

Concrete Footing Design

Job: HOLGUIN STORAGE BUILDING
 Footing ID: COLUMN SUPPORT
 Time: 2/16/2016 10:49

Designed By: HEC
 Checked By:
 Program: Spread Footing Design v2.4 Code: ACI 2002

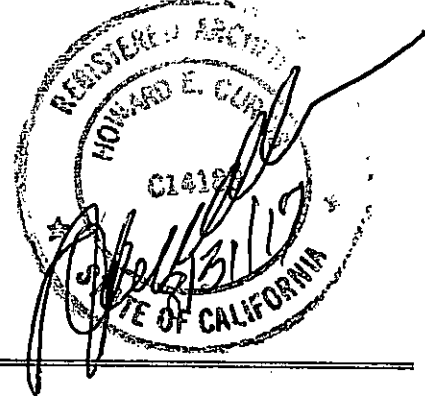
SOIL DATA			CONCRETE DATA			COLUMN DATA		
Max. Vert Press.	=	2.000 K /Ft ^2	F'c	=	3.000 K /In ^2	F'c	=	4.000 K /In ^2
Max. Flexural Press.	=	2.000 K /Ft ^2	Density	=	150.000 Lb/Ft ^3	X Dim.	=	8.000 In
Density	=	90.000 Lb/Ft ^3	Fy	=	60.000 K /In ^2	Z Dim.	=	10.000 In
Phi Angle	=	30.000 Deg				X Offset	=	0.000 Ft
Coeff. of Friction	=	0.333				Z Offset	=	0.000 Ft
Cohesion	=	0.000 Lb/Ft ^2	SURCHARGE DATA			BASE PLATE DATA		
Ftg. Depth	=	3.500 Ft	+X,+Z Quadrant	=	0.500 K /Ft ^2	X Dim.	=	10.000 In
FS Uplift	=	1.700	+X,-Z Quadrant	=	0.500 K /Ft ^2	Z Dim.	=	12.000 In
FS Overturning	=	1.700	-X,-Z Quadrant	=	0.500 K /Ft ^2			
FS Sliding	=	2.000	-X,+Z Quadrant	=	0.500 K /Ft ^2			

COLUMN LOAD DESCRIPTIONS

COLUMN LOAD
1 DESCRIPTION

LOAD COMBINATIONS

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



UNFACTORED LOADS INPUT

COLUMN LOAD No. 1	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical =	8.000 K	0.000 K	1.500 K	0.000 K	0.000 K
Moment X =	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z =	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X =	0.000 K				
Z =	0.000 K				

FOOTING OUTPUT

FOOTING CHECK		SHEAR STRESSES (ONE WAY)		SHEAR STRESSES- (TWO WAY)	
X Dimension =	3.500 Ft	+X Area =	0.000 K /In ^2	+X Area =	-0.001 K /In ^2
Z Dimension =	3.500 Ft	-X Area =	0.000 K /In ^2	-X Area =	-0.001 K /In ^2
Thickness =	24.000 In	+Z Area =	0.000 K /In ^2	+Z Area =	-0.001 K /In ^2
Max. Press. =	-0.156 K /Ft ^2	-Z Area =	0.000 K /In ^2	-Z Area =	-0.001 K /In ^2
		Allow. =	0.082 K /In ^2	Allow. =	0.164 K /In ^2

Max. Pressure Governing Column = 1, Combination = 13
 Footing is Adequate

BOTTOM STEEL DESIGN (Parallel to X Axis)
 Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = 0.000 Ft-K
 (-X Area) = 0.000 Ft-K

BOTTOM STEEL DESIGN (Parallel to Z Axis)
 Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = 0.000 Ft-K
 (-Z Area) = 0.000 Ft-K

Steel Required = 0.907 In² (Min)
 Dist. to Centroid = 0.000 In

Typical Spacings

9 #3 Bars at 4.500 In. Centers (Anchor)
 5 #4 Bars at 9.000 In. Centers (Anchor)
 3 #5 Bars at 18.000 In. Centers (Anchor)

TOP STEEL DESIGN (Parallel to X Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = -3.241 Ft-K
 (-X Area) = -3.241 Ft-K
 Steel Required = 0.907 In² (Min)
 Dist. to Centroid = 0.000 In

Typical Spacings

9 #3 Bars at 4.500 In. Centers (Anchor)
 5 #4 Bars at 9.000 In. Centers (Anchor)
 3 #5 Bars at 18.000 In. Centers (Anchor)

Steel Required = 0.907 In² (Min)
 Dist. to Centroid = 0.000 In

Typical Spacings

9 #3 Bars at 4.500 In. Centers (Anchor)
 5 #4 Bars at 9.000 In. Centers (Anchor)
 3 #5 Bars at 18.000 In. Centers (Anchor)

TOP STEEL DESIGN (Parallel to Z Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = -2.860 Ft-K
 (-Z Area) = -2.860 Ft-K
 Steel Required = 0.907 In² (Min)
 Dist. to Centroid = 0.000 In

Typical Spacings

9 #3 Bars at 4.500 In. Centers (Anchor)
 5 #4 Bars at 9.000 In. Centers (Anchor)
 3 #5 Bars at 18.000 In. Centers (Anchor)

QUANTITIES : 37.044 Lbs of Steel and 24.500 Ft³ of Concrete.

Concrete Footing Design

Job: HOLGUIN STORAGE BUILDING
 Footing ID: CENTER END WALL COLUMN
 Time: 2/16/2016 2:15

Designed By: HEC
 Checked By:
 Program: Spread Footing Design v2.4 Code: ACI 2002

SOIL DATA			CONCRETE DATA			COLUMN DATA		
Max. Vert. Press.	=	2.000 K /Ft ^2	F'c	=	3.000 K /In ^2	F'c	=	4.000 K /In ^2
Max. Flexural Press.	=	2.000 K /Ft ^2	Density	=	150.000 Lb/Ft ^3	X Dim.	=	8.000 In
Density	=	90.000 Lb/Ft ^3	Fy	=	60.000 K /In ^2	Z Dim.	=	10.000 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	SURCHARGE DATA			BASE PLATE DATA		
Ftg. Depth	=	3.500 Ft	+X,+Z Quadrant	=	0.500 K /Ft ^2	X Dim.	=	10.000 In
FS Uplift	=	1.700	+X,-Z Quadrant	=	0.500 K /Ft ^2	Z Dim.	=	12.000 In
FS Overturning	=	1.700	-X,-Z Quadrant	=	0.500 K /Ft ^2			
FS Sliding	=	2.000	-X,+Z Quadrant	=	0.500 K /Ft ^2			

COLUMN LOAD DESCRIPTIONS

COLUMN LOAD	DESCRIPTION
1	COLUMN AT END WALL
2	

LOAD COMBINATIONS

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

UNFACTORED LOADS INPUT

COLUMN LOAD No. 1	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical	5.800 K	0.000 K	0.000 K	0.000 K	0.000 K
Moment X	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X	0.000 K				
Z	0.000 K				
COLUMN LOAD No. 2	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical	5.800 K	0.000 K	0.000 K	0.000 K	0.000 K
Moment X	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X	0.000 K				
Z	0.000 K				

FOOTING OUTPUT

FOOTING CHECK		SHEAR STRESSES (ONE WAY)		SHEAR STRESSES (TWO WAY)	
X Dimension	= 3.000 Ft	+X Area	= 0.000 K /In ^2	+X Area	= -0.003 K /In ^2
Z Dimension	= 3.000 Ft	-X Area	= 0.000 K /In ^2	-X Area	= -0.003 K /In ^2
Thickness	= 18.000 In	+Z Area	= 0.000 K /In ^2	+Z Area	= -0.003 K /In ^2
Max. Press.	= -0.054 K /Ft ^2	-Z Area	= 0.000 K /In ^2	-Z Area	= -0.003 K /In ^2
		Allow.	= 0.082 K /In ^2	Allow.	= 0.164 K /In ^2

Max. Pressure Governing Column = 0, Combination = 0

Footing is Adequate

BOTTOM STEEL DESIGN (Parallel to X Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = 0.000 Ft-K
 (-X Area) = 0.000 Ft-K
 Steel Required = 0.583 In² (Min)
 Dist. to Centroid = 3.500 In

Typical Spacings

6 #3 Bars at 6.000 In. Centers
 3 #4 Bars at 15.000 In. Centers

TOP STEEL DESIGN (Parallel to X Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = -1.713 Ft-K
 (-X Area) = -1.713 Ft-K
 Steel Required = 0.583 In² (Min)
 Dist. to Centroid = 3.500 In

Typical Spacings

6 #3 Bars at 6.000 In. Centers
 3 #4 Bars at 15.000 In. Centers (Anchor)

BOTTOM STEEL DESIGN (Parallel to Z Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = 0.000 Ft-K
 (-Z Area) = 0.000 Ft-K
 Steel Required = 0.583 In² (Min)
 Dist. to Centroid = 4.500 In

Typical Spacings

6 #3 Bars at 6.000 In. Centers
 3 #4 Bars at 15.000 In. Centers

TOP STEEL DESIGN (Parallel to Z Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = -1.468 Ft-K
 (-Z Area) = -1.468 Ft-K
 Steel Required = 0.583 In² (Min)
 Dist. to Centroid = 4.500 In

Typical Spacings

6 #3 Bars at 6.000 In. Centers (Anchor)
 3 #4 Bars at 15.000 In. Centers (Anchor)

QUANTITIES : 19.845 Lbs of Steel and 13.500 Ft³ of Concrete.

Concrete Footing Design

Job: HOLQUIN STORAGE BUILDING
 Footing ID: CORNER COLUMN FOOTING
 Time: 2/16/2016 11:03

Designed By: HEC
 Checked By:
 Program: Spread Footing Design v2.4 Code: ACI 2002

SOIL DATA			CONCRETE DATA			COLUMN DATA		
Max. Vert. Press.	=	2.000 K /Ft ^2	F'c	=	3.000 K /In ^2	F'c	=	4.000 K /In ^2
Max. Flexural Press.	=	2.000 K /Ft ^2	Density	=	150.000 Lb/Ft ^3	X Dim.	=	8.000 In
Density	=	90.000 Lb/Ft ^3	Fy	=	60.000 K /In ^2	Z Dim.	=	10.000 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	SURCHARGE DATA			BASE PLATE DATA		
Ftg. Depth	=	3.500 Ft	+X,+Z Quadrant	=	0.500 K /Ft ^2			
FS Uplift	=	1.700	+X,-Z Quadrant	=	0.500 K /Ft ^2	X Dim.	=	0.000 In
FS Overturning	=	1.700	-X,-Z Quadrant	=	0.500 K /Ft ^2	Z Dim.	=	0.000 In
FS Sliding	=	2.000	-X,+Z Quadrant	=	0.500 K /Ft ^2			

COLUMN LOAD DESCRIPTIONS

COLUMN LOAD	DESCRIPTION
1	CORNER COLUMN

LOAD COMBINATIONS

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

UNFACTORED LOADS INPUT

COLUMN LOAD No. 1	DEAD LOAD	LIVE LOAD	WIND LOAD	EARTHQUAKE LOAD	ROOF LOAD
Vertical =	3.300 K	0.000 K	0.000 K	0.000 K	0.000 K
Moment X =	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Moment Z =	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K	0.000 Ft-K
Horizontal X =	0.000 K				
Z =	0.000 K				

FOOTING OUTPUT

FOOTING CHECK		SHEAR STRESSES (ONE WAY)		SHEAR STRESSES (TWO WAY)	
X Dimension =	2.500 Ft	+X Area =	0.000 K /In ^2	+X Area =	-0.001 K /In ^2
Z Dimension =	2.500 Ft	-X Area =	0.000 K /In ^2	-X Area =	-0.001 K /In ^2
Thickness =	18.000 In	+Z Area =	0.000 K /In ^2	+Z Area =	-0.001 K /In ^2
Max. Press. =	0.062 K /Ft ^2	-Z Area =	0.000 K /In ^2	-Z Area =	-0.001 K /In ^2
		Allow. =	0.082 K /In ^2	Allow. =	0.164 K /In ^2

Max. Pressure Governing Column = 1, Combination = 1
 Footing is Adequate

BOTTOM STEEL DESIGN (Parallel to X Axis)
 Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = 0.000 Ft-K
 (-X Area) = 0.000 Ft-K

BOTTOM STEEL DESIGN (Parallel to Z Axis)
 Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = 0.000 Ft-K
 (-Z Area) = 0.000 Ft-K

Steel Required = 0.486 In² (Min)
 Dist. to Centroid = 3.500 In

Typical Spacings

5 #3 Bars at 6.000 In. Centers
 3 #4 Bars at 12.000 In. Centers

TOP STEEL DESIGN (Parallel to X Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+X Area) = -0.776 Ft-K
 (-X Area) = -0.776 Ft-K
 Steel Required = 0.486 In² (Min)
 Dist. to Centroid = 3.500 In

Typical Spacings

5 #3 Bars at 6.000 In. Centers (Anchor)
 3 #4 Bars at 12.000 In. Centers (Anchor)

QUANTITIES : 13.230 Lbs of Steel and 9.375 Ft³ of Concrete.

Steel Required = 0.486 In² (Min)
 Dist. to Centroid = 4.500 In

Typical Spacings

5 #3 Bars at 6.000 In. Centers
 3 #4 Bars at 12.000 In. Centers

TOP STEEL DESIGN (Parallel to Z Axis)

Governing Column = Temp/Shrink Minimum
 Moment (+Z Area) = -0.642 Ft-K
 (-Z Area) = -0.642 Ft-K
 Steel Required = 0.486 In² (Min)
 Dist. to Centroid = 4.500 In

Typical Spacings

5 #3 Bars at 6.000 In. Centers (Anchor)
 3 #4 Bars at 12.000 In. Centers (Anchor)