

Step 5: Convert, if necessary, In this problem, the result 516 lb/in^2 is in the form that we desire, so no additional conversion is necessary.

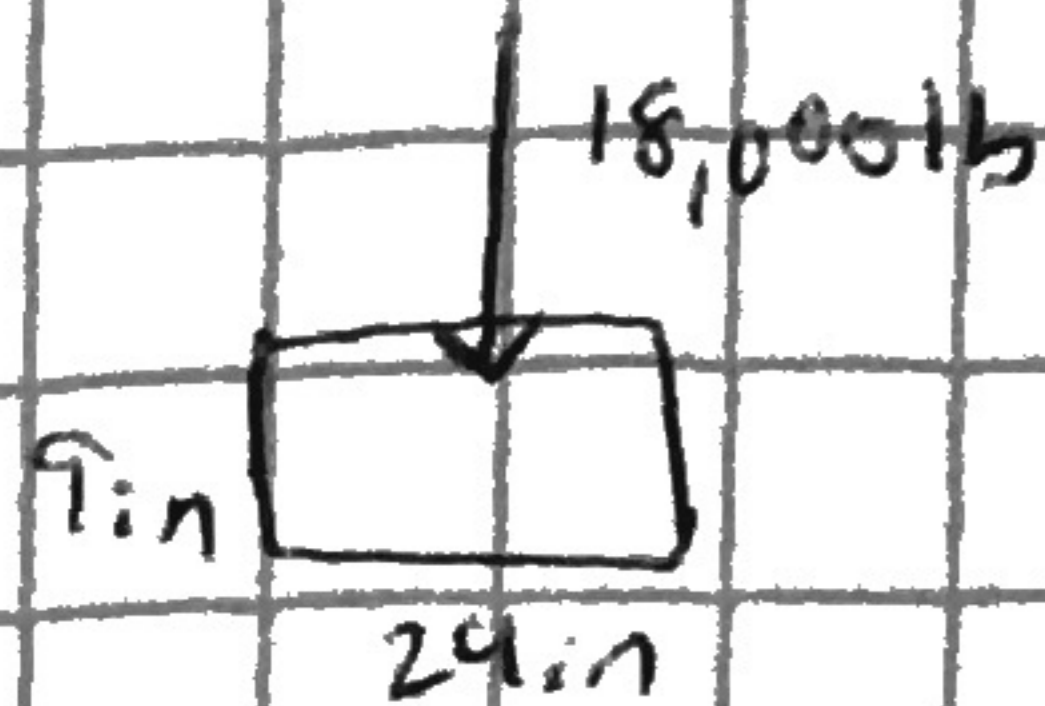
1. $F = 18,000 \text{ lbs}$

$A = 9 \text{ in} \times 24 \text{ in} = 216 \text{ in}^2$

$\sigma = 18,000 / 216 = 83.3 \text{ lb/in}^2$

$.75 \text{ in} \times 2 \text{ in} = 1.5 \text{ in}^2$

$12,000 \text{ ft/in}^2$



2. Know/unknown

$\sigma = 63,750 \text{ psi}$

Tensile $F = 925 \text{ lb}$

Diameter = $\frac{1}{4}$ (0.25 in)

Max $D = R$

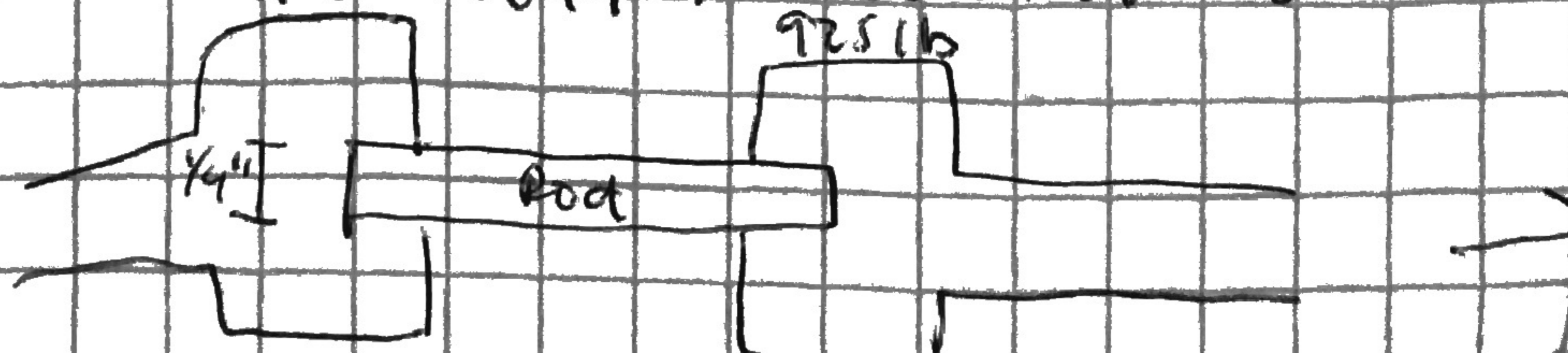
given $D = R = \frac{1}{8}$ (0.125 in)

$A = \pi r^2$

$\pi (0.125)^2 = 0.049$

$A = 0.049$

$\sigma = \frac{F}{A} \left(\frac{63,750 \text{ psi}}{0.049} \right) = 1301020.408$



Answer 3 lb/1/4

170 HWK continued

3. $24,000 \text{ psi} = \frac{F}{0.2 \text{ in}^2}$ $A = .25^2 \cdot \pi = .196$

$24,000 \text{ psi} \cdot 0.2 \text{ in}^2 = 4,800 \text{ lbs}$

4. $4 \text{ in} \times 1.125 \text{ in} = 4.5 \text{ in}^2$ $\sigma = 32,000 \text{ lb} / 4.5 \text{ in}^2$ $\sigma = 7111.1 \text{ lb/in}^2$
 $25,000 \text{ psi} / 4.5 \text{ in}^2 = \sigma$ $\sigma = 555.6 \text{ psi/in}^2$

5. $dL = 0.266 \text{ in}$ $P = 8,000 \text{ lb}$ $L = 35 \text{ ft} \times 12 = 420 \text{ in}$ $A = ?$
 $E = 30,000,000$ $A = PL/dLE$
 $A = 8000 \times 420 / 0.266 \times 30,000,000$
 $A = .421 \text{ in}^2 = \pi r^2$
 $r = 0.732 \text{ in}$

6. $\sigma = 270 \text{ lb} / 0.144 \text{ in}^2$ $\sigma = 18750 \text{ lb/in}^2$
 $E = .75/100$ $E = .0075$

7. Know	unknown	A. $30,000,000 = \sigma / .0012$ $\sigma = 36,000 \text{ lb/in}^2$
$W_{80} = 1.25 \text{ in}$	σ	B. $36,000 = F/A$ $36,000 = F/3.75$ $F = 135,000$
$W_{AO} = 3 \text{ in}$	F	C. $\epsilon = S/240 \cdot .0012 = S/240$ $S = 2.88 \text{ in}$
$L_0 = 240 \text{ in}$	S	
$E = 30,000,000 \text{ psi}$		
$\epsilon = .001200$		

8. $E = (255,480) / (.11045 \cdot .1)$ $E = 11,081,937.53 \text{ psi}$
 $E = (255,480) / (.1575 \cdot .25)$ $E = 9,439,822.61 \text{ psi}$
 Material H has a higher ME
 Material K is stiffer

Activity Continued

$$9. E = PL_0 / AS$$

$$10,000,000 = (90008192) / (A \cdot 50)$$

$$10,000,000 = 1728000 / A$$

$$5,000,000 A = 1728000$$

$$A = .34$$

$$Ar^2 = .3456$$

$$r^2 = .11$$

$$r = .33$$

$$D = .66 \text{ in}$$

$$10. A = 7000 / 42000$$

$$A = .166$$

$$3.14 D^2 = .166$$

$$D = .46 \text{ in}$$

$$16500000 = 7000 L / .0332$$

$$547800 = 7000 L$$

$$L = 78 \text{ in}$$