Web Park Short Value of Short Controlled Res 1.5	REFERENCES	CALCULATIONS	RESULTS
ABC Fig. 12-5 $M_{\rm S} = \left(\begin{array}{c} 0.6 \text{odd} \\ 0.8 \text{odd} \\ 0.9 $		Web Plate Shear Yielding	
$ABC E_{0}, 24.3 \rangle$ $ABC E_{0}, 24.5 \rangle$	AISC Sec. J4-2	Allowable Shear Capacity:	
$Ra_{ii} = \left(\frac{1}{10}\right)$ $-\frac{0.0383(0.39)}{1.0} (20)$ -30.4 kips $Design capacity ratio, DCR:$ $required shear, R_i = 4.0 \text{ kips}$ $coveral capacity, R_{ii} = 10.4 \text{ kips}$ $DCR = \left(\frac{4.6}{30.1}\right)$ -0.191 $AISC Tables 12.5$ $Stouch, of Fills, Webb Web Phase to W10x32 Flores, Webb Strength R_{ii} = 0.0 \text{ Frex} R_{ii} = 0.0 $		$\Omega=1.5$	
$Ra_{ii} = \left(\frac{1}{10}\right)$ $-\frac{0.0383(0.39)}{1.0} (20)$ -30.4 kips $Design capacity ratio, DCR:$ $required shear, R_i = 4.0 \text{ kips}$ $coveral capacity, R_{ii} = 10.4 \text{ kips}$ $DCR = \left(\frac{4.6}{30.1}\right)$ -0.191 $AISC Tables 12.5$ $Stouch, of Fills, Webb Web Phase to W10x32 Flores, Webb Strength R_{ii} = 0.0 \text{ Frex} R_{ii} = 0.0 $			
Design copacity ratio, DCR:	AISC Eq. J4-3	$Ra_v = \left(rac{0.6 Fy Ag_v}{\Omega} ight)$	
Design capacity ratio, DCR:			30 4 kins
required shoar, $R_{\rm c} = 3.04$ kips overall capacity, $R_{\rm tot} = 3.04$ kips $R_{\rm col} = 3.04$ kips $R_{\rm tot} = 3.04$ ki		— 50.4 Kips	00.4 мрз
AISC Tobic 22.5 With Plate to W10x12 Flarge, World Strength Discrete Strength of Fliet Welds World Strength of Fliet Welds Power Hills Fliet, (1.1) + 10.5 sin^{1/2}(t) 9 — the engle which the load makes with the weld axis 9.0 for inspired welds Strength per unit size of weld: Allow alite weld strength, $F_{\rm col} = \left(\frac{0.6000}{2.0}\right)$ — 18 left inspired welds length, $F_{\rm col} = \left(\frac{0.5000}{2.0}\right)$ Total effective king (himse) of filler weld, as: $\left(\frac{R_{\rm c}}{t}\right) = 135.0 {\rm kgps} / {\rm in}$ by the evidence of since of 45deg. $x = (0.707) t$ — 0.141 in AlSC Eq. 12.3 $R_{\rm c} = \left(\frac{R_{\rm c}}{t}\right) t$ = 135 (0.141) (2) — 38.2 kips Design capacity ratio, DCR: required load, $R_{\rm col} = 1.0 {\rm kips}$ overall capacity, $R_{\rm col} = 3.8 {\rm kips}$ Design capacity ratio, DCR:			
$AISC\ Table\ 12.5$ Web Place to Wifer12 Flange, Weld Strength $R_{ev} = 0.6\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta)$ $\theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes with the weld axis = 90.\ F_{EVY}\ (1.0-0.5\ sin^{1.5}\theta) \theta = the angle which the lood makes$		overall capacity, $Ra_v=30.4~\mathrm{kips}$	
Strength of Fillet Welds Weld Size, $t=0.2$ in $D_{an}=0.6F_{EXX}$ AISC Eq. J2-5 $F_{an}=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $=0.18E_0$ $1.0E_0\left(\frac{R_0}{2.0}\right)$ $=1.8E_0\left(\frac{1.0}{2.0}\right)$ $=1.8E_0\left(\frac$			Pass
Strength of Fillet Welds Weld Size, $t=0.2$ in $D_{an}=0.6F_{EXX}$ AISC Eq. J2-5 $F_{an}=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $\theta=0.6F_{EXX}\left(1.0+0.5\sin^{-5}\theta\right)$ $=0.18E_0$ $1.0E_0\left(\frac{R_0}{2.0}\right)$ $=1.8E_0\left(\frac{1.0}{2.0}\right)$ $=1.8E_0\left(\frac$			
AISC Fig. J2-25 Weld Size, $\tau = 0.2$ in $\Omega = 2.0$ $F_{aw} = 0.6 \ F_{EXX}$ AISC Fig. J2-5 $F_{aw} = 0.6 \ F_{EXX}$ Also a sink the weld axis $-0.90 \text{ for innersersely loaded welds}$ Strength per unit size of weld: Allowable weld stress, $F_{aw} = \left(\frac{0.6(60)}{2.0}\right)$ $= 18 \ \text{kis}$ $\text{transverse length, } b = 5 \text{ in}$ $\text{longitudinal length, } t = 6 \text{ in}$ $\text{longitudinal length, } t = 6 \text{ in}$ $\text{total effective length, } t = 1.5 \text{ for } 0.1 \text{ for } 0.0 \text{ fillet weld, a:}$ $0.707 = \text{the cosine or sine of 45 deg}$ $A = (0.707) \ t = 0.341 \text{ in}$ AlsC Fig. J. t $-135.0.141 \text{ (2)}$ $-135.0.141 \text{ (2)}$ $-135.0.141 \text{ (2)}$ $-135.0.141 \text{ (2)}$ $-135.0.142 \text{ (2)}$ $-135.0.143 \text{ (3)}$		Web Plate to W10x12 Flange, Weld Strength	
AlSC Eq. J2-3 $F_{ov} = 0.6 F_{EXX} \times 1.0 + 0.5 \sin^{1/2}\theta)$ $\theta = \text{the angle which the load makes with the weld axis}$ $90, for transversely loaded welds$ $= 0, for longitudinally loaded welds}$ Strength per unit size of weld: $Allowable weld stress, F_{ov} = \left(\frac{9.6(60)}{2.0}\right)$ $- 1.8 \text{last}$ $\text{transverse length, } t = 6 \text{in}$ $\text{longitudinal length, } t = 0 \text{in}$ $\text{total effective length, } t = (1.15) + t_1 (1.0)$ $- 7.5 \text{in}$ $\left(\frac{R_3}{t}\right) = 135.0 \text{kips} / \text{in}$ $= 0.141 \text{in}$ $R_c = \left(\frac{R_c}{t}\right) t$ $= 0.141 \text{in}$ $R_c = \left(\frac{R_c}{t}\right) t$ $= 135 (0.141) (2)$ $- 38.2 \text{kips}$ $Overall capacity, Ra = 38.2 \text{kips}$ $OVER = \left(\frac{4.6}{3.82}\right)$	AISC Table J2.5		
$\theta = \text{the angle which the load makes with the weld cois} \\ = 90, \text{ for transversely loaded welds} \\ = 0, \text{ for longitudinally loaded welds}$ $\text{Strength per unit size of weld:}$ $\text{Allowable weld stress, } F_{xx} = \left(\frac{0.6(60)}{2.0}\right) \\ = 18 \text{ ksi}$ $\text{transverse length, } t = 5 \text{ in}$ $\text{longitudinal length, } t = 0 \text{ in}$ $\text{total effective length, } t = 1, (1.5) + t_1(1.0)$ $= 7.5 \text{ in}$ $\left(\frac{R_c}{t}\right) = 135.0 \text{ kps / in}$ $\left(\frac{R_c}{t}\right) = 135.0 \text{ kps / in}$ AISC Sec. J2.2a $\text{Effective size (throat) of fillet weld, a:} \\ 0.707 = \text{the cosine or sine of 45deg}$ $a = (0.707) \text{ total cosine or sine of 45deg}$ $a = (0.707) \text{ total cosine or sine of 45deg}$ $Alsc \text{ Eq. J2-3}$ $R_c = \left(\frac{R_c}{t}\right) t$ $- 135 (0.141) (2)$ $= 38.2 \text{ kips}$ $\text{Design capacity ratio, DCR:}$ $\text{required load, } R = 4.6 \text{ kips}$ $\text{overall capacity, } Ra = 38.2 \text{ kips}$ $\text{DCR} = \left(\frac{4.6}{38.2}\right)$		$\Omega=2.0 \ F_{nw}=0.6\ F_{EXX}$	
$\theta = \text{the angle which the load makes with the weld cois} \\ = 90, \text{ for transversely loaded welds} \\ = 0, \text{ for longitudinally loaded welds}$ $\text{Strength per unit size of weld:}$ $\text{Allowable weld stress, } F_{xx} = \left(\frac{0.6(60)}{2.0}\right) \\ = 18 \text{ ksi}$ $\text{transverse length, } t = 5 \text{ in}$ $\text{longitudinal length, } t = 0 \text{ in}$ $\text{total effective length, } t = 1, (1.5) + t_1(1.0)$ $= 7.5 \text{ in}$ $\left(\frac{R_c}{t}\right) = 135.0 \text{ kps / in}$ $\left(\frac{R_c}{t}\right) = 135.0 \text{ kps / in}$ AISC Sec. J2.2a $\text{Effective size (throat) of fillet weld, a:} \\ 0.707 = \text{the cosine or sine of 45deg}$ $a = (0.707) \text{ total cosine or sine of 45deg}$ $a = (0.707) \text{ total cosine or sine of 45deg}$ $Alsc \text{ Eq. J2-3}$ $R_c = \left(\frac{R_c}{t}\right) t$ $- 135 (0.141) (2)$ $= 38.2 \text{ kips}$ $\text{Design capacity ratio, DCR:}$ $\text{required load, } R = 4.6 \text{ kips}$ $\text{overall capacity, } Ra = 38.2 \text{ kips}$ $\text{DCR} = \left(\frac{4.6}{38.2}\right)$			
$R_{c} = \begin{pmatrix} 0, \text{ for longitudinally loaded welds} \\ \text{Strength per unit size of weld:} \\ \text{Allowable weld stress, } F_{coc} = \begin{pmatrix} 0.6(90) \\ 2.0 \end{pmatrix} \\ \text{1 b kis} \\ \text{transverse length, } l = 1 \text{ kis} \\ \text{transverse length, } l = 0 \text{ in} \\ \text{longitudinal length, } l = 0 \text{ in} \\ \text{longitudinal length, } l = l_t (1.5) + l_t (1.0) \\ -7.5 \text{ in} \\ \end{pmatrix}$ $R_{c} = \begin{pmatrix} R_{c} \\ t \end{pmatrix} = 135.0 \text{ kips / in} \\ \text{AISC Sec. J2.2a} \\ \text{AISC Paper length or sine of 45deg} \\ R_{c} = \begin{pmatrix} R_{c} \\ t \end{pmatrix} t \\ -135(0.141) (2) \\ -38.2 \text{ kips}} \\ \text{Design capacity ratio, DCR:} \\ \text{required boad, } R_{c} = 4.6 \text{ kips} \\ \text{overall capacity, } R_{c} = 38.2 \text{ kips} \\ \text{DCR} = \begin{pmatrix} 4.6 \\ 38.2 \end{pmatrix}$	AISC Eq. J2-5		
Allowable weld stress, $F_{vw} = \left(\frac{0.6(60)}{2.0}\right)$ $= 18 \text{ ksi}$ $\text{transverse length, } l_r - 5 \text{ in}$ $\text{longitudinal length, } l_r - 0 \text{ in}$ $\text{total effective length, } l_r = 1, l_r (1.5) + l_r (1.0)$ $= 7.5 \text{ in}$ $\left(\frac{R_o}{t}\right) = 135.0 \text{ kips / in}$ $\left(\frac{R_o}{t}\right) = 135.0 \text{ kips / in}$ AlSC Sec. J2.2a $\text{Effective size (throat) of fillet weld, a: 0.707 + the cosine or sine of 45 deg}$ $\text{a} = (0.707) \text{ t}$ $= 0.141 \text{ in}$ $R_o = \left(\frac{R_o}{t}\right) t$ $= 135.0 \text{ lat / in}$ $R_o = \frac{R_o}{t} = \frac{R_o}{t}$ $= 135.0 \text{ lat / in}$ $\text{Design capacity ratio, DCR:}$ $\text{required load, } R = 4.6 \text{ kips}$ $\text{overall capacity, } Ra = 38.2 \text{ kips}$ $\text{DCR} = \left(\frac{4.6}{38.2}\right)$			
$-18 \mathrm{ki}$ transverse length, $t_t = 5 \mathrm{in}$ longitudinal length, $t_t = 0 \mathrm{in}$ longi			
AISC Sec. J2.2a $ \begin{cases} R_a \\ L \\ L \end{cases} = 0.000000000000000000000000000000000$			
AISC Sec. J2.2a $ \begin{cases} \frac{R_a}{t} = 135.0 \text{ kips / in} \\ \\ \frac{R_a}{t} = 135.0 \text{ kips / in} \end{cases} $ $ = (0.707) \text{ t} $ $ = 0.141 \text{ in} $ $ = 38.2 \text{ kips} $ $ = 38.2 \text{ kips} $ Design capacity ratio, DCR: $ = \frac{R_a}{t} = \frac{R_a}$		${ m transverse\ length}, l_t=5\ { m in}$	
AISC Sec. J2.2a $ Effective size (throat) of fillet weld, a: \\ 0.707 = the cosine or sine of 45 deg $ $ a = (0.707) t \\ = 0.141 \text{ in} $ $ R_c = \left(\frac{R_c}{t}\right) t \\ = 135 (0.141) (2) \\ = 38.2 \text{ kips} $ $ Design capacity ratio, DCR: $ $ required load, R = 4.6 \text{ kips} \\ overall capacity, Ra = 38.2 \text{ kips} $ $ DCR = \left(\frac{4.6}{38.2}\right) $			
AISC Sec. J2.2a $ Effective size (throat) of fillet weld, a: \\ 0.707 = the cosine or sine of 45 deg $ $ a = (0.707) t \\ = 0.141 \text{ in} $ $ R_c = \left(\frac{R_c}{t}\right) t \\ = 135 (0.141) (2) \\ = 38.2 \text{ kips} $ $ Design capacity ratio, DCR: $ $ required load, R = 4.6 \text{ kips} \\ overall capacity, Ra = 38.2 \text{ kips} $ $ DCR = \left(\frac{4.6}{38.2}\right) $		$\langle R_a \rangle$ 125 01: $\langle \cdot \rangle$	
AISC Sec. J2.2a $0.707 = \text{the cosine or sine of } 45 \text{deg}$ $a = (0.707) \text{ t}$ $= 0.141 \text{ in}$ $R_a = \left(\frac{R_a}{t}\right) t$ $= 135 (0.141) (2)$ $= 38.2 \text{ kips}$ $\text{Design capacity ratio, DCR:}$ $\text{required load, R} = 4.6 \text{ kips}$ $\text{overall capacity, Ra} = 38.2 \text{ kips}$ $\text{DCR} = \left(\frac{4.6}{38.2}\right)$		$\left(\frac{1}{t}\right) = 135.0 \text{ kips / in}$	
AISC Eq. J2-3 $R_a = \left(\frac{R_a}{t}\right)t$ $= 135~(0.141)~(2)$ $= 38.2~\text{kips}$ $38.2~\text{kips}$ Design capacity ratio, DCR: $\text{required load, } R = 4.6~\text{kips}$ overall capacity, Ra = 38.2 kips $\text{DCR} = \left(\frac{4.6}{38.2}\right)$	AISC Sec. J2.2a		
AISC Eq. J2-3 $R_a = \left(\frac{R_a}{t}\right) t$ $= 135 \ (0.141) \ (2)$ $= 38.2 \ \text{kips}$ $38.2 \ \text{kips}$ Design capacity ratio, DCR: $\text{required load, R} = 4.6 \ \text{kips}$ overall capacity, Ra = 38.2 kips $\text{DCR} = \left(\frac{4.6}{38.2}\right)$		a = (0.707) t	
$= 135 \ (0.141) \ (2)$ $= 38.2 \ \text{kips}$ $= 38.2 \ \text{kips}$ Design capacity ratio, DCR: $\text{required load, R} = 4.6 \ \text{kips}$ overall capacity, Ra = 38.2 kips $\text{DCR} = \left(\frac{4.6}{38.2}\right)$			
$= 135 \ (0.141) \ (2)$ $= 38.2 \ \text{kips}$ $= 38.2 \ \text{kips}$ Design capacity ratio, DCR: $\text{required load, R} = 4.6 \ \text{kips}$ overall capacity, Ra = 38.2 kips $\text{DCR} = \left(\frac{4.6}{38.2}\right)$	AISC Eq. J2-3	$R_a = \left(rac{R_a}{t} ight) t$	
required load, R = 4.6 kips overall capacity, Ra = 38.2 kips $\mathrm{DCR} = \left(\frac{4.6}{38.2}\right)$		$=135\ (0.141)\ (2)$	$38.2~\mathrm{kips}$
required load, R = 4.6 kips overall capacity, Ra = 38.2 kips $\mathrm{DCR} = \left(\frac{4.6}{38.2}\right)$		Design come sites matic DCD	
$ ext{DCR} = \left(rac{4.6}{38.2} ight)$		$\rm required\ load,\ R=4.6\ kips$	
			Pass



	Web Plate Shear Rupture	
AISC Sec. J4-2	Allowable Shear Capacity:	
	$\Omega=2.0$	
	Calculation of net depth: $ \begin{array}{c} \text{total length of bolt hole(s)} = 0.625(2) \\ = 1.3 \text{ in} \\ \text{net depth, } d_{net} = 5 - [0.625(2)] \\ = 3.8 \text{ in} \end{array} $	
AISC Eq. J4-4	$Ra_v = \left(rac{0.6FyAn_v}{\Omega} ight) \ = \left(rac{0.6(59)(0.2)3.75}{2.0} ight) \ (2) \ = 26.5 ext{ kips}$	26.5~ m kips
	Design capacity ratio, DCR: $\begin{array}{c} \text{required shear, } R_v = 4.6 \text{ kips} \\ \text{overall capacity, } Ra_v = 26.5 \text{ kips} \\ \text{DCR} = \left(\frac{4.6}{26.5}\right) \\ = 0.173 \end{array}$	${ m Pass}$
	Web Plate to W8x10 Web, Block Shear Rupture Strength	
AISC Sec. J4-3	Block Shear Strength: $\Omega=2.0$	
AISC Eq. J4-5	$\left(rac{Ra}{\Omega} ight) = \left(rac{U_{bs}F_{u}A_{nt}}{\Omega} ight) + \min \left(rac{0.6F_{y}A_{gv}, 0.6F_{u}A_{nv}}{\Omega} ight)$	
	Tension Rupture Component: $Ubs = 1.0$ (uniform tension) $\left(\frac{U_{bs}F_uA_{nt}}{\Omega}\right) = \left(\frac{(1.0)(59)(3.0625)(0.2)}{2.0}\right)$ $= 90.35 \text{ kips/in } (0.2)$ $= 18.1 \text{ kips}$	
	Shear Yielding Component: $0.6F_yA_{gv}$ $\left(\frac{0.6F_yA_{gv}}{\Omega}\right) = \left(\frac{0.6(38)(4)}{2.0}\right) \ (0.2)$ $= 45.6 \ \text{kips/in} \ (0.2)$ $= 9.1 \ \text{kips}$	
	Shear Rupture Component: $0.6F_u A_{nv}$ $ \left(\frac{0.6F_u A_{nv}}{\Omega}\right) = \left(\frac{0.6(59)(3.0625)}{2.0}\right) (0.2) $ $ = 54.2 \text{ kips/in } (0.2) $ $ = 10.8 \text{ kips} $	
	Total Block Shear Capacity: $ \left(\frac{Ra}{\Omega}\right) = \left(\frac{U_{bs}F_uA_{nt}}{\Omega}\right) + \min\left(\frac{0.6F_yA_{gv}, 0.6F_uA_{nv}}{\Omega}\right) $ $= 18.1 + \min\left[\ 9.1 \ , 10.8\ \right] $ $= 27.2 \ \text{kips} $	$27.2~\mathrm{kips}$
	Design capacity ratio, DCR:	

	required shear, $R_v = 4.6 ext{ kips}$ overall capacity, $Ra_v = 27.2 ext{ kips}$ $ ext{DCR} = \left(\frac{4.6}{27.2}\right)$ $= 5.909$	Pass
	Web Plate to undefined Web, Bolt Group Shear and Bearing Check	
AISC Sec. J3.1	1. Shear Strength of Bolts $\Omega=2.0$	
	$\begin{array}{c} \text{Bolt Diameter} = 0.515 \text{ in} \\ \text{Nominal Shear Strength, } Fn_v = 27 \text{ ksi (AISC Table J3.2)} \\ \text{Nominal Shear Strength (per bolt), } Rn_v = 0.6 \ Fn_v \ A_b \\ = 0.6 \ (27) \ 0.208 \ \text{in}^2 2 \\ = 5.6 \ \text{kips} \\ \left(\frac{Rn_v}{\Omega}\right) = 2.8 \ \text{kips} \end{array}$	$2.8~{ m kips}~/~{ m bolt}$
AISC Sec. J3.10	2. Bearing Strength of Standard Bolt Holes (Ignoring bolt hole deformation at service load level)	
	$\Omega=2.0$ edge distance, $l_e=0.72$ in (clear)distance to adjacent hole, $l_c=2.44$ in	
	Since edge distance is less than the adjacent distance to the next bolt hole, edge distance will control.	
AISC Eq. J3.6a	$\left(rac{Rn_b}{\Omega} ight) = \left(rac{1.2l_ctFu}{\Omega} ight) \; \leq \; \left(rac{2.4dtFu}{\Omega} ight)$	
	For the outer bolt (tearout), lc = 0.72 in: $Rn_b = 1.2\ l_c\ t\ F_u$ $= 1.2(0.72)\ 0.2\ (59)$ $= 12.7\ \text{kips}$ $\left(\frac{Rn_b}{\Omega}\right) = 6.4\ \text{kips}$	
	For the inner bolt (tearout), $lc = 2.44$ in:	
	$Rn_b = 1.2 \ l_c \ { m t} \ F_u \ = 1.2 (2.44) \ 0.2 \ (59) \ = 43.1 \ { m kips} \ \left(rac{Rn_b}{\Omega} ight) = 21.6 \ { m kips}$	
	For overall bearing (bolt hole elongation): $Rn_b = 2.4 \text{ d t } F_u$ $= 2.4(0.5625) \ 0.2 \ (59)$ $= 18.2 \text{ kips}$ $\left(\frac{Rn_b}{\Omega}\right) = 9.1 \text{ kips}$	
	Bolt shear will control over bearing since $2.8~{ m kips} < 6.4~{ m kips}$	$6.4~{ m kips}~/~{ m bolt}$
	3. Capacity of Bolt Group Considering the minimum among: bolt shear capacity, bearing and tearing in inner and outer bolt holes.	
	a). Capacity of outer bolt (as established above):	
	$(ext{outer bolt}) \ , Ra_b = 2.8 \ ext{kips} \ / \ ext{bolt}$	
	b). Capacity of inner bolt (as established above): $ ({\rm inner\ bolt}) \; , Ra_b = 2.8 \; {\rm kips} \; / \; {\rm bolt} $	
	c). Capacity of the bolts as a group: sum of the capacities a). and b).	

$Ra_b = 2.8 + 1(2.8) \ = 11.2 ext{ kips}$	11.2 kips
Design capacity ratio, DCR:	
$ m required\ shear,\ R=4.6\ kips$ $ m overall\ capacity,\ \it Ra_b=11.2\ kips$	
$DCR = \left(\frac{4.6}{11.2}\right)$	
=0.409	Pass