

**Circular Stem Design - For Use in Spread Footings with Circular Stem**

F <sub>c</sub> =	3.00	ksi	
F <sub>y</sub> =	60	ksi	
C <sub>c</sub> =	2.00	in	Clear cover is uniform around the cross section
h =	36.00	in	Outside Diameter of Column (Approx. 70" max)
Bar Size =	5	As =	0.31 in <sup>2</sup>
		Dia =	0.625 in
Hoop Bar size =	4	As =	0.2 in <sup>2</sup>
		Dia =	0.5 in
Spacing =	3.75	in	Approximate desired spacing of main reinforcing (assumes as max)
Φ =	1		

**Determine if section is adequate for loads applied**

M <sub>u</sub> =	149.57	ft-kips	M <sub>u</sub> = Resultant moment = sqrt(M <sub>strong</sub> <sup>2</sup> + M <sub>weak</sub> <sup>2</sup> )
P <sub>u</sub> =	4.33	kips	IS SECTION OK? YES

**Calculate location of steel reinforcing around perimeter of column:**

Dia. of inner ring of reinf. =	30.375 in
perimeter =	95.43 in
# of bars =	26 number of (even) bars that will fit in perimeter (Program allows 42 bars maximum) OK
Number of bar rows =	13
spacing =	2.53 (in) actual vertical spacing of bars

Note: Program orients bars so that one layer is on the centroid of column (conservative)

**Calculate location of bars with respect to the extreme compression fiber:**

Rebar level	level in	Is rebar used for Tension or Comp.?	# bars in each level	Area of Steel Calculation
				As tension    As comp
d1	2.81 in	Comp	2	0.62
d2	5.34 in	Comp	2	0.62
d3	7.88 in	Comp	2	0.62
d4	10.41 in	Comp	2	0.62
d5	12.94 in	Comp	2	0.62
d6	15.47 in	Comp	2	0.62
d7	18.00 in	Steel Not Used	2	
d8	20.53 in	Tension	2	0.62
d9	23.06 in	Tension	2	0.62
d10	25.59 in	Tension	2	0.62
d11	28.13 in	Tension	2	0.62
d12	30.66 in	Tension	2	0.62
d13	33.19 in	Tension	2	0.62
d14	NA			
d15	NA			
d16	NA			
d17	NA			
			As tens =	3.72 As comp = 3.72

Centroid of Tension and Compression Steel from extreme compression fiber:

d(tension) =	26.86 in
d(comp) =	9.14 in