1) $F_H = \rho g h_c A_{proj}$

$F_{H_2} = 1.6 \times 1000 \times 9.81 (1.5)(3 \times 6)$

$\quad = 423792 N$

$F_{v_2} = \rho_2 g V_2$

$\quad = 9.81 \left(1600 \left(\frac{1}{2}\pi(1.5)^2 \times 6\right)\right)$

$\quad = 332845.4585 N$

$F_{H_r} = 0.8 \times 1000 \times 9.81 (0.75)(1.5 \times 6)$

$\quad = 52974 N$

$F_{v_r} = \rho_r g V_r$

$\quad = 9.81 \left(800 \left(\frac{1}{4}\pi(1.5)^2 \times 6\right)\right)$

$\quad = 83211.36462 N$

$F_H = 423792 - 52974$

$\quad = 370818 N$

$F_v = 332845.4585 + 83211.36462$

$\quad = 416056.8231 N$

$F_R = \sqrt{370818^2 + 416056.8231^2}$

$\quad = 557323.3076 N \approx 557 kN$

2) $F_H = \rho g h_c A_{proj}$

$$= 1000 \times 9.81 \times (6 \times 0.3 + 3 \times 0.3)(2 \times 3 \times 0.3 \times 0.3)$$

$$= 14302.98 N$$

$$\approx 14.3 kN$$

$F_v = \rho g^V$

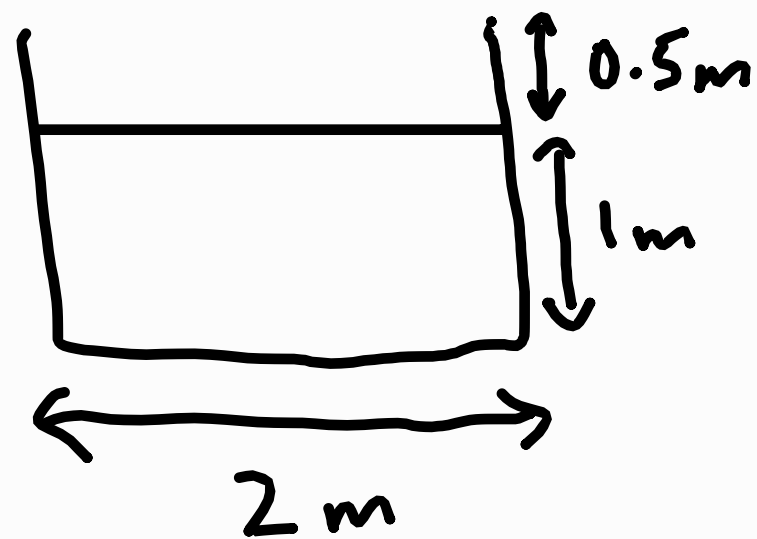$$= 1000 \times 9.81 \times \left(\frac{1}{2}\pi \left(3 \times 0.3\right)^2 \times 0.3\right)$$

$$= 3744.511408 N$$

$$\approx 3.74 kN$$

3) $dp_{max} = \rho g (1.5) - \rho g (1)$

$$= \frac{1}{2} \rho g$$

$$dp_{max} = \frac{\partial p}{\partial x} dx + \frac{\partial p}{\partial y} dy + \frac{\partial p}{\partial z} dz$$

$$\frac{1}{2} \rho g = - \rho a_{x_{max}}$$

$$- a_{x_{max}} = \frac{1}{2} g$$

$$a_{x_{max}} = -4.905 \, ms^{-2}$$

$$\approx -4.91 \, ms^{-2}$$

$$\therefore |a_{x_{max}}| \approx 4.91 \, ms^{-2}$$

0.5m

1m

2m