19.0	19.0	5.0	45.0	.00	.0 2
7	21.0	21.0	20.0	45.0	.00	.0 2

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00

3	100.00	595.00
4	226.00	621.00
5	326.00	622.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.649 ***

Individual data on the 40 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Top Lbs(kg)	Tie Force Lbs(kg)	Tie Bot Lbs(kg)	Earthquake Force Lbs(kg)	Surcharge Tan Lbs(kg)	Hor Load Lbs(kg)	Ver Load Lbs(kg)
--------------	----------------	----------------------------	-------------------------	-------------------------	-----------------------	--------------------------------	-----------------------------	------------------------	------------------------

1	3.8	48.4	.0	.0	.0	.0	.0	.0	.0
2	2.2	44.9	.0	12.9	.0	.0	.0	.0	.0
3	3.4	138.8	.0	.0	.0	.0	.0	.0	.0
4	4.3	287.4	.0	.0	.0	.0	.0	.0	.0
5	4.0	335.7	.0	.0	.0	.0	.0	.0	.0
6	1.4	126.8	.0	.0	.0	.0	.0	.0	.0
7	8.6	1042.0	.0	.0	.0	.0	.0	.0	.0
8	.2	26.1	.0	.0	.0	.0	.0	.0	.0
9	1.1	156.3	.0	2.1	.0	.0	.0	.0	.0
10	2.7	405.2	.0	21.0	.0	.0	.0	.0	.0
11	7.2	1199.0	.0	154.7	.0	.0	.0	.0	.0
12	2.8	526.0	.0	94.5	.0	.0	.0	.0	.0
13	4.0	780.8	.0	162.8	.0	.0	.0	.0	.0
14	3.2	650.7	.0	154.1	.0	.0	.0	.0	.0
15	6.8	1494.4	.0	373.6	.0	.0	.0	.0	.0
16	3.2	736.7	.0	194.2	.0	.0	.0	.0	.0
17	.8	186.8	.0	51.8	.0	.0	.0	.0	.0
18	9.0	2185.4	.0	592.1	.0	.0	.0	.0	.0
19	1.0	243.7	.0	65.0	.0	.0	.0	.0	.0
20	4.0	1008.0	.0	267.4	.0	.0	.0	.0	.0
21	4.7	1196.8	.0	306.7	.0	.0	.0	.0	.0
22	5.3	1374.1	.0	323.4	.0	.0	.0	.0	.0
23	4.0	1035.3	.0	219.8	.0	.0	.0	.0	.0
24	.2	50.3	.0	10.3	.0	.0	.0	.0	.0
25	9.2	2345.2	.0	387.7	.0	.0	.0	.0	.0
26	.6	163.3	.0	19.7	.0	.0	.0	.0	.0
27	4.0	996.0	.0	90.7	.0	.0	.0	.0	.0
28	4.2	1000.8	.0	32.3	.0	.0	.0	.0	.0
29	.0	3.0	.0	.0	.0	.0	.0	.0	.0
30	5.8	1364.3	.0	.0	.0	.0	.0	.0	.0
31	2.6	580.7	.0	.0	.0	.0	.0	.0	.0
32	1.4	300.4	.0	.0	.0	.0	.0	.0	.0
33	6.5	1310.2	.0	.0	.0	.0	.0	.0	.0
34	3.5	650.9	.0	.0	.0	.0	.0	.0	.0
35	3.9	656.6	.0	.0	.0	.0	.0	.0	.0
36	.1	7.8	.0	.0	.0	.0	.0	.0	.0
37	6.8	914.6	.0	.0	.0	.0	.0	.0	.0
38	3.2	345.2	.0	.0	.0	.0	.0	.0	.0
39	3.0	248.6	.0	.0	.0	.0	.0	.0	.0
40	5.2	169.5	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.23	602.13
3	109.92	599.69
4	119.79	598.08
5	129.76	597.30
6	139.76	597.37
7	149.72	598.28
8	159.57	600.02
9	169.23	602.59
10	178.64	605.97
11	187.74	610.13
12	196.45	615.04
13	204.72	620.67
14	212.48	626.97
15	219.68	633.91
16	226.27	641.43
17	232.21	649.48
18	235.60	655.00

*** 1.651 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.20	601.79
3	105.94	599.53
4	115.83	598.05
5	125.81	597.35
6	135.81	597.45
7	145.77	598.33
8	155.63	599.99
9	165.33	602.43
10	174.80	605.63
11	183.99	609.56
12	192.85	614.21
13	201.31	619.54
14	209.32	625.52
15	216.84	632.12
16	223.81	639.29
17	230.19	646.99
18	235.83	655.00

*** 1.658 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.07	601.51
3	100.80	599.21
4	110.68	597.66
5	120.65	596.85
6	130.65	596.80
7	140.62	597.51
8	150.52	598.96
9	160.27	601.16
10	169.83	604.09
11	179.15	607.73
12	188.16	612.07
13	196.82	617.07
14	205.07	622.72
15	212.88	628.97
16	220.19	635.79
17	226.97	643.14
18	233.17	650.98
19	235.88	655.00

*** 1.660 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.61	601.57
3	103.33	599.23
4	113.20	597.64
5	123.17	596.83
6	133.17	596.80
7	143.14	597.55
8	153.03	599.08
9	162.76	601.37
10	172.29	604.42
11	181.55	608.19
12	190.48	612.68
13	199.04	617.85
14	207.17	623.67
15	214.82	630.11
16	221.95	637.13
17	228.51	644.68
18	234.46	652.71
19	235.89	655.00

*** 1.660 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.64	601.66
3	103.38	599.39
4	113.26	597.89
5	123.24	597.17
6	133.24	597.22
7	143.20	598.05
8	153.07	599.65
9	162.79	602.02
10	172.29	605.13
11	181.52	608.98
12	190.43	613.53
13	198.95	618.76
14	207.04	624.64
15	214.65	631.12
16	221.73	638.19
17	228.24	645.78
18	234.14	653.85
19	234.85	655.00

*** 1.662 ***

1

Run Date:
Time of Run:
Run By:
Input Data Filename: americ4d.txt
Output Filename: americ4d.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric4d.DAT)

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

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

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 19 Coordinate Points

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant No.
1	13.5	13.5	25.0	27.0	.00	.0
2	13.5	13.5	25.0	27.0	.00	.0
3	17.0	17.0	5.0	27.0	.00	.0
4	18.0	18.0	10.0	30.0	.00	.0
5	18.0	18.0	10.0	33.0	.00	.0
6	19.0	19.0	5.0	45.0	.00	.0
7	21.0	21.0	20.0	45.0	.00	.0

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.07	601.51
3	100.80	599.21
4	110.68	597.66
5	120.65	596.85
6	130.65	596.80
7	140.62	597.51
8	150.52	598.96
9	160.27	601.16
10	169.83	604.09
11	179.15	607.73
12	188.16	612.07
13	196.82	617.07
14	205.07	622.72
15	212.88	628.97
16	220.19	635.79
17	226.97	643.14
18	233.17	650.98
19	235.88	655.00

Unit Weight of Water = 10.00

*** 1.912 ***

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Individual data on the 41 slices

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00
3	100.00	595.00
4	226.00	621.00
5	326.00	622.00

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Force Top Lbs(kg)	Tie Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Surcharge Force Hor Lbs(kg)	Ver Load Lbs(kg)	Lbs(kg)
1	8.5	226.8	.0	.0	.0	.0	.0	.0	.0
2	1.1	51.9	.0	23.5	.0	.0	.0	.0	.0
3	3.2	222.5	.0	29.6	.0	.0	.0	.0	.0
4	5.8	659.3	.0	.0	.0	.0	.0	.0	.0
5	.8	116.0	.0	.0	.0	.0	.0	.0	.0
6	3.2	476.4	.0	.0	.0	.0	.0	.0	.0
7	6.7	1216.8	.0	.0	.0	.0	.0	.0	.0
8	1.6	342.8	.0	.0	.0	.0	.0	.0	.0
9	1.7	402.9	.0	4.3	.0	.0	.0	.0	.0
10	4.0	959.8	.0	42.3	.0	.0	.0	.0	.0
11	2.6	669.1	.0	52.8	.0	.0	.0	.0	.0
12	7.4	2116.5	.0	229.4	.0	.0	.0	.0	.0
13	2.6	829.6	.0	110.1	.0	.0	.0	.0	.0
14	1.4	422.0	.0	61.2	.0	.0	.0	.0	.0
15	8.6	2905.5	.0	448.1	.0	.0	.0	.0	.0
16	1.4	502.2	.0	80.6	.0	.0	.0	.0	.0
17	4.0	1457.8	.0	240.6	.0	.0	.0	.0	.0
18	4.5	1677.2	.0	283.0	.0	.0	.0	.0	.0
19	5.5	2149.7	.0	352.8	.0	.0	.0	.0	.0

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

20	4.0	1584.9	.0	253.8	.0	.0	.0	.0	.0
21	.3	106.7	.0	17.2	.0	.0	.0	.0	.0
22	9.6	3859.4	.0	567.8	.0	.0	.0	.0	.0
23	.2	68.8	.0	9.2	.0	.0	.0	.0	.0
24	4.0	1623.3	.0	206.9	.0	.0	.0	.0	.0
25	5.1	2054.1	.0	220.5	.0	.0	.0	.0	.0
26	4.9	1957.7	.0	154.6	.0	.0	.0	.0	.0
27	4.0	1564.3	.0	74.6	.0	.0	.0	.0	.0
28	.2	60.1	.0	2.0	.0	.0	.0	.0	.0
29	3.0	1136.8	.0	19.2	.0	.0	.0	.0	.0
30	5.6	2097.8	.0	.0	.0	.0	.0	.0	.0
31	1.2	434.7	.0	.0	.0	.0	.0	.0	.0
32	4.0	1390.6	.0	.0	.0	.0	.0	.0	.0
33	3.1	1000.1	.0	.0	.0	.0	.0	.0	.0
34	6.9	2130.1	.0	.0	.0	.0	.0	.0	.0
35	.9	254.1	.0	.0	.0	.0	.0	.0	.0
36	3.1	824.7	.0	.0	.0	.0	.0	.0	.0
37	4.2	974.4	.0	.0	.0	.0	.0	.0	.0
38	5.8	1145.5	.0	.0	.0	.0	.0	.0	.0
39	1.0	162.0	.0	.0	.0	.0	.0	.0	.0
40	6.2	664.6	.0	.0	.0	.0	.0	.0	.0
41	2.7	73.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.61	601.57
3	103.33	599.23
4	113.20	597.64
5	123.17	596.83
6	133.17	596.80
7	143.14	597.55
8	153.03	599.08
9	162.76	601.37
10	172.29	604.42
11	181.55	608.19
12	190.48	612.68
13	199.04	617.85
14	207.17	623.67
15	214.82	630.11
16	221.95	637.13
17	228.51	644.68
18	234.46	652.71
19	235.89	655.00

*** 1.917 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.60	601.57
3	101.34	599.32
4	111.22	597.80
5	121.19	597.04
6	131.19	597.03
7	141.17	597.77
8	151.05	599.26
9	160.80	601.50
10	170.35	604.46
11	179.65	608.13
12	188.65	612.50
13	197.29	617.53
14	205.53	623.20
15	213.31	629.48
16	220.61	636.32
17	227.36	643.69
18	233.54	651.56
19	235.85	655.00

*** 1.917 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93

8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.918 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.58	601.56
3	100.33	599.33
4	110.22	597.84
5	120.19	597.08
6	130.19	597.07
7	140.16	597.80
8	150.05	599.27
9	159.81	601.48
10	169.37	604.40
11	178.69	608.03
12	187.71	612.34
13	196.39	617.31
14	204.68	622.91
15	212.52	629.11
16	219.88	635.88
17	226.72	643.18
18	232.99	650.96
19	235.78	655.00

*** 1.920 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.64	601.66
3	103.38	599.39
4	113.26	597.89
5	123.24	597.17
6	133.24	597.22
7	143.20	598.05
8	153.07	599.65
9	162.79	602.02
10	172.29	605.13
11	181.52	608.98
12	190.43	613.53
13	198.95	618.76
14	207.04	624.64
15	214.65	631.12
16	221.73	638.19
17	228.24	645.78
18	234.14	653.85
19	234.85	655.00

*** 1.920 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.20	601.79
3	105.94	599.53
4	115.83	598.05
5	125.81	597.35
6	135.81	597.45
7	145.77	598.33
8	155.63	599.99
9	165.33	602.43
10	174.80	605.63
11	183.99	609.56

*** 1.924 ***

1

.00	144.10	288.20	432.30	576.40	720.50
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-	1
-	**
-	.17*
4.10 +	..11**
-	..1.*
-	..11**
-	..W1*
-	..1

1 576.40 +

T 1152.80 +

Point No.	X-Surf (ft)	Y-Surf (ft)
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★★★ 1.929 ★★★

1

Point No.	X-Surf (ft)	Y-Surf (ft)
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*** 1.930 ***

Point No.	X-Surf (ft)	Y-Surf (ft)
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1	88.21	604.90
2	97.75	601.92
3	107.50	599.71
4	117.40	598.28
5	127.38	597.64
6	137.38	597.81
7	147.33	598.76
8	157.18	600.51
9	166.85	603.04
10	176.30	606.33
11	185.45	610.36
12	194.25	615.11
13	202.65	620.54
14	210.58	626.63
15	218.01	633.33
16	224.87	640.59
17	231.14	648.39
18	235.64	655.00

** PCSTABL5M **

by
Purdue University

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ5b.txt
Output Filename: americ5b.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (ame
ric5b.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant (psf)
1	8.5	8.5	10.0	26.0	.00	.0
2	8.5	8.5	10.0	26.0	.00	.0
3	17.0	17.0	5.0	27.0	.00	.0
4	18.0	18.0	10.0	30.0	.00	.0
5	18.0	18.0	10.0	33.0	.00	.0
6	19.0	19.0	5.0	45.0	.00	.0
7	21.0	21.0	20.0	45.0	.00	.0

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00

3	100.00	595.00
4	226.00	630.00
5	326.00	631.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.23	602.13
3	109.92	599.69
4	119.79	598.08
5	129.76	597.30
6	139.76	597.37
7	149.72	598.28
8	159.57	600.02
9	169.23	602.59
10	178.64	605.97
11	187.74	610.13
12	196.45	615.04
13	204.72	620.67
14	212.48	626.97
15	219.68	633.91
16	226.27	641.43
17	232.21	649.48
18	235.60	655.00

*** 1.420 ***

Individual data on the 38 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Top Lbs(kg)	Water Bot Lbs(kg)	Tie Force Lbs(kg)	Tie Norm Lbs(kg)	Earthquake Force Lbs(kg)	Surcharge Tan Lbs(kg)	Hor Load Lbs(kg)	Ver Load Lbs(kg)
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1	9.2	305.5	.0	.0	.0	.0	.0	.0	.0
2	.2	15.1	.0	.0	.0	.0	.0	.0	.0
3	3.8	267.5	.0	.0	.0	.0	.0	.0	.0
4	5.9	556.0	.0	.0	.0	.0	.0	.0	.0
5	4.1	506.6	.0	.0	.0	.0	.0	.0	.0
6	.3	41.9	.0	.0	.0	.0	.0	.0	.0
7	3.7	512.4	.0	29.4	.0	.0	.0	.0	.0
8	1.8	262.4	.0	35.5	.0	.0	.0	.0	.0
9	8.2	1408.6	.0	308.1	.0	.0	.0	.0	.0
10	1.8	339.0	.0	96.4	.0	.0	.0	.0	.0
11	2.2	431.7	.0	135.3	.0	.0	.0	.0	.0
12	7.8	1623.0	.0	570.8	.0	.0	.0	.0	.0
13	2.2	513.1	.0	192.6	.0	.0	.0	.0	.0
14	4.0	926.4	.0	366.7	.0	.0	.0	.0	.0
15	3.7	879.9	.0	367.0	.0	.0	.0	.0	.0
16	6.3	1579.8	.0	667.2	.0	.0	.0	.0	.0
17	3.6	918.5	.0	396.3	.0	.0	.0	.0	.0
18	.4	110.2	.0	49.8	.0	.0	.0	.0	.0
19	9.2	2427.8	.0	1066.8	.0	.0	.0	.0	.0
20	.8	209.7	.0	91.5	.0	.0	.0	.0	.0
21	4.0	1068.1	.0	467.7	.0	.0	.0	.0	.0
22	4.6	1224.6	.0	526.3	.0	.0	.0	.0	.0
23	5.4	1432.7	.0	590.4	.0	.0	.0	.0	.0
24	3.7	976.3	.0	379.6	.0	.0	.0	.0	.0
25	.3	66.4	.0	26.7	.0	.0	.0	.0	.0
26	8.4	2115.5	.0	744.5	.0	.0	.0	.0	.0
27	1.6	382.9	.0	116.5	.0	.0	.0	.0	.0
28	4.0	936.5	.0	248.3	.0	.0	.0	.0	.0
29	2.7	598.6	.0	125.7	.0	.0	.0	.0	.0
30	6.4	1343.7	.0	136.1	.0	.0	.0	.0	.0
31	.9	176.7	.0	.0	.0	.0	.0	.0	.0
32	.5	94.2	.0	.0	.0	.0	.0	.0	.0
33	3.5	638.8	.0	.0	.0	.0	.0	.0	.0
34	3.7	587.5	.0	.0	.0	.0	.0	.0	.0
35	6.3	854.6	.0	.0	.0	.0	.0	.0	.0
36	.3	31.7	.0	.0	.0	.0	.0	.0	.0
37	5.9	481.6	.0	.0	.0	.0	.0	.0	.0
38	3.4	79.6	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	96.41	608.21
2	105.61	604.28
3	115.14	601.24
4	124.91	599.13
5	134.84	597.95
6	144.84	597.72
7	154.81	598.44
8	164.67	600.10
9	174.33	602.69
10	183.70	606.19
11	192.69	610.57
12	201.23	615.77
13	209.23	621.77
14	216.63	628.50
15	223.35	635.90
16	229.35	643.90
17	234.55	652.44
18	235.79	655.00

*** 1.421 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	95.90	607.95
2	105.14	604.13
3	114.70	601.20
4	124.49	599.17
5	134.43	598.06
6	144.43	597.89
7	154.40	598.65
8	164.26	600.34
9	173.91	602.94
10	183.28	606.44
11	192.28	610.79
12	200.84	615.97
13	208.87	621.92
14	216.32	628.60
15	223.11	635.94
16	229.18	643.89
17	234.48	652.37
18	235.80	655.00

*** 1.428 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	96.92	608.46
2	106.10	604.49
3	115.62	601.42
4	125.39	599.28
5	135.32	598.10
6	145.31	597.89
7	155.29	598.65
8	165.14	600.36
9	174.78	603.02
10	184.12	606.60
11	193.06	611.07
12	201.54	616.38
13	209.46	622.48
14	216.75	629.32
15	223.35	636.84
16	229.19	644.95
17	234.22	653.60
18	234.86	655.00

*** 1.430 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.430 ***

Failure Surface Specified By 17 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	97.95	608.97
2	107.02	604.78
3	116.48	601.53
4	126.22	599.26
5	136.14	598.00
6	146.14	597.76
7	156.11	598.55
8	165.95	600.35
9	175.55	603.14
10	184.81	606.90
11	193.64	611.59
12	201.95	617.16
13	209.64	623.55
14	216.65	630.69
15	222.88	638.51
16	228.28	646.92
17	232.37	655.00

*** 1.435 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
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★★★ 1.437 ★★★

Point No.	X-Surf (ft)	Y-Surf (ft)
1	94.36	607.18
2	103.68	603.57
3	113.30	600.82
4	123.12	598.96
5	133.08	598.01
6	143.08	597.98
7	153.04	598.85
8	162.88	600.64
9	172.52	603.32
10	181.87	606.86
11	190.85	611.25
12	199.40	616.44
13	207.44	622.39
14	214.90	629.05
15	221.72	636.36
16	227.84	644.27
17	233.21	652.70
18	234.40	655.00

*** 1.438 ***

Point No.	X-Surf (ft)	Y-Surf (ft)
1	98.46	609.23
2	107.59	605.14
3	117.07	601.97
4	126.82	599.76
5	136.75	598.53
6	146.75	598.29
7	156.72	599.04
8	166.57	600.77
9	176.19	603.48
10	185.51	607.12
11	194.41	611.67
12	202.82	617.08
13	210.65	623.30
14	217.83	630.27
15	224.28	637.91
16	229.94	646.15
17	234.76	654.91
18	234.79	655.00

★★★ 1.440 ★★★

8	161.09	600.84
9	170.74	603.45
10	180.14	606.88
11	189.21	611.09
12	197.88	616.06
13	206.11	621.75
14	213.81	628.12
15	220.95	635.13
16	227.46	642.72
17	233.31	650.83
18	235.80	655.00

*** 1.443 ***

Y A X I S F T

.00	144.10	288.20	432.30	576.40	720.50
-----	--------	--------	--------	--------	--------

X	.00 +-----+-----+-----+-----L-***
-	.
-	**
-	.11*
144.10 +	.11**
-	..1.*
-	..11**
-	..1W*
-	..1
A	288.20 +
-	L ** W*
-	
-	
X	432.30 +
-	
-	
I	576.40 +
-	
-	
S	720.50 +
-	
-	
-	
864.60 +	
-	
-	
F	1008.70 +
-	
-	
T	1152.80 +

** PCSTABL5M **

by
Purdue University

1

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

Run Date:
Time of Run:
Run By:
Input Data Filename: americ5d.txt
Output Filename: americ5d.sai

PROBLEM DESCRIPTION AT. SANITARIO Americana - CORTE A - (americ5d.DAT)

BOUNDARY COORDINATES

21 Top Boundaries
28 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	600.00	90.00	605.00	3
2	90.00	605.00	100.00	610.00	2
3	100.00	610.00	104.00	610.00	2
4	104.00	610.00	114.00	615.00	2
5	114.00	615.00	118.00	615.00	2
6	118.00	615.00	128.00	620.00	2
7	128.00	620.00	132.00	620.00	2
8	132.00	620.00	142.00	625.00	2
9	142.00	625.00	146.00	625.00	2
10	146.00	625.00	156.00	630.00	2
11	156.00	630.00	160.00	630.00	2
12	160.00	630.00	170.00	635.00	2
13	170.00	635.00	174.00	635.00	2
14	174.00	635.00	184.00	640.00	2
15	184.00	640.00	188.00	640.00	2
16	188.00	640.00	198.00	645.00	2
17	198.00	645.00	202.00	645.00	2
18	202.00	645.00	212.00	650.00	1
19	212.00	650.00	216.00	650.00	1
20	216.00	650.00	226.00	655.00	1
21	226.00	655.00	326.00	655.00	1
22	90.00	600.00	95.00	600.00	3
23	.00	595.00	95.00	600.00	4
24	95.00	600.00	100.00	595.00	4
25	100.00	595.00	326.00	607.56	4
26	.00	586.00	326.00	604.00	5
27	.00	580.00	326.00	598.00	6
28	.00	574.00	326.00	592.00	7

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

Janbus Empirical Coef. is being used for the case of c & phi both > 0
1600 Trial Surfaces Have Been Generated.

40 Surfaces Initiate From Each Of 40 Points Equally Spaced
Along The Ground Surface Between X = 80.00 ft.
and X = 100.00 ft.

Each Surface Terminates Between X = 216.00 ft.
and X = 236.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 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 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.54	604.53
2	91.07	601.51
3	100.80	599.21
4	110.68	597.66
5	120.65	596.85
6	130.65	596.80
7	140.62	597.51
8	150.52	598.96
9	160.27	601.16
10	169.83	604.09
11	179.15	607.73
12	188.16	612.07
13	196.82	617.07
14	205.07	622.72
15	212.88	628.97
16	220.19	635.79
17	226.97	643.14
18	233.17	650.98
19	235.88	655.00

*** 1.771 ***

ISOTROPIC SOIL PARAMETERS

7 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param. (psf)	Piez. Constant No.
1	13.5	13.5	25.0	27.0	.00	.0 1
2	13.5	13.5	25.0	27.0	.00	.0 1
3	17.0	17.0	5.0	27.0	.00	.0 2
4	18.0	18.0	10.0	30.0	.00	.0 2
5	18.0	18.0	10.0	33.0	.00	.0 2
6	19.0	19.0	5.0	45.0	.00	.0 2
7	21.0	21.0	20.0	45.0	.00	.0 2

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 10.00

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	600.00
2	90.00	605.00
3	100.00	595.00
4	226.00	630.00
5	326.00	631.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	582.00
2	326.00	600.00

Searching Routine Will Be Limited To An Area Defined By 1 Boundaries
Of Which The First 1 Boundaries Will Deflect Surfaces Upward

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)
1	.00	550.00	326.00	550.00

Individual data on the 41 slices

Slice No.	Width Ft(m)	Water Weight Lbs(kg)	Water Force Top Lbs(kg)	Tie Force Bot Lbs(kg)	Tie Force Norm Lbs(kg)	Earthquake Force Tan Lbs(kg)	Surcharge Force Hor Lbs(kg)	Ver Load Lbs(kg)
1	8.5	226.8	.0	.0	.0	.0	.0	.0
2	1.1	51.9	.0	23.5	.0	.0	.0	.0
3	3.2	222.5	.0	29.6	.0	.0	.0	.0
4	5.8	659.3	.0	.0	.0	.0	.0	.0
5	.8	116.0	.0	.0	.0	.0	.0	.0
6	3.2	476.4	.0	.0	.0	.0	.0	.0
7	6.0	1067.5	.0	.0	.0	.0	.0	.0
8	.7	149.3	.0	1.1	.0	.0	.0	.0
9	3.3	745.7	.0	29.1	.0	.0	.0	.0
10	4.0	959.8	.0	85.8	.0	.0	.0	.0
11	2.6	669.1	.0	87.4	.0	.0	.0	.0
12	7.4	2116.5	.0	348.9	.0	.0	.0	.0
13	2.6	829.6	.0	161.9	.0	.0	.0	.0
14	1.4	422.0	.0	89.4	.0	.0	.0	.0
15	8.6	2905.5	.0	657.3	.0	.0	.0	.0
16	1.4	502.2	.0	118.8	.0	.0	.0	.0
17	4.0	1457.8	.0	359.3	.0	.0	.0	.0
18	4.5	1677.2	.0	430.4	.0	.0	.0	.0
19	5.5	2149.7	.0	553.3	.0	.0	.0	.0
20	4.0	1584.9	.0	413.6	.0	.0	.0	.0
21	.3	106.7	.0	28.6	.0	.0	.0	.0
22	9.6	3859.4	.0	1006.9	.0	.0	.0	.0
23	.2	68.8	.0	17.6	.0	.0	.0	.0
24	4.0	1623.3	.0	416.7	.0	.0	.0	.0
25	5.1	2054.1	.0	508.6	.0	.0	.0	.0
26	4.9	1957.7	.0	454.7	.0	.0	.0	.0

27	4.0	1564.3	.0	336.3	.0	.0	.0	.0	.0
28	.2	60.1	.0	12.6	.0	.0	.0	.0	.0
29	8.7	3234.6	.0	590.0	.0	.0	.0	.0	.0
30	1.2	434.7	.0	63.3	.0	.0	.0	.0	.0
31	4.0	1390.6	.0	164.9	.0	.0	.0	.0	.0
32	3.1	1000.1	.0	75.2	.0	.0	.0	.0	.0
33	2.8	889.0	.0	25.6	.0	.0	.0	.0	.0
34	4.1	1241.1	.0	.0	.0	.0	.0	.0	.0
35	.9	254.1	.0	.0	.0	.0	.0	.0	.0
36	3.1	824.7	.0	.0	.0	.0	.0	.0	.0
37	4.2	974.4	.0	.0	.0	.0	.0	.0	.0
38	5.8	1145.5	.0	.0	.0	.0	.0	.0	.0
39	1.0	162.0	.0	.0	.0	.0	.0	.0	.0
40	6.2	664.6	.0	.0	.0	.0	.0	.0	.0
41	2.7	73.4	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.65	601.66
3	105.37	599.31
4	115.25	597.76
5	125.22	597.01
6	135.22	597.07
7	145.19	597.93
8	155.05	599.60
9	164.74	602.07
10	174.20	605.30
11	183.37	609.30
12	192.18	614.02
13	200.59	619.43
14	208.53	625.51
15	215.95	632.22
16	222.80	639.50
17	229.05	647.31
18	234.23	655.00

*** 1.773 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.61	601.57
3	103.33	599.23
4	113.20	597.64
5	123.17	596.83
6	133.17	596.80
7	143.14	597.55
8	153.03	599.08
9	162.76	601.37
10	172.29	604.42
11	181.55	608.19
12	190.48	612.68
13	199.04	617.85
14	207.17	623.67
15	214.82	630.11
16	221.95	637.13
17	228.51	644.68
18	234.46	652.71
19	235.89	655.00

*** 1.774 ***

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	82.05	604.56
2	91.60	601.57
3	101.34	599.32
4	111.22	597.80
5	121.19	597.04
6	131.19	597.03
7	141.17	597.77
8	151.05	599.26
9	160.80	601.50
10	170.35	604.46
11	179.65	608.13
12	188.65	612.50
13	197.29	617.53
14	205.53	623.20
15	213.31	629.48

16	220.61	636.32
17	227.36	643.69
18	233.54	651.56
19	235.85	655.00

*** 1.775 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	90.77	605.38
2	100.23	602.13
3	109.92	599.69
4	119.79	598.08
5	129.76	597.30
6	139.76	597.37
7	149.72	598.28
8	159.57	600.02
9	169.23	602.59
10	178.64	605.97
11	187.74	610.13
12	196.45	615.04
13	204.72	620.67
14	212.48	626.97
15	219.68	633.91
16	226.27	641.43
17	232.21	649.48
18	235.60	655.00

*** 1.778 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.67	604.81
2	96.20	601.79
3	105.94	599.53
4	115.83	598.05
5	125.81	597.35
6	135.81	597.45
7	145.77	598.33
8	155.63	599.99
9	165.33	602.43
10	174.80	605.63
11	183.99	609.56
12	192.85	614.21
13	201.31	619.54
14	209.32	625.52
15	216.84	632.12
16	223.81	639.29
17	230.19	646.99
18	235.83	655.00

*** 1.778 ***

1

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	84.10	604.67
2	93.64	601.66
3	103.38	599.39
4	113.26	597.89
5	123.24	597.17
6	133.24	597.22
7	143.20	598.05
8	153.07	599.65
9	162.79	602.02
10	172.29	605.13
11	181.52	608.98
12	190.43	613.53
13	198.95	618.76
14	207.04	624.64
15	214.65	631.12
16	221.73	638.19
17	228.24	645.78
18	234.14	653.85
19	234.85	655.00

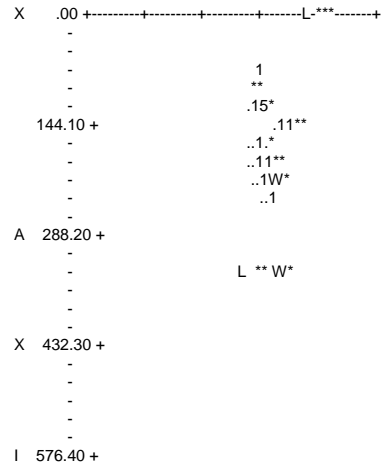
*** 1.778 ***

Y A X I S F T

.00 144.10 288.20 432.30 576.40 720.50

Failure Surface Specified By 19 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	81.03	604.50
2	90.58	601.56
3	100.33	599.33
4	110.22	597.84
5	120.19	597.08
6	130.19	597.07
7	140.16	597.80
8	150.05	599.27
9	159.81	601.48
10	169.37	604.40
11	178.69	608.03
12	187.71	612.34
13	196.39	617.31
14	204.68	622.91
15	212.52	629.11
16	219.88	635.88
17	226.72	643.18
18	232.99	650.96
19	235.78	655.00

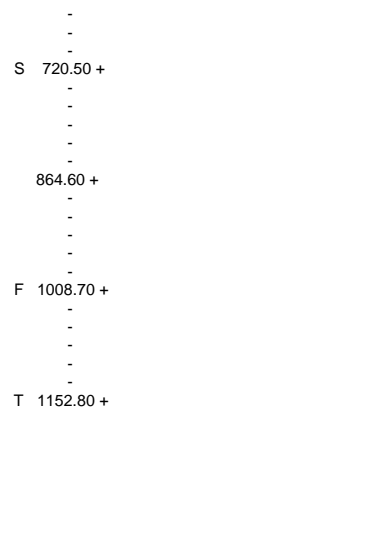


*** 1.780 ***

1

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	88.21	604.90
2	97.75	601.92
3	107.50	599.71
4	117.40	598.28
5	127.38	597.64
6	137.38	597.81
7	147.33	598.76
8	157.18	600.51
9	166.85	603.04
10	176.30	606.33
11	185.45	610.36
12	194.25	615.11
13	202.65	620.54
14	210.58	626.63
15	218.01	633.33
16	224.87	640.59
17	231.14	648.39
18	235.64	655.00



*** 1.786 ***

Failure Surface Specified By 18 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	86.15	604.79
2	95.70	601.81
3	105.45	599.60
4	115.35	598.16
5	125.33	597.51
6	135.33	597.65
7	145.28	598.58
8	155.14	600.29
9	164.82	602.78
10	174.28	606.02
11	183.46	610.00
12	192.29	614.69
13	200.72	620.06
14	208.70	626.09
15	216.19	632.72
16	223.12	639.93
17	229.46	647.66
18	234.58	655.00



*** 1.787 ***

1