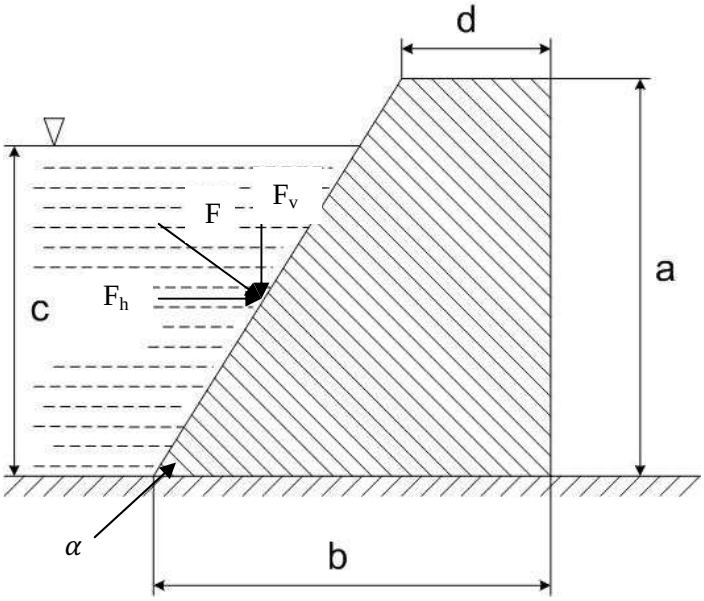
2.
Betonska brana jedinične težine 22.5 kN/m^3 (ρ*g) izložena je tlaku vode. Ako je visina brane a = 50 m, širina vrha brane d = 20 m, širina dna brane b = 57 m, a visina vode c = 37 m, koliki je minimalni koeficijent trenja između brane i podloge kako ne bi došlo do klizanja brane?
ρ = 1000 kg/m^3, g = 9,81 m/s^2
Računajte s duljinom brane od 1 m.



MOJE RJEŠENJE:

$\dot{G} = 22{,}5\ kN/m^3$

$a = 50\ m$

$d = 20\ m$

$b = 57\ m$

$c = 37\ m$

$\rho = 1000\ kg/m^3$

$g = 9{,}81\ m/s^2$

$l = 1\ m$

$\mu = ?$

$$F_h = F_{tr}$$

$$F_h = F \cdot sin\alpha = \rho \cdot g \cdot H_t \cdot A \cdot sin\alpha = \rho \cdot g \cdot \frac{c}{2} \cdot \frac{c}{sin\alpha} \cdot l \cdot sin\alpha = \rho \cdot g \cdot \frac{c^2}{2}$$

$$F_v = F \cdot cos\alpha = \rho \cdot g \cdot \frac{c}{2} \cdot \frac{c}{sin\alpha} \cdot cos\alpha = \rho \cdot g \cdot \frac{c^2}{2 \cdot tg\alpha}$$

$$F_{tr} = \mu \cdot (G + F_v) = \mu \cdot \left(\dot{G} \cdot V + F_v\right) = \mu \cdot \left(\dot{G} \cdot \frac{b+d}{2} \cdot a \cdot l + \rho \cdot g \cdot \frac{c^2}{2 \cdot tg\alpha}\right)$$

$$\rho \cdot g \cdot \frac{c^2}{2} = \mu \cdot \left(\dot{G} \cdot \frac{b+d}{2} \cdot a \cdot l + \rho \cdot g \cdot \frac{c^2}{2 \cdot tg\alpha}\right); \quad tg\alpha = \frac{a}{b-d}$$

$$\mu = \frac{\rho \cdot g \cdot \frac{c^2}{2}}{\dot{G} \cdot \frac{b+d}{2} \cdot a \cdot l + \rho \cdot g \cdot \frac{c^2}{2 \cdot tg\alpha}} = 0.1391$$