



**Structural Design Calculations
for Cell Blocks, Inc.
Precast Post-Tension
Foundation System
US Patent No. 6050038
Foreign Patents Pending**

**Owner's Name Here
Site Name: XX-XXXXX; XXXXXXXXX
Site Location: Ctiy, State**

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Job No: 43003-0000
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Anchor Bolt Tension / Compression:

$$\text{Max_Tension} := \frac{\text{Moment}}{ab \cdot BC}$$

$$\text{Max_Tension} = 158.82 \text{ k}$$

$$\text{Max_Compression} := \frac{\text{Moment}}{ab \cdot BC} + \frac{\text{Axial}}{N}$$

$$\text{Max_Compression} = 161.32 \text{ k}$$

Anchor Bolt Capacity: $F_y := 75 \text{ ksi}$

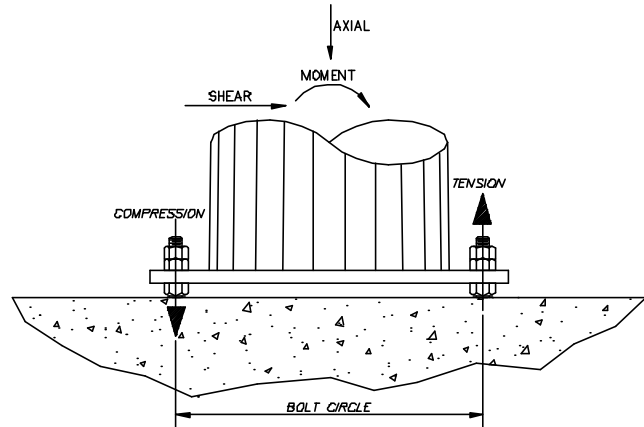
$$T_{\text{cap}} := 3.25 \text{ in}^2 \cdot 0.6 \cdot F_y \cdot 1.33$$

$$T_{\text{cap}} = 194.51 \text{ k}$$

$$\text{Stress_Ratio} := \frac{\text{Max_Tension}}{T_{\text{cap}}} \cdot 100\%$$

Stress_Ratio = 81.65 %

NOTE that the worst case anchor bolt tension or compression is when the direction of loading is across the diagonals on the base plate such that two quadrants of the anchor bolts carry approximately zero load and the opposite two quadrants carry all of the tension or compression.



Anchor bolts are #18J ASTM A615 grade 75 material, @ 2 1/4" diameter

Cone of Failure for Concrete Strength Calculations:

$$L \equiv 25 \text{ in}$$

$$D_1 \equiv 9 \text{ in}$$

$$D_2 \equiv (2 \cdot L) + D_1 \quad D_2 = 59 \text{ in}$$

$$f_c := 5000 \text{ psi} \quad F_y := 60 \cdot \text{ksi}$$

$$\text{Reduction_Factor} := 0.25$$

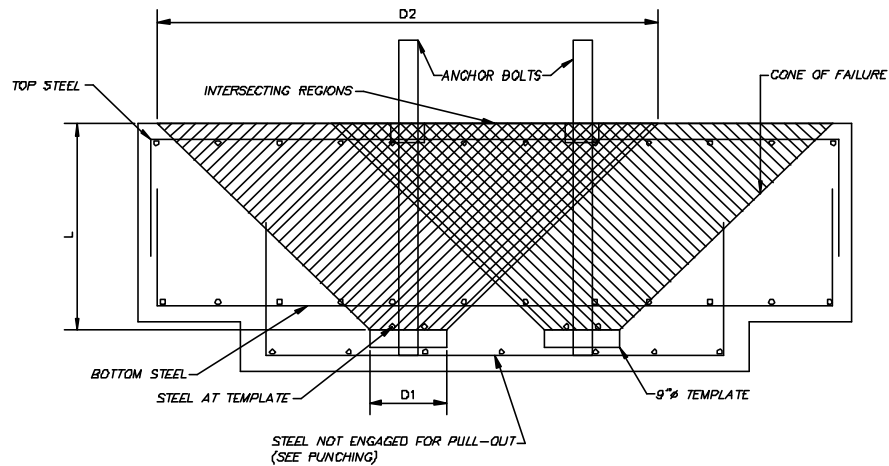
A_{eff} = Effective Surface Area of failure cone

$$A_{\text{eff}} := \pi \cdot \left(\left(\frac{D_1 + D_2}{2} \right) \right) \cdot L \cdot \text{Redu}$$

$$A_{\text{eff}} = 667.59 \text{ in}^2$$

$$V_c := 0.65 \cdot 4 \cdot \sqrt{f_c} \cdot \text{psi} \cdot A_{\text{eff}}$$

$$V_c = 122.73 \text{ k} \quad (\text{Pull-out Capacity of the Concrete})$$



Note the reduction factor reduces the surface area of the failure cone due to the overlap of the failure cones of the combined anchor bolts, thus reducing the capacity of the concrete.