Spread Footing Analysis

General Input Information

*Note: width is in plane of truss, Length is perpendicular to plane of truss

Footing Dimensions (feet)			Rectangular Stem Dimensions (feet)				Allow. Soil Press. (ksf)	Unit Weight Soil (kcf)
Width*	Length*	Thick	Width*	Length*	H above	H below		
12.00	16.00	2.00	3.50	3.50	4.00	2.00	4.00	0.12

ENTER CIRCULAR STEM PROPERTIES

Circular Stem Dimensions (feet)			Design OK?
Diameter	H above	H below	
3.00	4.00	2.00	YES

Analysis Results

Soil Pressures			F.S. FOR Overturning Stong Axis	F.S. FOR Overturning Weak Axis	F.S. FOR Sliding
Max. Soil Pressure	Min. Soil Pressure	Uplift?			
0.85	0.03	NO	3.94	10.97	9.60
OK		OK	OK	OK	OK

Concrete and Reinforcing Steel Input ENTER CIRCULAR STEM PROPERTIES

Concrete Information			Footing Reinforcing		Rect. Stem Reinforcing			Circular Stem Reinforcing		
Compressive Strength (f'c)	Footing Cover (in)	Stem Cover (in)	Trans. Bar Size	Long. Bar Size	Side Vert. Bars	End Vert. Bars	Side Horiz. Bars	Longit. (Vert.) Bars	Horiz. Bars	Prelim. Long. Bar Spacing (in)
3000	3.00	2.00	4	5	5	5	4	6	4	5

Analysis Results

Note: Quantities are for one foundation

Number Required	38	38	NA	NA	NA	20	6.00
Length of Bar (ft)	11.500	15.500	6.583	6.583	3.167	6.000	8.919
Approx. Spacing (in)	10.306	7.632	12.458	4.872	11.344	3.025	12.000
Weight of Bars (lb)	292	614	NA	NA	NA	240	36
Shear Check	OK	OK	OK	OK	N/A	N/A	N/A

Quantities		
Total Weight of Rebar (both foundations)	2363	lbs.
Total Volume of Concrete (both foundations)	31.59	CY

			Footing Weight kips	Soil Weight kips
Footing Area	192.00	ft^2	63.96	44.38
Footing Sec. Mod. (strong)	512.00	ft^3		
Footing Sec. Mod. (weak)	384.00	ft^3		

Assumed Unit Weight of Soil

		Percent Overstress	
Group I	DL	1.00	
Group II Case 1	DL + Wn + .2Wt	1.33	
Group II Case 2	DL + .6Wn + .3Wt	1.33	
Group III Case 1	DL + ICE + .5Wn + .1t	1.33	Minimum wind pressure of 25 psf
Group III Case 2	DL + ICE + .3Wn + .1t	1.33	Minimum wind pressure of 25 psf

Wn = WIND FORCES PERPENDICULAR TO SIGNS
Wt = WIND FORCED TRANSVERSE (PARALLEL) TO SIGNS

LOAD COMBINATION RESULTS (Loads and Moments are for both posts)

(loads include overstress)

Reactions		Forces at Baseplates					Forces at Base of Footing			Moment at Top of Ftg.		F.S. FOR OT Stong Axis	F.S. FOR OT Weak Axis	F.S. FOR Sliding
		Mstrong kip-ft	Mweak kip-ft	Vstrong kips	Vweak kips	Axial kips	Mstrong kip-ft	Mweak kip-ft	Axial kips	Mstrong kip-ft	Mweak kip-ft			
Left Support	GI	0.00	0.00	0.00	0.00	3.76	0.00	0.00	112.11	0.00	0.00	N/A	N/A	N/A
Right Support		0.00	0.00	0.00	0.00	4.21	0.00	0.00	112.56	0.00	0.00	N/A	N/A	N/A
Left Support	GIIC1	94.89	24.83	3.80	0.99	2.83	117.66	30.75	84.29	110.07	28.77	5.73	16.45	12.90
Right Support		140.70	21.89	5.23	0.82	3.17	172.05	26.79	84.63	161.60	25.16	3.94	18.95	9.60
Left Support	GIIC2	56.93	37.24	2.28	1.48	2.83	70.60	46.12	84.29	66.04	43.16	9.55	10.97	18.62
Right Support		84.42	32.52	3.14	1.23	3.17	103.23	40.19	84.63	96.96	37.73	6.86	12.64	15.08
Left Support	GIIIC1	49.87	12.41	2.08	0.49	3.81	62.33	15.37	85.27	58.17	14.39	10.95	33.28	23.98
Right Support		73.10	10.94	2.60	0.41	4.36	89.92	13.40	85.82	84.32	12.58	7.64	38.44	18.18
Left Support	GIIIC2	29.92	18.62	1.25	0.48	3.81	37.40	21.58	85.27	34.90	20.59	16.24	23.71	38.19
Right Support		43.86	16.41	1.68	0.41	4.36	53.95	18.87	85.82	50.59	18.05	12.73	27.30	29.75
Max Values		140.70	37.24	5.23	1.48	4.36	172.05	46.12	112.56	161.60	43.16	16.24	38.44	38.19

Assumed Friction Factor for Sliding	0.5

Uplift and Bearing Checks (Article 13.7.1)

(loads include overstress)

Reactions		Soil Pressures			
		Max. S+,W+	S+,W-	S-,W+	Min S-,W-
Left Support	GI	0.58	0.58	0.58	0.58
Right Support		0.59	0.59	0.59	0.59
Left Support	GIIC1	0.75	0.59	0.29	0.13
Right Support		0.85	0.71	0.17	0.03
Left Support	GIIC2	0.70	0.46	0.42	0.18
Right Support		0.75	0.54	0.34	0.13
Left Support	GIIIC1	0.61	0.53	0.36	0.28
Right Support		0.66	0.59	0.31	0.24
Left Support	GIIIC2	0.57	0.46	0.43	0.31
Right Support		0.60	0.50	0.39	0.29
	Max =	0.85		Min =	0.03

Longitudinal Footing Reinforcing

Cantelever Length (feet)	Cantelever Width (feet)	Footing Thickness (in)	Cover (in)	Bar Size	Bar Area (in^2)	Bar Dia. (in)	Bar Weight (lb/ft)	d (in)
6.50	12.00	24.00	3.00	5	0.31	0.625	1.043	20.688

Moment = 2575.32 (inch kips)
j = 0.897
As req. = 5.78 inches^2

Shear = 66.03 (kips)
Shear Stress v = 22.17 (psi)
Allow. vc = 52.03 (psi)
OK

Number of Bars 19 (based on design)
Bar Spacing 7.632 inches (based on design)
Max. Spacing = 18.00 inches
Number of Bars 9 (based on max spacing)
Number of Bars 19 (top and bottom)
Spacing 7.632 inches
Bar Length 15.500 feet

Reinforcing Bar Properties			
Bar Size	Area	Dia.	Weight
3	0.11	0.375	0.376
4	0.20	0.500	0.668
5	0.31	0.625	1.043
6	0.44	0.750	1.502
7	0.60	0.875	2.044
8	0.79	1.000	2.67
9	1.00	1.128	3.4
10	1.27	1.270	4.3
11	1.56	1.410	5.313
14	2.25	1.693	7.65
18	4.00	2.257	13.6

Transverse Footing Reinforcing

Cantelever Length (feet)	Cantelever Width (feet)	Footing Thickness (in)	Cover (in)	Bar Size	Bar Area (in^2)	Bar Dia. (in)	Bar Weight (lb/ft)	d (in)
4.50	16.00	24.00	3.00	4	0.2	0.5	0.668	20.125

Moment = 1645.77 (inch kips)
j = 0.897
As req. = 3.80 inches^2

Shear = 60.85 (kips)
Shear Stress v = 15.77 (psi)
Allow. vc = 52.03 (psi)
OK

Number of Bars 19 (based on design)
Bar Spacing 10.306 inches (based on design)
Max. Spacing = 16.00 inches
Number of Bars 12 (based on max spacing)
Number of Bars 19 (top and bottom)
Spacing 10.306 inches
Bar Length 11.500 feet

Rectangular Stem Reinforcing (side Face)

NOT APPLICABLE SEE CIRCULAR STEM

Cantelever Length (feet)	Cantelever Width (feet)	Stem Thickness (in)	Cover (in)	Bar Size	Bar Area (in^2)	Bar Dia. (in)	Bar Weight (lb/ft)	d (in)
4.00	3.50	42.00	2.00	5	0.31	0.625	1.043	39.188

Moment = 517.92 (inch kips)
j = 0.897
As req. = 0.51 inches^2

Shear = 1.48 (kips)
Shear Stress v = 0.90 (psi)
Allow. vc = 52.03 (psi)
OK

Number of Bars 2 (based on design)
Bar Spacing 18.688 inches (based on design)
Max. Spacing = 18.00 inches
Number of Bars 3 (based on max spacing)
Number of Bars 3 (each face)
Spacing 12.458 inches
Bar Length 6.583 feet

Rectangular Stem Reinforcing (end Face)

NOT APPLICABLE SEE CIRCULAR STEM

Cantelever Length (feet)	Cantelever Width (feet)	Stem Thickness (in)	Cover (in)	Bar Size	Bar Area (in^2)	Bar Dia. (in)	Bar Weight (lb/ft)	d (in)
4.00	3.50	42.00	2.00	5	0.31	0.625	1.043	39.188

Moment = 1939.21 (inch kips)
j = 0.897
As req. = 2.30 inches^2

Shear = 5.23 (kips)
Shear Stress v = 3.18 (psi)
Allow. vc = 52.03 (psi)
OK

Number of Bars 8 (based on design)
Bar Spacing 4.672 inches (based on design)
Max. Spacing = 18.00 inches
Number of Bars 3 (based on max spacing)
Number of Bars 8 (each face)
Spacing 4.672 inches
Bar Length 6.583 feet

Stem Reinforcing (horizontals)

Use #4 bars at 12" NOT APPLICABLE SEE CIRCULAR STEM

Max. Spacing = 12.00 inches
Number of Bars 5 (based on max spacing)
Spacing 11.344 inches
Bar Length 3.167 feet

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