Concrete Footing Design

Job:
Description:
Time: 5:52 PM 8/6/2020

Designed By:
Checked By:
Program: Spread Footing Design v4.1 Code: ACI 2019

SOIL DATA			CONCRETE DATA			COLUMN DATA		
Max. Vert Press.	3.000	K / Ft^2	F'c	3.000	K / In^2	F'c	4.000	K / In^2
Max. Flexural Press.	3.500	K / Ft^2	Density	150.000	Lb/ Ft^3	X Dim.	12.000	In
Density	100.000	Lb/ Ft^3	Fy	60.000	K / In^2	Z Dim.	12.000	In
Phi Angle	30.000	Deg				X Offset	0.000	Ft
Coeff. of Friction	0.330					Z Offset	0.000	Ft
Cohesion	0.000	Lb/ Ft^2	**SURCHARGE DATA**					
Ftg. Depth	3.500	Ft	+X,+Z Quadrant	0.000	K / Ft^2			
FS Uplift	1.700		+X,-Z Quadrant	0.000	K / Ft^2	**BASE PLATE DATA**		
FS Overturning	1.700		-X,-Z Quadrant	0.000	K / Ft^2	X Dim.	0.000	In
FS Sliding	2.000		-X,+Z Quadrant	0.000	K / Ft^2	Z Dim.	0.000	In

COLUMN LOAD DESCRIPTIONS

COLUMN LOAD	DESCRIPTION
1	LoadGroup1
2	LoadGroup2

LOAD COMBINATIONS

LOAD COMBINATION	DESCRIPTION
1	1.4D
2	1.2D + 1.6L + 0.5R
3	1.2D + 1.0L + 1.6R
4	1.2D + 0.5W + 1.6R
5	1.2D + 1.0L + 1.0W + 0.5R
6	1.2D + 1.0L + 1.0E
7	0.9D + 1.0W
8	0.9D + 1.0E

UNFACTORED LOADS INPUT

COLUMN LOAD No. 1	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical	-200.000 K	-129.000 K	0.000 K	0.000 K	0.000 K
Moment X	0.000 Ft-K	0.000 Ft-K	23.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z	0.000 Ft-K	0.000 Ft-K	-34.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X	18.000 K				
Z	0.000 K				

COLUMN LOAD No. 2	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical	-12.000 K	0.000 K	54.000 K	0.000 K	0.000 K
Moment X	0.000 Ft-K	0.000 Ft-K	34.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z	0.000 Ft-K	0.000 Ft-K	16.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X	12.000 K				
Z	0.000 K				

FOOTING OUTPUT

FOOTING DESIGN			SHEAR STRESSES (ONE WAY)			SHEAR STRESSES (TWO WAY)		
X Dimension	13.250	Ft	+X Area	0.040	K / In^2	+X Area	0.142	K / In^2
Z Dimension	13.250	Ft	-X Area	0.040	K / In^2	-X Area	0.142	K / In^2
Thickness	26.000	In	+Z Area	0.043	K / In^2	+Z Area	0.142	K / In^2
Max. Press	2.129	K / Ft^2	-Z Area	0.043	K / In^2	-Z Area	0.142	K / In^2
			Allow.	0.082	K / In^2	Allow.	0.164	K / In^2

X Dimension Governing Column = 2, Combination = 4
Z Dimension Governing Column = 2, Combination = 4
Thickness Governing Column = 1, Combination = 2
Max. Pressure Governing Column = 1, Combination = 5
Design Controlled by Uplift Forces

BOTTOM STEEL DESIGN (Parallel to X Axis)			
Governing Column	=	1, Combination = 2	
Moment (+X Area)	=	631.961	Ft-K
(-X Area)	=	631.961	Ft-K
Steel Required	=	6.375	In^2
Dist. to Centroid	=	3.500	In

BOTTOM STEEL DESIGN (Parallel to Z Axis)			
Governing Column	=	1, Combination = 2	
Moment (+Z Area)	=	631.961	Ft-K
(-Z Area)	=	631.961	Ft-K
Steel Required	=	6.686	In^2
Dist. to Centroid	=	4.500	In

Typical Spacings			
58	#3 Bars at	2.684	In. Centers
32	#4 Bars at	4.935	In. Centers
21	#5 Bars at	7.650	In. Centers
15	#6 Bars at	10.929	In. Centers
11	#7 Bars at	15.300	In. Centers
10	#8 Bars at	17.000	In. Centers

Typical Spacings			
62	#3 Bars at	2.508	In. Centers
34	#4 Bars at	4.636	In. Centers
22	#5 Bars at	7.286	In. Centers
16	#6 Bars at	10.200	In. Centers
12	#7 Bars at	13.909	In. Centers
10	#8 Bars at	17.000	In. Centers

TOP STEEL DESIGN (Parallel to X Axis)			
Governing Column	=	Temp/Shrink Minimum	
Moment (+X Area)	=	-68.254	Ft-K
(-X Area)	=	-54.061	Ft-K
Steel Required	=	0.000	In^2 (Min)
Dist. to Centroid	=	3.500	In

TOP STEEL DESIGN (Parallel to Z Axis)			
Governing Column	=	Temp/Shrink Minimum	
Moment (+Z Area)	=	-46.078	Ft-K
(-Z Area)	=	-76.237	Ft-K
Steel Required	=	0.000	In^2 (Min)
Dist. to Centroid	=	4.500	In

Typical Spacings			
34	#3 Bars at	4.636	In. Centers
19	#4 Bars at	8.500	In. Centers
13	#5 Bars at	12.750	In. Centers
10	#6 Bars at	17.000	In. Centers

Typical Spacings			
34	#3 Bars at	4.636	In. Centers
19	#4 Bars at	8.500	In. Centers
13	#5 Bars at	12.750	In. Centers
10	#6 Bars at	17.000	In. Centers

QUANTITIES : 889.496 Lbs of Steel and 380.385 Ft^3 of Concrete.

HORIZONTAL KEY DESIGN (Parallel to X Axis) **HORIZONTAL KEY DESIGN (Parallel to Z Axis)**

Keys Not Required. Soil-Ftg. Friction and Passive Pressure Sufficient to Resist Horizontal Load.