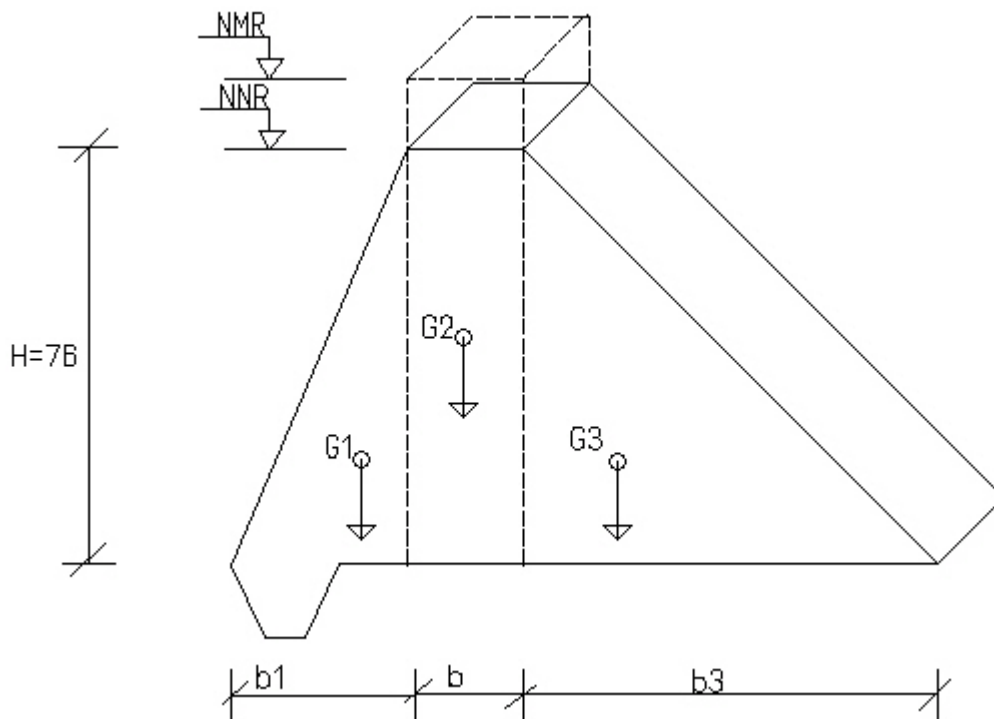


Calculul fortelor ce actioneaza asupra barajului



$b = 0,1 \cdot H = 7.6m$ conf. CH Aplicati volumul I .Adrian Popovici pg 137.

Greutate proprie

$$G_1 = H \cdot b_1 \cdot \delta_b \cdot l = 32509.12$$

$$G_2 = H \cdot b \cdot \delta_b \cdot l = 13862.4$$

$$G_3 = H \cdot b_3 \cdot \delta_b \cdot l = 60855.94$$

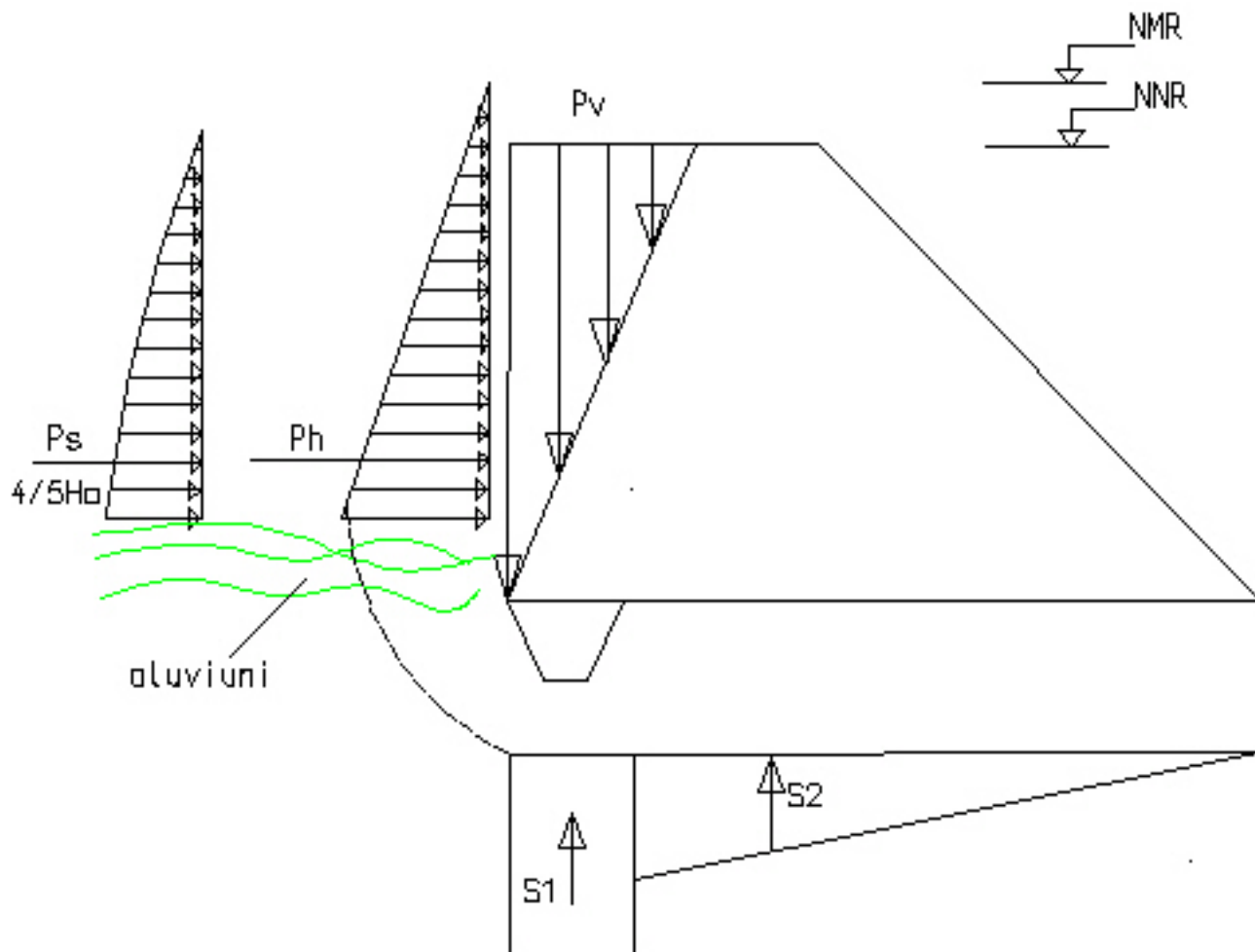
Braturi fata de piciorul barajului

$$G_1 = \begin{cases} H: \frac{2}{3} b_1 = 23.76m \\ V: \frac{1}{3} H = 25.33m \end{cases}$$

$$G_2 = \begin{cases} H: = 27.56m \\ V: \frac{H}{2} = 38m \end{cases}$$

$$G_3 = \begin{cases} H: \frac{2}{3} b_2 = 95.81m \\ V: \frac{1}{3} H = 25.33m \end{cases}$$

Forta hidrostática



Se folosesc doua componente (orizontala si verticala) ale fortei de presiune hidrostatica

- Componenta verticala P_v

$$P_v = \left(\frac{\lambda \cdot H^2}{2} + \lambda \cdot l \right) \cdot \gamma_a = \left(\frac{0,47 \cdot 76^2}{2} + 0,47 \cdot l \right) \cdot 10 = 13902 \text{ KN}$$

- Componenta orizontala P_o

$$P_o = \frac{H \cdot H_a}{2} \gamma_a = \frac{76 \cdot 77}{2} \cdot 10 = 29260 \text{ KN}$$

Forța de subpresiune

Această forță se datorează gradientului hidraulic amonte și aval

$$S_1 = 4 \cdot m \cdot \gamma_a \frac{H \cdot H_a}{2} = 4 \cdot 0.85 \cdot 10 \cdot \frac{76 \cdot 77}{2} = 2616 \text{ KN}$$

$$S_2 = 0.4 \cdot (B - 4) \cdot \gamma_a \cdot \frac{H_a \cdot H}{2} = 0.4 \cdot (110 - 4) \cdot 10 \cdot \frac{77 \cdot 76}{2} = 16302 \text{ KN}$$

Forța seismică

$$F_{sa} = \frac{2}{3} k_s C_p (H')^2$$

$$H'^2 = \text{NNR-CTN} + \text{DA} = 270 - 210 + 6 = 66$$

$$C_p = \frac{8.17}{\sqrt{1 - \frac{7.75}{10^6} \left(\frac{H'}{T} \right)^2}} = \frac{8.17}{\sqrt{1 - \frac{7.75}{10^6} \left(\frac{66}{1} \right)^2}} = 8.31 \frac{\text{KN}}{\text{m}^3}$$

conform CH Aplicati volumul I. Adrian Popovici pag 37.

$$F_{sa} = 2/30.36 \cdot 8.31 \cdot 66 = 8689.17 \frac{\text{KN}}{\text{m}^3}$$

Presiunea valurilor

$$W = \frac{1}{2} \gamma_a (H_a + h_0)(H_a + H'v) - \frac{1}{2} \gamma_a H_a^2 \Rightarrow$$

$$W = \frac{1}{2} 10(77 + 1.76)(77 + 4.13) - \frac{1}{2} 10_a 77^2 = 2303.99 \text{ KN/ml}$$

Presiunea ghetii

$$Pg = 100 \text{ KN/m}$$

VERIFICARI

Verificare la alunecare

$$K_{al} = \frac{f \Sigma F_v}{\Sigma F_h} \geq 1.2$$

$$\Sigma F_v = G + F_v - S$$

$$\Sigma F_v = 107227.5 + 13901.93 - 13701.99 = 102191.39$$

$$\Sigma F_h = Ph + Pg + W$$

$$\Sigma F_h = 2303.99 + 100 + 29260 = 31663.99$$

$$K_{al} = \frac{0.6 \cdot 102191.39}{31663.99} = 1.936 > 1.2$$

Verificare la rasturnare

$$K_s = \frac{M_s}{M_r} \geq 1.5$$

$$M_s = G_1 * b_{g1} + G_2 * b_{g2} + G_3 * b_{g3} + F_v * b_{fv} = >$$

$$M_s = 32509.13 * 86.21 + 13862.4 * 82.41 + 60855.9 * 14.16 + 13901.93 * 98.09 = >$$

$$M_s = 2802611 + 1142400 + 861761.3 + 1363668 = >$$

$$M_s = 6170440.05$$

$$b_{g1} = 109.97 - 23.76 = 86.21$$

$$b_{g2} = 109.86 - 27.56 = 82.41$$

$$b_{g3} = 109.86 - 95.81 = 14.16$$

$$b_{fv} = 109.86 - (35.53 - 23.69) = 98.09$$

$$M_r = F_0 * b_{r F_0} + S_1 * b_{r S_1} + S_2 * b_{r S_2} + F_{sbaraj} * H/2 + F_{sa} * H/2$$

$$M_r = 29260 * 25.33 + 2618 * 107.97 + 16319.99 * 52.99 + 38564.3 * 38 + 8689 * 38$$

$$M_r = 741253.33 + 282675.84 + 864747.01 + 1466871.62 + 330190 = >$$

$$M_r = 3685700$$

$$b_{r F_0} = 76/3 = 25.33$$

$$b_{r S_1} = 105.97 + 2 = 107.97$$

$$brS2=105.97/2=52.93$$

$$H/2=76/2=38$$

$$K_s = \frac{6170440.05}{3685700} = 1.67 > 1.5$$

Verificarea eforturilor pe talpa

Metoda elementara

$$\sigma_{am} = \frac{N}{A} \pm \frac{M}{W}$$

$$N=(G1+G2+G3+Fv)-S1-S2$$

$$N=(32509.73+13862.4+60855.94+13901.93)-2618-16319.99=>$$

$$N=102237.65$$

$$A=1*B=1*109.86=109.86$$

$$\begin{aligned} M &= G_1 * b_r + G_2 * b_r - G_3 * b_r + Fv_1 * b_r + Fo * b_r + S_1 * b_r - S_2 * b_r + Fs \\ &\text{baraj}_1 * b_r + Fs \text{ apa} * b_r = 32509 * 31.22 + 13862 * 27.43 - \\ &- 60856 * 40.83 + 13902 * 43.10 + 290260 * 25.33 + 2618 * 52.99 - \\ &- 161320 * 2 + 38602 * 38 + 8689 * 38 = 215494 \text{ KNm} \end{aligned}$$

$$W = \frac{B^2}{6} = \frac{109.97^2}{6} = 2015.77$$

$$\sigma_{am} = \frac{102191.39}{109.97} - \frac{2154294}{2015.77} = -139,52 \text{ KN} / \text{m}^2$$