

# Concrete Footing Design

Job:  
 Footing ID:  
 Time: 11/1/2002 11:19

Designed By:  
 Checked By:  
 Program: Spread Footing Design v2.00 Code: ACI 2002

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 = 90.000 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 = 0.333		Z Offset = 0.000 Ft
Cohesion = 0.000 Lb/Ft ^2		
Ftg. Depth = 3.500 Ft	<b>SURCHARGE DATA</b>	
FS Uplift = 1.700	+X,+Z Quadrant = 0.000 K /Ft ^2	
FS Overturning = 1.700	+X,-Z Quadrant = 0.000 K /Ft ^2	<b>BASE PLATE DATA</b>
FS Sliding = 2.000	-X,-Z Quadrant = 0.000 K /Ft ^2	X Dim. = 0.000 In
	-X,+Z Quadrant = 0.000 K /Ft ^2	Z Dim. = 0.000 In

## C O L U M N L O A D D E S C R I P T I O N S

COLUMN LOAD	DESCRIPTION
1	A1
2	A2

## L O A D C O M B I N A T I O N S

LOAD COMBINATION	DESCRIPTION
1	1.4D
2	1.2D + 1.6L + 0.5R
3	1.2D + L + 1.6R
4	1.2D + 0.8W + 1.6R
5	1.2D + L + 1.6W + 0.5R
6	1.2D + L + 1.4E + 0.2R
7	0.9D + 1.6W
8	0.9D + 1.4E
9	1.2D - 0.8W + 1.6R
10	1.2D + L - 1.6W + 0.5R
11	1.2D + L - 1.4E + 0.2R
12	0.9D - 1.6W
13	0.9D - 1.4E

## U N F A C T O R E D L O A D S I N P U T

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	36.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X =	12.000 K				
Z =	2.000 K				

## F O O T I N G O U T P U T

FOOTING DESIGN	SHEAR STRESSES (ONE WAY)	SHEAR STRESSES (TWO WAY)
X Dimension = 18.250 Ft	+X Area = 0.030 K /In ^2	+X Area = 0.126 K /In ^2
Z Dimension = 18.250 Ft	-X Area = 0.030 K /In ^2	-X Area = 0.126 K /In ^2
Thickness = 28.000 In	+Z Area = 0.032 K /In ^2	+Z Area = 0.126 K /In ^2
Max. Press. = 1.184 K /Ft ^2	-Z Area = 0.032 K /In ^2	-Z Area = 0.126 K /In ^2
Area of Dowels Req'd > 3.46 In^2	Allow. = 0.082 K /In ^2	Allow. = 0.164 K /In ^2

X Dimension Governing Column = 2, Combination = 7

Z Dimension Governing Column = 2, Combination = 7  
 Thickness = Maximum Ratio  
 Max. Pressure Governing Column = 1, Combination = 5  
 Design Controlled by Biaxial Negative Pressure (Ult) and Ultimate Design

**BOTTOM STEEL DESIGN (Parallel to X Axis)**

Governing Column = 1, Combination = 2  
 Moment (+X Area) = 909.808 Ft-K  
 (-X Area) = 909.808 Ft-K  
 Steel Required = 8.407 In<sup>2</sup>  
 Dist. to Centroid = 3.500 In

**Typical Spacings**

77	#3 Bars at	2.803	In. Centers
43	#4 Bars at	5.071	In. Centers
28	#5 Bars at	7.889	In. Centers
20	#6 Bars at	11.211	In. Centers
15	#7 Bars at	15.214	In. Centers
13	#8 Bars at	17.750	In. Centers

**TOP STEEL DESIGN (Parallel to X Axis)**

Governing Column = Temp/Shrink Minimum  
 Moment (+X Area) = -231.876 Ft-K  
 (-X Area) = -179.005 Ft-K  
 Steel Required = 5.519 In<sup>2</sup> (Min)  
 Dist. to Centroid = 3.500 In

**Typical Spacings**

51	#3 Bars at	4.260	In. Centers
28	#4 Bars at	7.889	In. Centers
18	#5 Bars at	12.529	In. Centers
13	#6 Bars at	17.750	In. Centers

**BOTTOM STEEL DESIGN (Parallel to Z Axis)**

Governing Column = 1, Combination = 2  
 Moment (+Z Area) = 909.808 Ft-K  
 (-Z Area) = 909.808 Ft-K  
 Steel Required = 8.780 In<sup>2</sup>  
 Dist. to Centroid = 4.500 In

**Typical Spacings**

80	#3 Bars at	2.696	In. Centers
44	#4 Bars at	4.953	In. Centers
29	#5 Bars at	7.607	In. Centers
20	#6 Bars at	11.211	In. Centers
15	#7 Bars at	15.214	In. Centers
13	#8 Bars at	17.750	In. Centers

**TOP STEEL DESIGN (Parallel to Z Axis)**

Governing Column = Temp/Shrink Minimum  
 Moment (+Z Area) = -180.474 Ft-K  
 (-Z Area) = -230.407 Ft-K  
 Steel Required = 5.519 In<sup>2</sup> (Min)  
 Dist. to Centroid = 4.500 In

**Typical Spacings**

51	#3 Bars at	4.260	In. Centers
28	#4 Bars at	7.889	In. Centers
18	#5 Bars at	12.529	In. Centers
13	#6 Bars at	17.750	In. Centers

**QUANTITIES :** 1704.733 Lbs of Steel and 777.146 Ft<sup>3</sup> of Concrete.

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

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

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