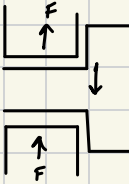
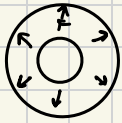


Homework # 3

Problem 4.2



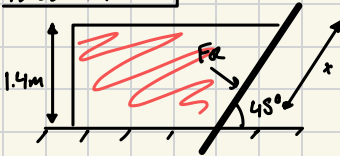
$$d = 30 \text{ in}$$

$$P = 23.6 \text{ psig}$$

$$A = \frac{\pi}{4} d^2 \rightarrow \frac{\pi}{4} 30^2 = 707 \text{ in}^2$$

$$F = 23.6(707) \Rightarrow \underline{F = 16,685.216}$$

Problem 4.17



$$\sin 45^\circ = \frac{1.4}{x} \rightarrow \frac{1.4}{\sin 45^\circ} \Rightarrow x = 1.96 \text{ m}$$

$$A = L(x) \rightarrow 4(1.96) \Rightarrow 7.92 \text{ m}^2$$

$$F_R = \gamma \left(\frac{1}{2} \right) A \rightarrow (860 \times 9.81) \left(\frac{1}{2} \right) \times 7.92 \Rightarrow \underline{F_R = 46.8 \text{ kN}}$$

$$C.O.P_v = \frac{h}{3} \rightarrow \frac{1.4}{3} \Rightarrow .47 \text{ m}$$

$$L_{COP} = \frac{2x}{3} \rightarrow \frac{2(1.96)}{3} \Rightarrow \underline{1.32 \text{ m}}$$

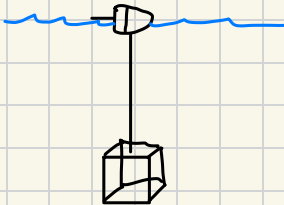
$$C.O.P_e = \frac{x}{3} \rightarrow \frac{1.96}{3} \Rightarrow .66 \text{ m}$$

Problem 5.5

$$L = 100 \text{ mm}$$

$$V = 10^{-3} \text{ m}^3$$

$$W_s = 80 \text{ N}$$



$$F_b = 5g(10^{-3}) \rightarrow 9.81 \text{ N}$$

$$F_{bg} = r_w V_g \rightarrow 9.81(10^3) V_g$$

$$W_g = r_f V_g \rightarrow 470 V_g$$

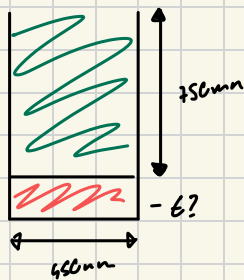
$$F_{bg} + F_b - W_g - W_s = 0 \Rightarrow 9.81(10^3) V_g + 9.81 - 470 V_g - 80 = 0$$

$$\Rightarrow \underline{V_g = 7.52 \times 10^{-3} \text{ m}^3}$$

Problem 529

$$\gamma_w = 9940 \text{ N/m}^3$$

$$\gamma_B = 89,000 \text{ N/m}^3$$



$$V_b = A\epsilon, \quad W_b = \gamma_B A\epsilon$$

$$F_B = \gamma_w A b, \quad F_c = \gamma_w A H$$

$$\therefore W + W_b = F + F_b$$

$$\hookrightarrow \epsilon(\gamma_B - \gamma_w) = H(\gamma_w - \gamma)$$

$$\text{so } \epsilon = \frac{750(9940 - 8168)}{89000 - 9940}$$

$$\Rightarrow \epsilon = \underline{42.9 \text{ mm}}$$