Homework 4

Thursday, February 15, 2024 9:05 AM

#2

$p = 23.6 \qquad D = 30$

$A = \frac{\pi}{4} \cdot 30^2 = 706.85$

$F = 23.6 \cdot 706.85 = \boxed{16,681.66}$

#10

$A = \frac{\pi}{4} \cdot .75^2 = 4417.77\ mm^2 = 0.004417\ m^2$

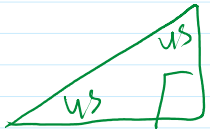
$V = \pi \left(\frac{0.5m}{2}\right)^2 = 0.000636$

$m = 1000\ kg/m^3 \cdot 0.000636 = 0.636\ kg$

$F = mgA = 0.636\ kg \cdot 9.8 m/s^2 \cdot 0.004417\ m^2 = 0.0272\ N$

17

$A = 4 \cdot \sqrt{2(1.4)^2} = 7.919\ m^2$

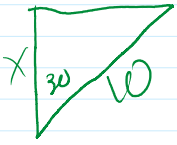


$F = 0.86 \cdot 1000 \cdot 9.81 \cdot \frac{1.4}{\sin 45} \cdot 4 \cdot 0.7$

$F = \boxed{46776.12\ N}$

$h = 2/3 \cdot 1.4 = \boxed{0.933\ m}$

42



$\cos 30 = \frac{X}{10}$

$\frac{10\cos 30}{2}$

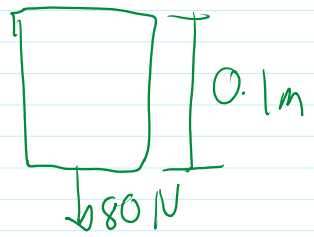
$H = 38 + \frac{10\cos 30}{2} = 42.33\ in$

$A = \frac{\pi}{4} \cdot 10^2 = 78.539\ inch^2$

$F_R = \frac{62.4 \cdot 78.539 \cdot 42.33}{12^3} = 120.0546\ lb$

R_{cp}

8



$V_S = 0.001$

$F_b = 1000 \cdot 9.8 \cdot 0.001 = 9.81\ N$

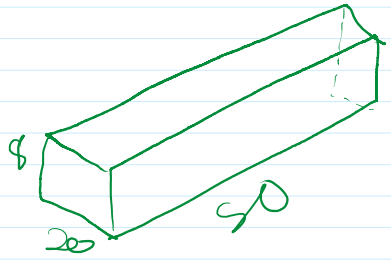
$W = 420\ V_f$

$F_b = 9.81 \cdot 1000 \cdot V_f$

$9.81 \cdot 10^3 \cdot V_f + 9.81 - 420\ V_f - 80 = 0$

$V_f = 7.515 \cdot 10^{-3}\ m^3$

$W = 450{,}000\ lb$



$8 \cdot 20 \cdot 50 = 8{,}000$

$F_b = 62.4\ lb/ft^3 \cdot 32.2\ ft/se \cdot 8000 = 16{,}074{,}240\ lb$

$450{,}000 < 16{,}074{,}240$

it would be stable