

Driven Pile Analysis

Organization:
 Project Name: **Example 2**
 Job #:
 Design by:
 Date: **January 17, 2018**

Loading

Units	SI	Passive Wedge	2.5
Top of Pile Cond.	Free Head	F.S. Side Friction	2.0
Downward Load	500.0 KN	F.S. End Bearing	2.5
Pile Length	20.000 m	Groundwater	4.00 m
Lateral Load (Shear)	40.0 KN	O.C. Ratio	1.00
Moment Load	33.0 KN.m		
Allow. Lat. Deflection	15.00 mm		
Uplift Load	0.00 KN		

Pile Properties

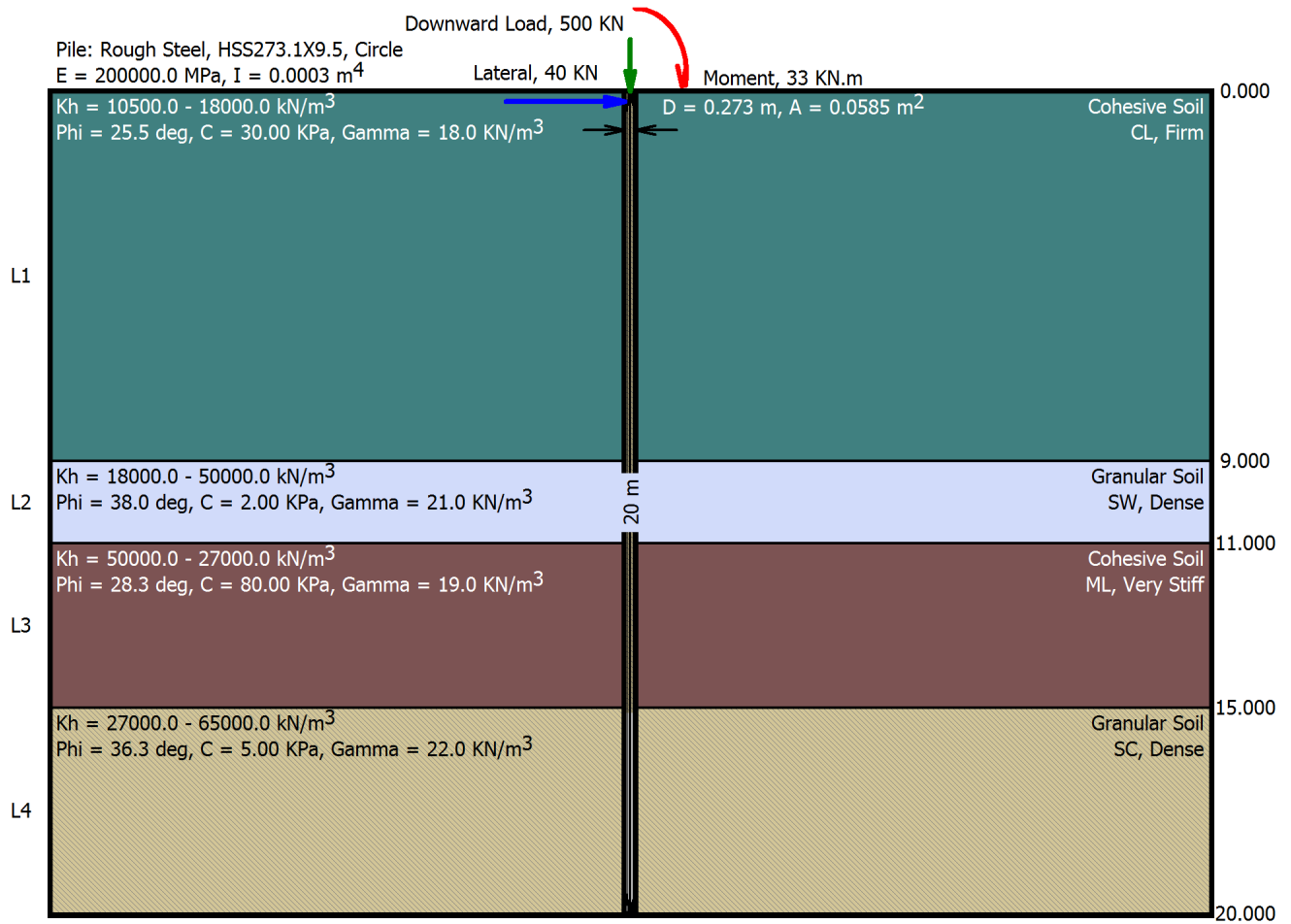
Pile & Soil Interface	Rough Steel	Cross Section Area	0.0585 m²
Pile Type	Pile - small displ.	Pile Perimeter	0.858 m
Shape	Pipe Shape	Tip Area	0.059 m²
Diameter	0.273 m		
Drying	N/A	Modulus of Elasticity (E)	200000.0 MPa
Static Analysis	Yes	Moment of Inertia (I)	0.0003 m⁴
Cyclic Analysis	No		

Geotechnical Properties

#	Material Type	USCS	Layer Thick, m	SPT Field N	Consistency	Lat. S.G, KN/m ³	Kp	F.S. on Kp	Cohesion, KPa	Gamma, KN/m ³	NSF
1	Cohesive Soil	CL	9.000 0 - 9	6	Firm	10500.0- 18000.0	2.51	1.25	30.00	18.0	No
2	Granular Soil	SW	2.000 9 - 11	40	Dense	18000.0- 50000.0	4.20	1.25	2.00	21.0	No
3	Cohesive Soil	ML	4.000 11 - 15	17	Very Stiff	50000.0- 27000.0	2.80	1.00	80.00	19.0	No
4	Granular Soil	SC	5.000 15 - 20	33	Dense	27000.0- 65000.0	3.89	1.00	5.00	22.0	No

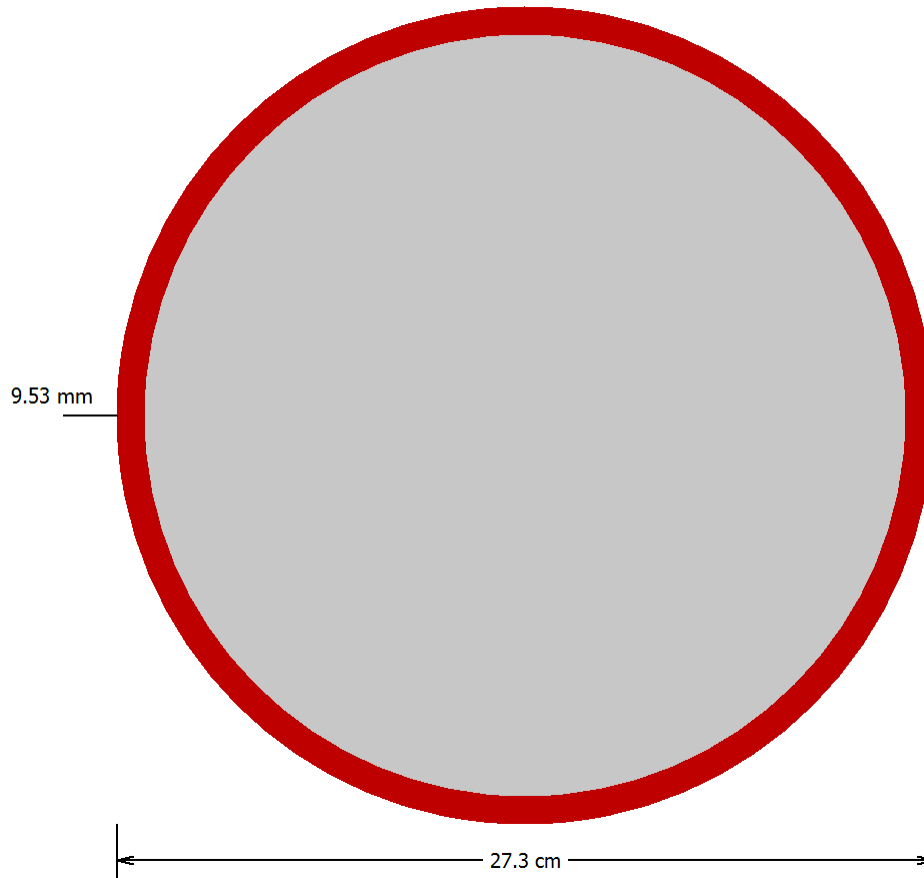
Results

Axial Load - P util.	0.846	Maximum Deflection is 12.09 mm at 0.00 m
Moment Load Mx util.	0.001	Maximum Moment is 60.72 KN.m at 1.50 m
Combined Util. Ratio	0.847	Maximum Shear is 40.00 KN at 0.00 m
		Pile Tip Movement is 0.00 mm at the bottom (20.00 m)
		Downward Capacity is 597.6 KN
		Negative Skin Friction is 0.00 KN
		Uplift Capacity is 298.8 KN
		Pile Movement is 12.38 mm



Structural Design - Round Steel

Shapes	North American	Yield Strength, F_y	340.00 MPa
Member Type	Beam-Column	Effective Length, K	1.00
Beam Size	HSS273.1X9.5	Unbraced Length, L	10.00 m
Concrete Filled	Yes	X-axis Bend. Coeff, C_{mx}	1.00
Downward Load, P	600.00 KN	Conc. Compr. Str, F'_c	22.0 MPa
Moment Load, M_r	98.00 KN.m		



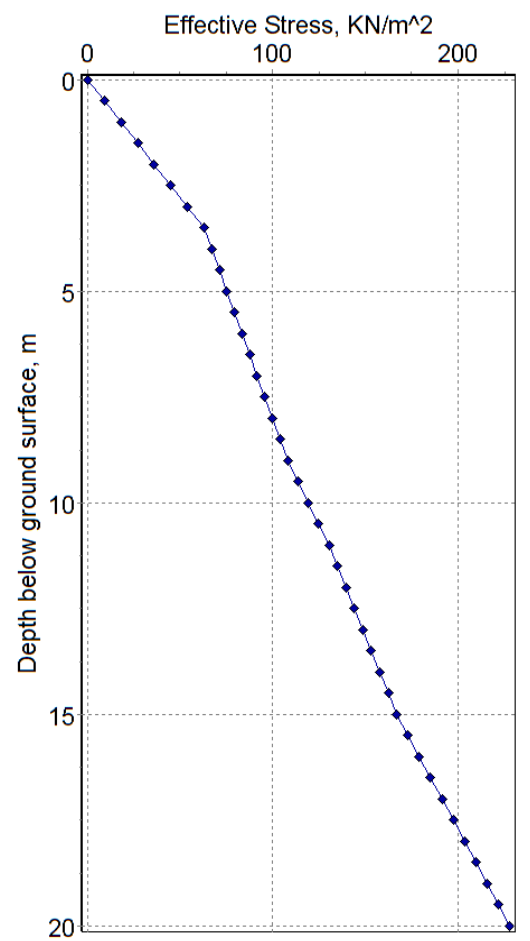
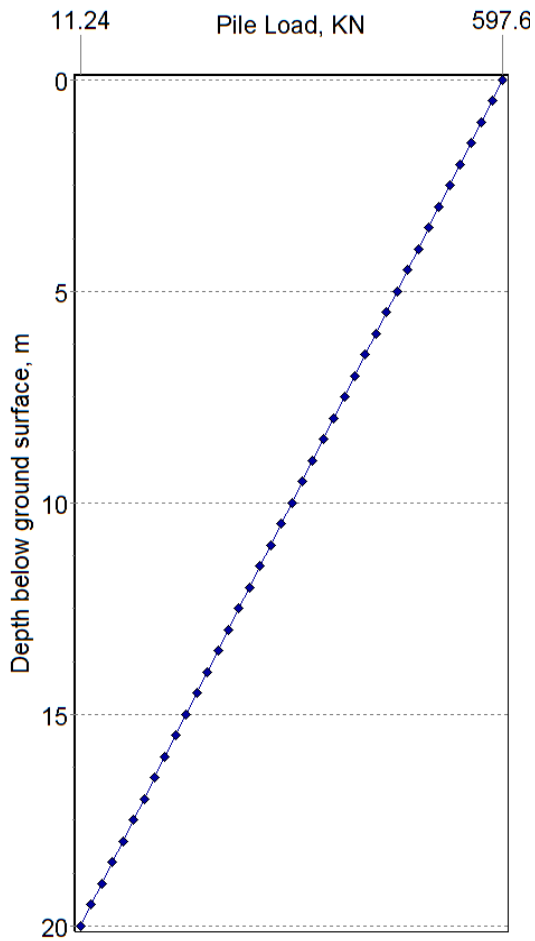
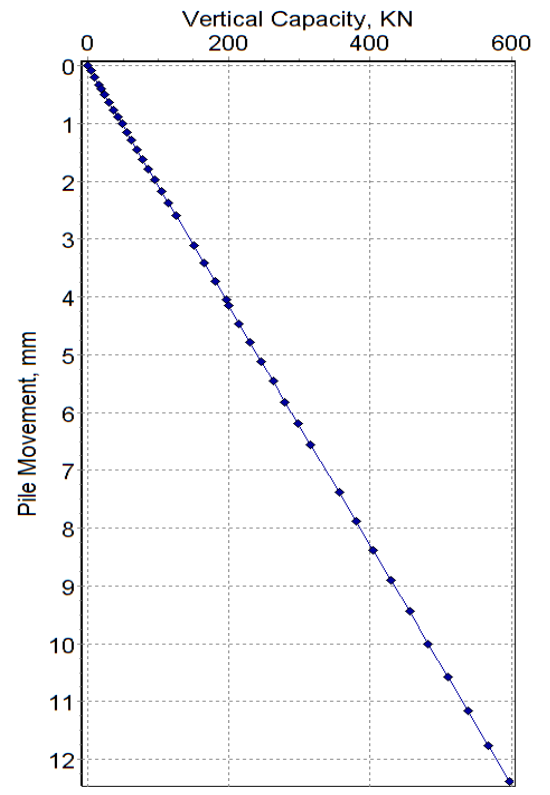
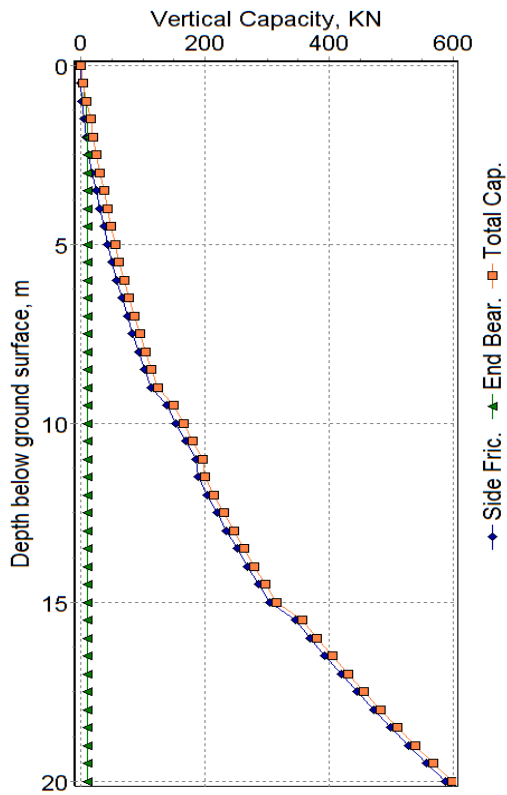
Vertical Table

Node #	Depth m	Sigma' V KN/m ²	Phi deg	NSF KN	Ultimate Side Fric. KN	Allow. Side Fric. KN	Ultimate End Bear. KN	Allow. End Bear. KN	Vertical Capacity KN	Pile Movement mm
1	0.00	0.00	25.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.50	9.00	25.50	0.00	1.05	0.52	9.48	3.79	4.32	0.09
3	1.00	18.00	25.50	0.00	4.19	2.10	18.97	7.59	9.68	0.20
4	1.50	27.00	25.50	0.00	9.44	4.72	28.10	11.24	15.96	0.33
5	2.00	36.00	25.50	0.00	16.77	8.39	28.10	11.24	19.63	0.41
6	2.50	45.00	25.50	0.00	26.21	13.10	28.10	11.24	24.34	0.51
7	3.00	54.00	25.50	0.00	37.74	18.87	28.10	11.24	30.11	0.63
8	3.50	63.00	25.50	0.00	51.37	25.68	28.10	11.24	36.92	0.77
9	4.00	67.09	25.50	0.00	62.52	31.26	28.10	11.24	42.50	0.89
10	4.50	71.19	25.50	0.00	74.63	37.32	28.10	11.24	48.55	1.01
11	5.00	75.28	25.50	0.00	87.69	43.85	28.10	11.24	55.09	1.15
12	5.50	79.38	25.50	0.00	101.71	50.86	28.10	11.24	62.09	1.29
13	6.00	83.47	25.50	0.00	116.68	58.34	28.10	11.24	69.58	1.45
14	6.50	87.57	25.50	0.00	132.61	66.30	28.10	11.24	77.54	1.62
15	7.00	91.66	25.50	0.00	149.48	74.74	28.10	11.24	85.98	1.79
16	7.50	95.76	25.50	0.00	167.32	83.66	28.10	11.24	94.90	1.98
17	8.00	99.85	25.50	0.00	186.10	93.05	28.10	11.24	104.29	2.17
18	8.50	103.95	25.50	0.00	205.84	102.92	28.10	11.24	114.16	2.38
19	9.00	108.04	25.50	0.00	226.54	113.27	28.10	11.24	124.51	2.60
20	9.50	113.64	38.00	0.00	278.03	139.01	28.10	11.24	150.25	3.11
21	10.00	119.23	38.00	0.00	307.07	153.54	28.10	11.24	164.77	3.41
22	10.50	124.83	38.00	0.00	337.55	168.78	28.10	11.24	180.02	3.72
23	11.00	130.42	38.00	0.00	369.48	184.74	28.10	11.24	195.98	4.05
24	11.50	135.02	28.25	0.00	376.87	188.43	28.10	11.24	199.67	4.15
25	12.00	139.61	28.25	0.00	406.64	203.32	28.10	11.24	214.56	4.46
26	12.50	144.21	28.25	0.00	437.52	218.76	28.10	11.24	230.00	4.78
27	13.00	148.80	28.25	0.00	469.52	234.76	28.10	11.24	246.00	5.12
28	13.50	153.40	28.25	0.00	502.63	251.32	28.10	11.24	262.56	5.46
29	14.00	157.99	28.25	0.00	536.86	268.43	28.10	11.24	279.67	5.82
30	14.50	162.59	28.25	0.00	572.21	286.10	28.10	11.24	297.34	6.18
31	15.00	167.18	28.25	0.00	608.67	304.33	28.10	11.24	315.57	6.56
32	15.50	173.28	36.25	0.00	690.28	345.14	28.10	11.24	356.38	7.38
33	16.00	179.37	36.25	0.00	737.61	368.81	28.10	11.24	380.05	7.87
34	16.50	185.47	36.25	0.00	786.51	393.26	28.10	11.24	404.49	8.38
35	17.00	191.56	36.25	0.00	836.97	418.49	28.10	11.24	429.73	8.90
36	17.50	197.66	36.25	0.00	889.00	444.50	28.10	11.24	455.74	9.44
37	18.00	203.75	36.25	0.00	942.60	471.30	28.10	11.24	482.54	10.00
38	18.50	209.85	36.25	0.00	997.76	498.88	28.10	11.24	510.12	10.57
39	19.00	215.94	36.25	0.00	1054.49	527.25	28.10	11.24	538.49	11.16
40	19.50	222.04	36.25	0.00	1112.79	556.39	28.10	11.24	567.63	11.76
41	20.00	228.13	36.25	0.00	1172.65	586.33	28.10	11.24	597.56	12.38

Notes:

Sigma' V Effective Stress
Phi Soil/Rock Friction Angle
NSF Negative Skin Friction

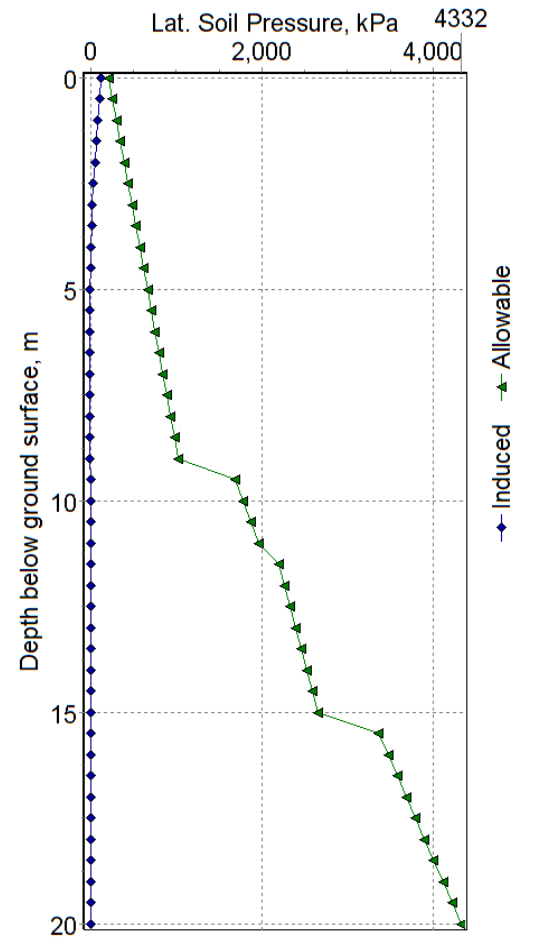
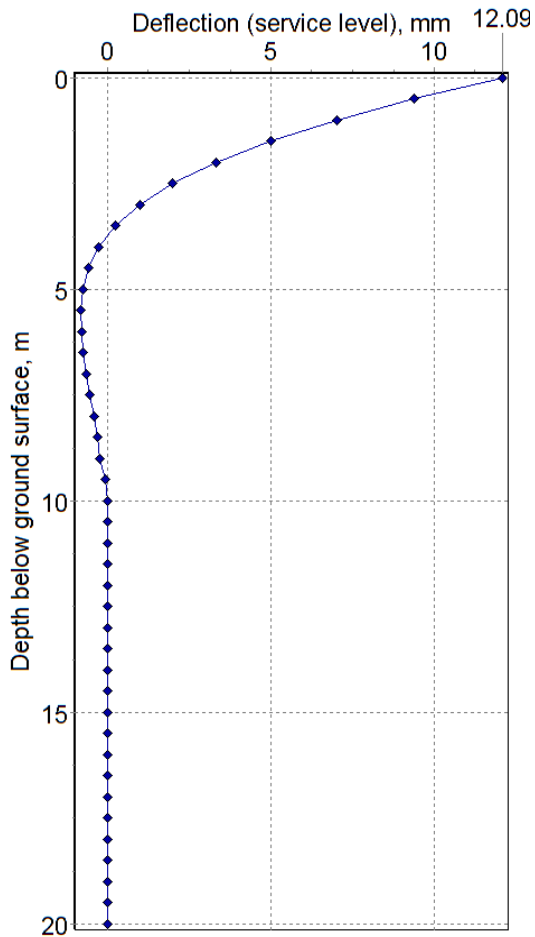
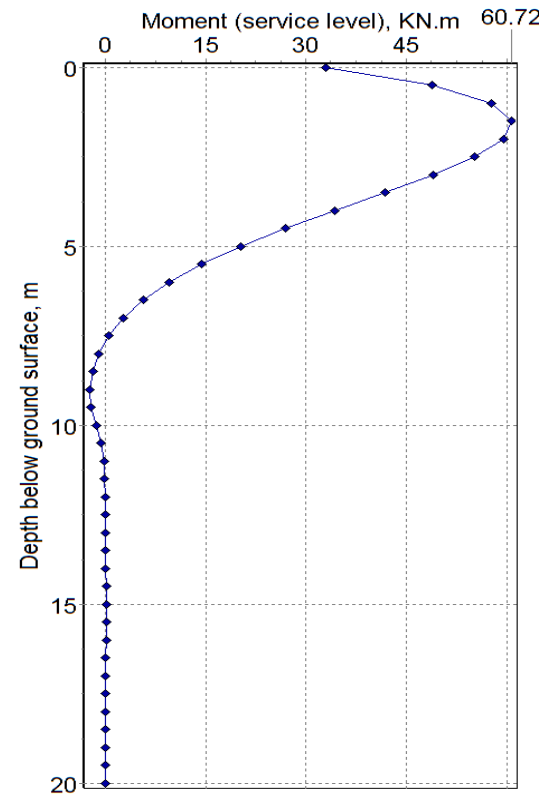
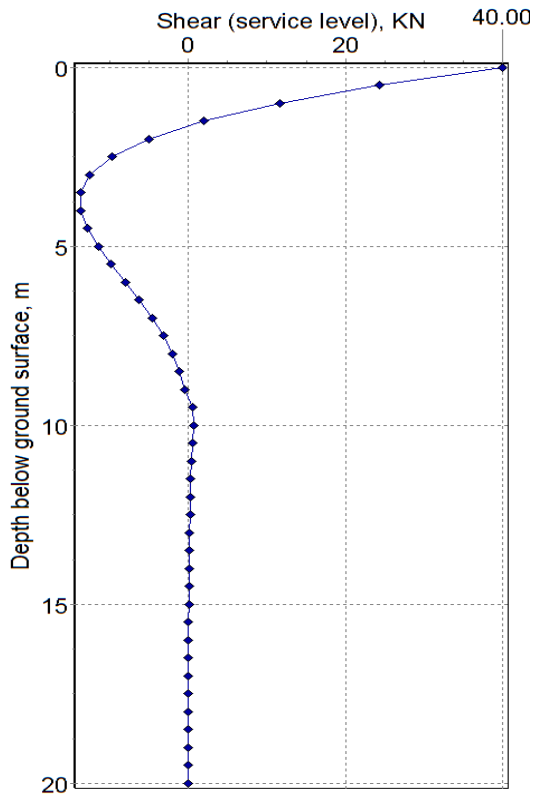
Vertical Charts



Lateral Table

Node #	Depth, m	Soil Modulus, KPa	Shear, KN	Moment, KN.m	Deflection, mm	Lat. Soil Pr, KPa	Allow. Soil Pr, KPa
1	0.00	2867	40.00	33.00	12.09	126.93	212.64
2	0.50	2980	24.25	48.92	9.40	106.69	257.85
3	1.00	3094	11.62	57.66	7.03	86.58	303.07
4	1.50	3208	1.92	60.72	5.01	67.53	348.28
5	2.00	3322	-5.10	59.48	3.34	50.19	393.50
6	2.50	3435	-9.80	55.21	2.01	35.01	438.71
7	3.00	3549	-12.55	49.01	1.00	22.22	483.92
8	3.50	3663	-13.75	41.79	0.25	11.87	529.14
9	4.00	3777	-13.76	34.26	-0.26	3.87	574.35
10	4.50	3890	-12.92	26.97	-0.58	-1.98	619.57
11	5.00	4004	-11.53	20.28	-0.75	-5.95	664.78
12	5.50	4118	-9.84	14.44	-0.81	-8.33	710.00
13	6.00	4232	-8.05	9.54	-0.79	-9.44	755.21
14	6.50	4345	-6.29	5.62	-0.72	-9.60	800.43
15	7.00	4459	-4.68	2.61	-0.63	-9.07	845.64
16	7.50	4573	-3.28	0.44	-0.52	-8.10	890.86
17	8.00	4687	-2.10	-1.03	-0.41	-6.88	936.07
18	8.50	4800	-1.17	-1.92	-0.31	-5.58	981.29
19	9.00	4914	-0.47	-2.36	-0.22	-4.31	1026.50
20	9.50	7098	0.49	-2.12	-0.05	-1.86	1695.63
21	10.00	9282	0.66	-1.33	0.01	-0.33	1783.91
22	10.50	11466	0.53	-0.66	0.02	0.40	1872.19
23	11.00	13650	0.33	-0.23	0.02	0.60	1960.47
24	11.50	12865	0.26	-0.13	0.01	0.57	2197.08
25	12.00	12080	0.20	-0.06	0.01	0.53	2263.51
26	12.50	11295	0.16	-0.01	0.01	0.48	2329.95
27	13.00	10511	0.12	0.02	0.01	0.42	2396.39
28	13.50	9726	0.09	0.05	0.01	0.37	2462.83
29	14.00	8941	0.07	0.06	0.01	0.33	2529.26
30	14.50	8156	0.06	0.08	0.01	0.30	2595.70
31	15.00	7371	0.05	0.08	0.01	0.27	2662.14
32	15.50	8408	-0.01	0.10	0.00	0.15	3368.69
33	16.00	9446	-0.03	0.08	0.00	0.07	3475.77
34	16.50	10483	-0.03	0.05	0.00	0.01	3582.85
35	17.00	11521	-0.02	0.03	0.00	-0.02	3689.92
36	17.50	12558	-0.02	0.01	0.00	-0.03	3797.00
37	18.00	13595	-0.01	0.00	0.00	-0.02	3904.07
38	18.50	14633	0.00	0.00	0.00	-0.02	4011.15
39	19.00	15670	0.00	0.00	0.00	-0.01	4118.23
40	19.50	16708	0.00	0.00	0.00	-0.01	4225.30
41	20.00	17745	0.00	0.00	0.00	0.00	4332.38

Lateral Charts



References:

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3. "2018 International Building Code", ICC, 2018
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