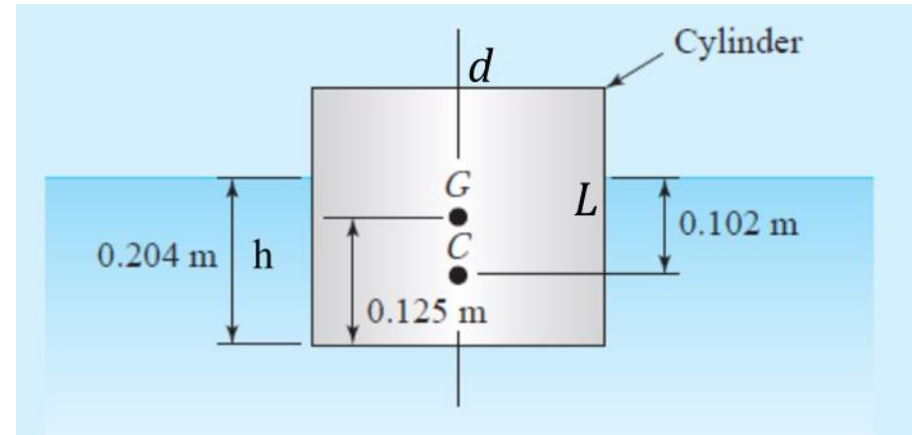


A 0.25-m-diameter cylinder is 0.25 m long and composed of material with specific weight 8000 N/m<sup>3</sup>. Will it float in water with the ends horizontal?

$$I_o = \frac{\pi d^4}{64} = \frac{3.41 \times 0.25^4}{64} = 0.000192 \text{ m}^4$$



$$V_d = \frac{W}{\gamma_{Water}} = \frac{\gamma V}{\gamma_{Water}} = \frac{\gamma \frac{\pi d^2}{4} L}{\gamma_{Water}} = \frac{8,000 \times 3.14 \times 0.25^2 \times 0.25}{4 \times 9,810} = \frac{8,000 \times 0.012}{9,810} = 0.01 \text{ m}^3$$

$$h = \frac{V_d}{A} = \frac{V_d}{\frac{\pi d^2}{4}} = \frac{4 \times 0.01}{3.14 \times 0.25^2} = 0.204 \text{ m}$$

$$CG = 0.125 - \frac{0.204}{2} = 0.023 \text{ m}$$

$$GM = \frac{I_o}{V_d} - CG = \frac{0.000192}{0.01} - 0.023 = -0.004 \text{ m}$$

This is a negative value showing that the cylinder will not float with ends horizontal. It would undoubtedly float on its side.