

Anchors To Masonry UBC 94 2108.1

$d_b := 1.5 \cdot \text{in}$	diameter of anchor	$L_b := 16 \cdot \text{in}$	length of embedment	$L_{be} := 60 \cdot \text{in}$	distance to edge in the direction of the shear load	$s := 60 \cdot \text{in}$	separation between anchors
$f_y := 60 \cdot \text{ksi}$	$f_m := 4000 \cdot \text{psi}$	specified compressive strength of the masonry, from 950 to 5300 psi in table 21-D			$\phi := 0.8$	material strength reduction factor for anchor bolts	
$V_u := 0 \cdot \text{lbf}$	Shear requirement at factored level	$P_u := 32000 \cdot \text{lbf}$	Tensile requirement at factored level				

$$A_b := \pi \cdot \frac{d_b^2}{4}$$

$$A_p := \min \left(\left(\pi \cdot L_b^2 \right) \left(\pi \cdot L_{be}^2 \right) \right)$$

$$B_{tn1} := A_p \cdot \sqrt{\frac{f_m}{\text{psi}}} \cdot \text{psi}$$

$$B_{tn1} = 50865.12 \text{ lbf}$$

$$B_{sn1} := 900 \cdot \left(\frac{f_m}{\text{psi}} \cdot \frac{A_b}{\text{in}^2} \right)^{\frac{1}{4}} \cdot \text{lbf}$$

$$B_{sn1} = 8252.31 \text{ lbf}$$

$$B_{tn2} := 0.4 \cdot f_y \cdot A_b$$

$$B_{tn2} = 42411.53 \text{ lbf}$$

$$B_{sn2} := 0.25 \cdot A_b \cdot f_y$$

$$B_{sn2} = 26507.2 \text{ lbf}$$

$$P_n := \min \left(\left(B_{tn1} \right) \left(B_{tn2} \right) \right)$$

$$P_n = 42411.53 \text{ lbf}$$

$$B_{snA} := \min \left(\left(B_{sn1} \right) \left(B_{sn2} \right) \right)$$

$$B_{snA} = 8252.31 \text{ lbf}$$

$$B_{snB} := \begin{cases} B_{snA} & \text{if } L_{be} \geq 12 \cdot d_b \\ \text{otherwise} \\ \begin{cases} 0 \cdot \text{lbf} & \text{if } L_{be} < 1.5 \cdot \text{in} \\ \frac{B_{snA}}{10.5 \cdot \text{in}} \cdot (L_{be} - 1.5 \cdot \text{in}) & \text{otherwise} \end{cases} \end{cases}$$

$$V_n := \begin{cases} B_{snB} & \text{if } s \geq 8 \cdot d_b \\ \text{otherwise} \\ \begin{cases} 0.75 \cdot B_{snB} & \text{if } s < 4 \cdot d_b \\ 0.75 \cdot B_{snB} + \frac{0.25 \cdot B_{snB}}{4 \cdot d_b} \cdot (s - 4 \cdot d_b) & \text{otherwise} \end{cases} \end{cases}$$

$$V_n = 8252.31 \text{ lbf}$$



$$\frac{V_u}{\phi \cdot V_n} + \frac{P_u}{\phi \cdot P_n} = 0.94$$

must be less than or equal to 1 for the interaction check be OK