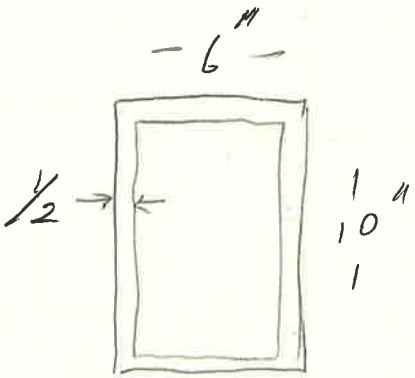
Req: Find Bending Stress & Shear Stress in STub/Plate Weldment

Given: Weldment Dim's as shown.

Assume: $F = (8{,}000\,lbf)(1.75)$

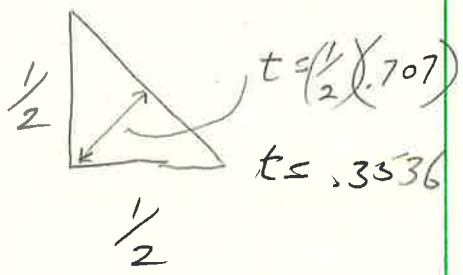
$S.W.S = 14{,}000\,lbf$



Weld Area

$$A_w = \left[(2)(9\tfrac{1}{2}) + (2)(5.5)\right](.3536)$$

$$A_w = 10.61\ in^2$$

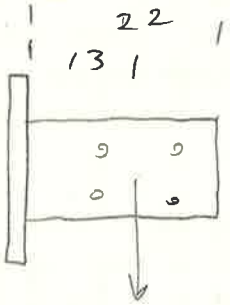


Second Moment

$$I = \frac{1}{12}\left[6(10)^3 - 5(9)^3\right]$$

6000 3645

$$I = 196.25\ in^4$$



Bending moment in Weld

$$M = F(b) = (14{,}000)(13)$$

$$M = 182{,}000.\ in\cdot lbf$$

Bending Stress AT weld (Max)

$$\sigma_b = \frac{Mc}{I} = \frac{(182{,}000)(5")}{196.25} = \boxed{4{,}637.\ psi}$$

Crane Stub | R/V Cargo | 4/1/19

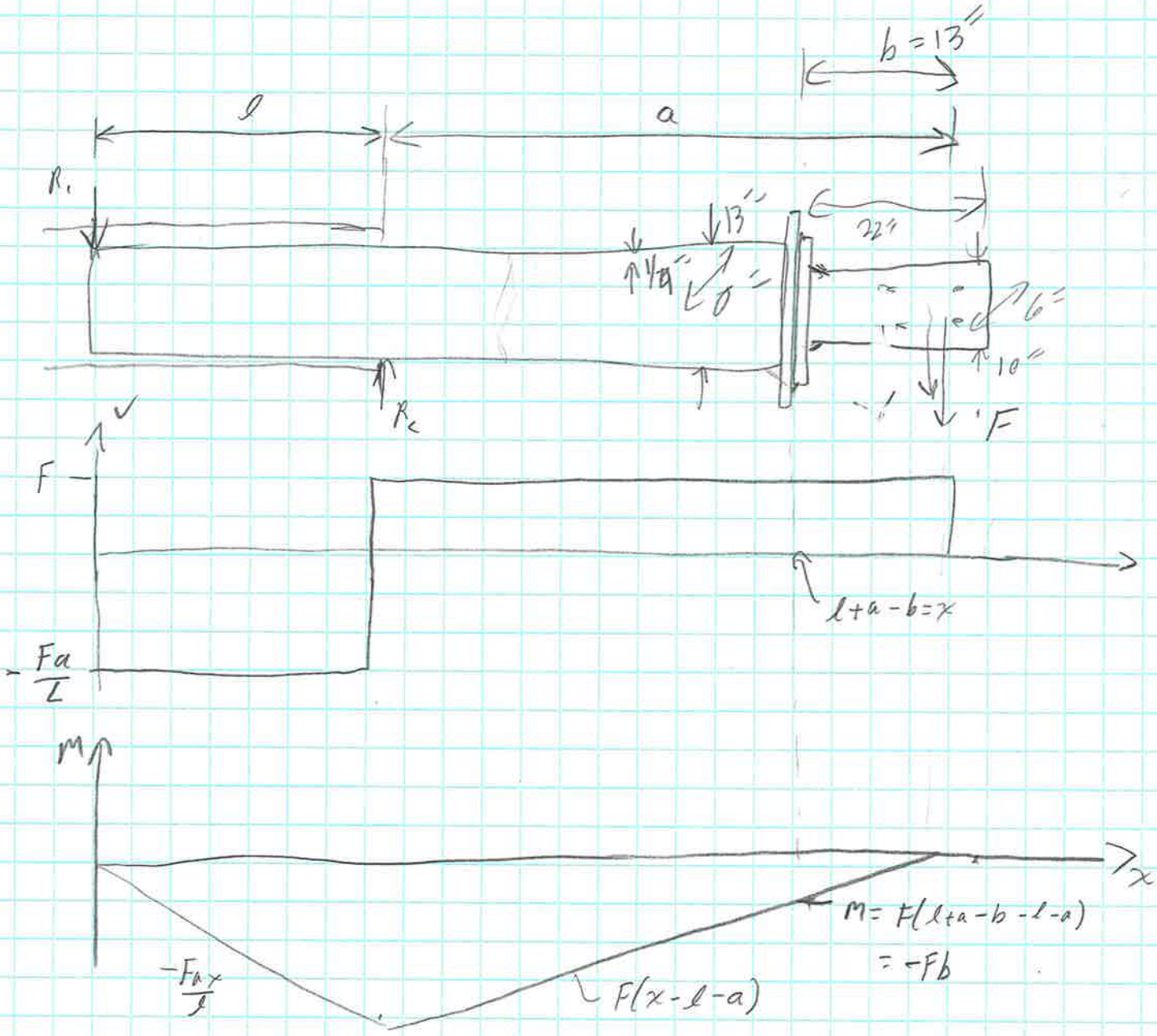
Shear Stress in Weld

$F = 14,000$ lbf

$A_{weld} = 10.61$ in^2

Shear Stress in Weld

$\tau = F/A = \frac{14,000 \text{ lbf}}{10.61 \text{ in}^2} = 1320.$ psi

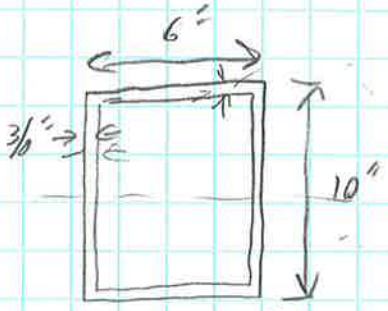

b = 13"
l
a
R1
13"
22"
1/4"
6"
10"
F
R2
V
F
l+a-b=x
-Fa/l
M
x
M= F(l+a-b-l-a)
= -Fb
-Fax/l
F(x-l-a)

$\sigma = \frac{My}{I}$

[$F = 20{,}000$ lbs]

@ OLD TUBE TO FLANGE WELD

3/8" OF WELD 6" × 10"



$y = 6"$

$I = \frac{1}{12}\left[6(10)^3 - (5.5)(9.25)^3\right]$

$153 in^4$

$A = [6 \cdot 10 - 5.5 \times 9.25)$

$= 11.4 in^2$

$M = -Fb$

$= 20{,}000 \cdot 13" = 26 \times 10^4$ in. lb

$\sigma = \frac{26 \times 10^4 \cdot 5"}{153 in^4} = 8500$ psi

$V = \frac{20{,}000}{} = 1750$ psi