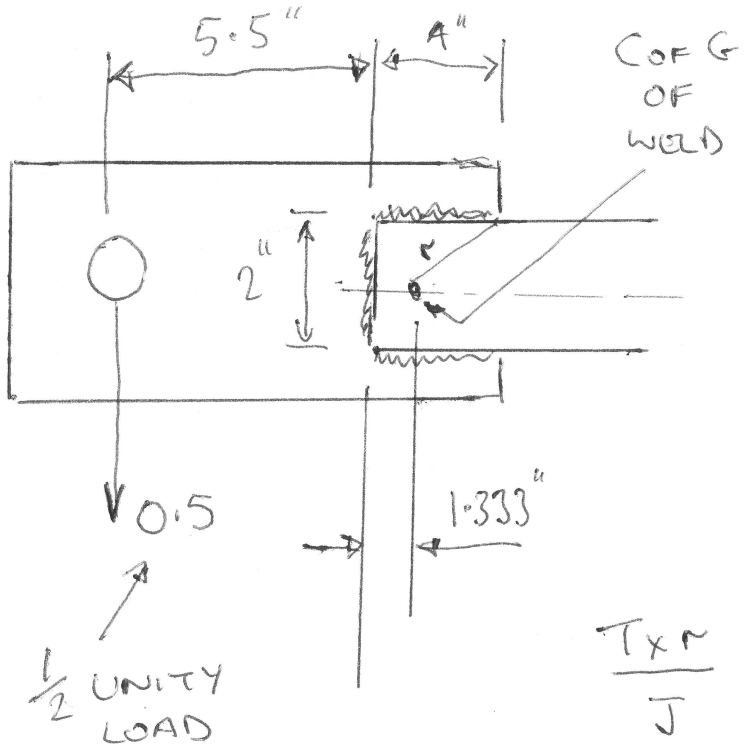


BECAUSE WELD IS ON BOTH SIDES

r = DISTANCE FROM WELD C OF G TO FURTHEST POINT ON WELD

$r = 2.84"$

WELD IN TORSION

USE WELDS AS PROPERTIES OF LINES

$\therefore J = \frac{Z}{12} - \frac{b^4}{2b+d}$ $\quad b = 4"$ $\quad d = 2"$

$Z = 8b^3 + 6bd^2 + d^3$

$\underline{J = 25.733\ in^3}$

$$\frac{T \times r}{J} = \tau_{TOR} = \frac{0.5 \times (5.5 + 1.33)}{25.733}$$

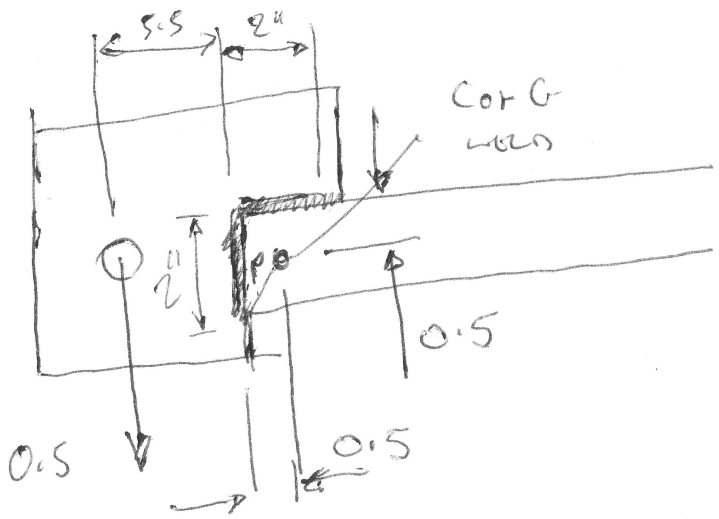
$$\tau_{TORSION} = \underline{0.1327\ lb/in^2}$$

SHEET 1

$$\tau_{DIRECT} = \frac{FORCE}{AREA} = \frac{0.5}{0.707 \times 0.25 \times 11"} = 0.2572\ lb/in^2$$

$$\text{MAX RESULTANT STRESS} = \sqrt{\tau^2_{TORSION} + \tau^2_{DIRECT}}$$

$$" \quad " \quad " = \sqrt{0.1327^2 + 0.25716^2} = \underline{0.2894\ lb/in^2}$$



SIMILAR TO PREVIOUS AND USING ROY MECH SITE FOR WELDS AS LINE PROPERTIES

$r = 4.5"$

$$J = \frac{(b+d)^4 - 6b^2d^2}{12(b+d)}$$

$b = 2"$

$d = 2"$

$J = 3.333\ in^3$

$$\tau = \frac{T \times r}{J} = \frac{0.5 \times 6 \times 2.121}{3.333}$$

SHEET 2

$\tau_{TORSION} = 1.9094\ lb/in^2$

$$\tau_{DIRECT} = \frac{F}{A} = \frac{0.5}{0.707 \times 0.5 \times 5} = 0.2829\ \frac{lb}{in^2}$$

$$\text{MAX RESULTANT STRESS} = \sqrt{1.9094^2 + 0.2829^2}$$

$$\tau = 1.9302\ lb/in^2$$