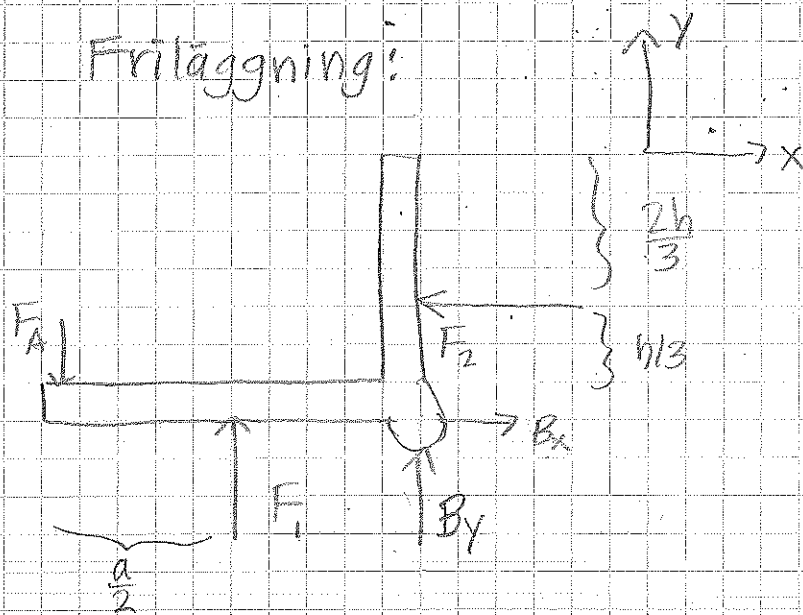


# Hydrostatik

1. Förläggning:



$$F_1 = \rho \cdot ab = \rho gh ab$$

$$F_2 = \frac{(\rho_1 - \rho_2) \cdot b \cdot h}{2} = \frac{(\rho gh - \rho g \cdot 0) \cdot b \cdot h}{2} = \frac{\rho gh^2 b}{2}$$

Jämvikt:

$$\rightarrow: B_x - F_2 = 0$$

Felaktig förläggning?

$$\uparrow: F_1 + B_y - F_A = 0$$

$$\overset{\curvearrowright}{M}_B: -F_1 \cdot \frac{a}{2} + F_2 \cdot \frac{h}{3} + F_A \cdot a = 0$$

$$\overset{\curvearrowleft}{M}_A: F_1 \cdot \frac{a}{2} + B_y \cdot a + F_2 \cdot \frac{h}{3} = 0$$

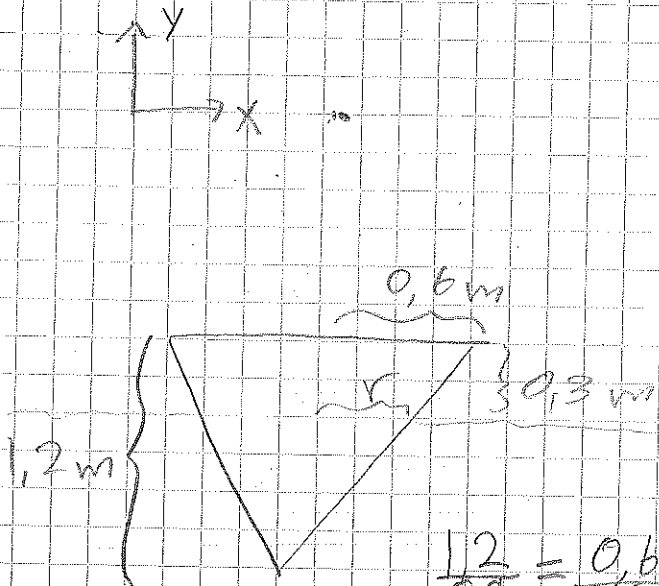
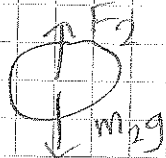
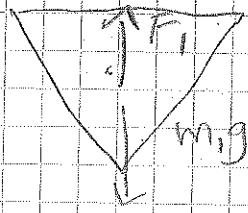
$$\Rightarrow B_y = -F_2 \cdot \frac{h}{3a} - \frac{F_1}{2}$$

$$F_A = \frac{F_1}{2} - \frac{F_2 \cdot h}{3a}$$

$$\Rightarrow -F_1 \cdot \frac{a}{2} + F_2 \cdot \frac{h}{3} + \frac{F_1 a}{2} - \frac{F_2 h}{3} = 0$$

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## Fritäggning



Jämvikt:

→: —

$$\Rightarrow r = 0,45$$

$$\uparrow: F_1 + F_2 = m_1g + m_2g$$

$$m_1g = g \cdot \underbrace{S_{\text{stål}} \cdot \pi \cdot 0,6 \cdot \sqrt{0,6^2 + 1,2^2}}_{\text{mantelytan}} + \underbrace{S_{\text{stål}} \cdot 0,6^2 \pi}_{\text{toppskivan}} \cdot g$$

$$= 564,34\pi + 165,98\pi = 730,33\pi \text{ N}$$

$$m_2g = S_{\text{oly}} \cdot g \cdot \frac{4}{3} \pi \left(\frac{d}{2}\right)^3 = 11370 \cdot 9,81 \cdot \frac{4}{3} \pi \cdot \frac{d^3}{8}$$

$$= 18589,95\pi d^3$$

$$F_2 = S_{\text{salt}} \cdot g \cdot \frac{4}{3} \pi \left(\frac{d}{2}\right)^3 = 1030 \cdot 9,81 \cdot \frac{4}{3} \pi \cdot \frac{d^3}{8}$$

$$= 1684,05\pi d^3 \text{ N}$$

$$F_1 = S_{\text{salt}} \cdot g \cdot \frac{1}{3} \pi \cdot r^2 \cdot 0,9 = 1030 \cdot \frac{1}{3} \pi \cdot 0,45^2 \cdot 0,9 \cdot 9,81$$

$$= 613,83\pi \text{ N}$$

$$F_1 + F_2 = m_1g + m_2g$$

$$613,83 + 1684,05d^3 = 730,33 + 18589,95d^3$$

$$(1684,05 - 18589,95)d^3 = 730,33 - 613,83$$

$$d = 0,19$$

fel tecken + värde

6. Storleken på kraften  $P$ :

$$P(x) = \int_0^{300} k \sqrt{x} dx = \left[ \frac{2k}{3} x^{3/2} \right]_0^{300} = \frac{2k \cdot 300^{3/2}}{3}$$
$$= 120 \text{ kN}$$

Totala Kraft över ytan (Väggen)

$$= 120 \text{ kN} \cdot 60 = 7,2 \text{ MN}$$

Position för kraften:

$$\frac{\int_0^{300} k \cdot \sqrt{x} \cdot x dx}{120 \text{ kN}} = \frac{\left[ k \cdot x^{5/2} \cdot \frac{2}{5} \right]_0^{300}}{120 \text{ kN}} = 180 \text{ m}$$

Momenten blir:

$$\overset{\curvearrowleft}{M_A}: 180 \text{ m} \cdot 7,2 \text{ MN} = 1,3 \text{ GNm}$$