

NAUČNÝ CHODNÍK NABRZIE V NATESTOVE

SO 03 LAVKA

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1. ZATAŽENIE:

TWINSON
OK PODPORT
UŽITNÉ

KN/m	q_1	q_2	q_{12}
	0,10	1,35	0,130
	0,10		0,130
	4,00	1,50	6,00
Σ	4,20		6,23

2. PRIEČNIK: $l_0 = 3,00 \text{ m}$
 $a' = 1,20 \text{ m}$

$$q_k = 1,20 \times 6,23 + 0,10 \times 1,35 = 7,60 \text{ kN/m}$$

$$M_k = \frac{1}{8} \cdot 3,00^2 \times 7,60 = 8,55 \text{ kNm}$$

$$\psi_{\text{OTZ}} = \frac{8,05}{235000} = 36,20 \text{ an}$$

I 120 $\omega_x = 54,57 \text{ cm}^3$
 $I_x = 3,27 \cdot 10^6 \text{ m}^4$
 $i_{x1} = 1,43$

$$\sigma_{\text{max}} = \frac{0,00855}{0,000054} = 158,00 \text{ MPa} < R_d = 235,00 \text{ MPa}$$

$$\gamma_{\text{max}} = \frac{5 \times 3100^4 \times 7,60}{384 \times 210 \times 3,27 \times 1,45} = 0,008 < \gamma_{\text{200}} = \frac{3,00}{250} = 9,02$$

VYHODNE I 120 $a' 1,20 \text{ m}$

3. POROZUMÝ LOSNÍK $a' = 0,40 \text{ m}$

$$q_k = 0,4 \times 6,23 = 2,50 \text{ kN/m}$$

$$M_k^{\text{I}} = \frac{1}{10} \cdot 1,20^2 \times 2,50 = 0,36 \text{ kNm}$$

□ 40/40/2,5 $\omega_x = 4,33 \text{ cm}^3$

$$\sigma_{\text{max}}^{\text{I}} = \frac{0,00036}{0,000043} = 84,00 \text{ MPa} < R_d = 235,00 \text{ MPa}$$

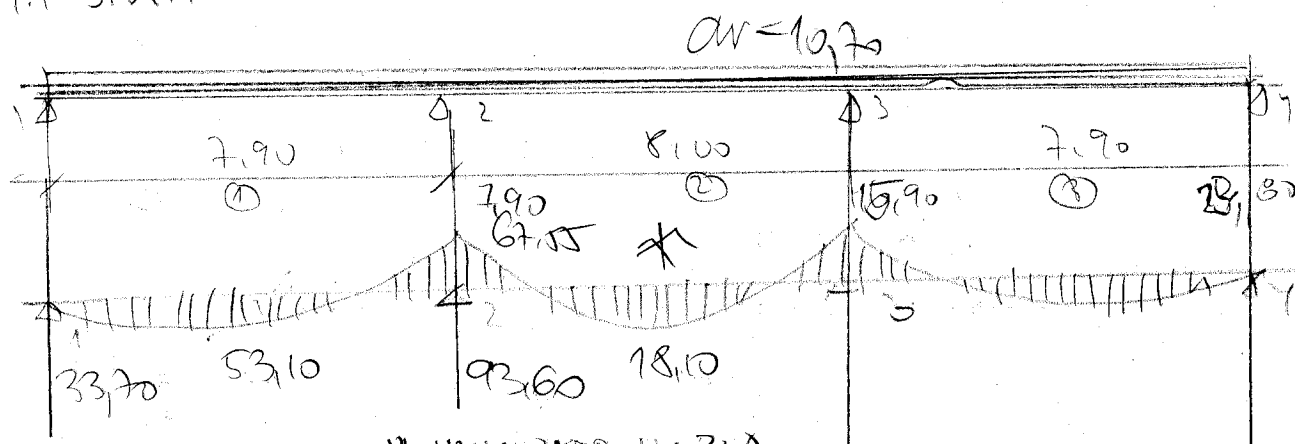
$$P = 1,5 \times 1,5 = 2,25$$

$$M_k^{\text{II}} = \frac{2,25 \times 1,2}{2} = 0,675 \text{ kNm}$$

$$\sigma_{\text{max}}^{\text{II}} = \frac{0,000675}{0,0000435} = 156,00 \text{ MPa} < R_d =$$

VYHODNE 40/40/2,5 $a' 0,40 \text{ m}$

4.1 STATICKÁ SCHEMA



$$q = 6.23 \times 1.50 + 1.0 \times 1.35 = 10.7 \text{ kN/m}$$

$$k_{red} = \frac{9.5}{8.0} = 0.94$$

$$M_{rmax} = 0.94 \times 67.55 = 63.45 \text{ kNm}$$

$$W_{potr} = \frac{63.45}{235000} = 270 \text{ cm}^3 \quad \text{U 260 } W_x = 3710 \text{ cm}^3$$

ZABRADLIE :

ZATÁŽENIE VETROM :

$$V_b = 26 \text{ m/s}$$

$$\text{TEREN I. } q_p(30) = 0.650 \text{ kN/m}^2$$

$$H = 5.0 \text{ m}$$

$$R/q = \frac{1.5}{24} = 0.06 \quad \sqrt{w} = 1.50$$

$$C_D = 0.7$$

$$C_E = -0.3$$

$$q_w = 0.65 \times 1.50 (0.7 + 0.3) = 1.00 \text{ kN/m}^2$$

$$P_{ZABR} = 10 \times 1.50 = 1.50 \text{ kN}$$

$$M_r = 1.5 \times 1.25 + 1.0 \times 1.25^2 \times 0.50 = 2.65 \text{ kNm}$$

$$W_{potr} = \frac{2.65}{235000} = 11.27 \text{ cm}^3$$

$$\text{PROFL } 160/60/4 \quad a' 0.150$$

$$W_x = 548 \text{ cm}^3$$

$$A_x = 7.94 \text{ cm}^2$$

$$I_x = 0.2315 \text{ m}^4$$

$$i_{min} = 1.24 \text{ cm}$$

$$\frac{80/30/4}{a' 1.00} \quad W_x = 12.00 \text{ cm}^3$$

$$\text{ZÁR } 40/30/3$$

POSÚDENIE L PROFILU :

$$q_w = 1.0 \times 0.87 \times 0.15 = 0.1435 \text{ kN/m}$$

$$M_h = \frac{1}{10} \times 0.1435 \times 1.0^2 = 0.01435 \text{ kNm}$$

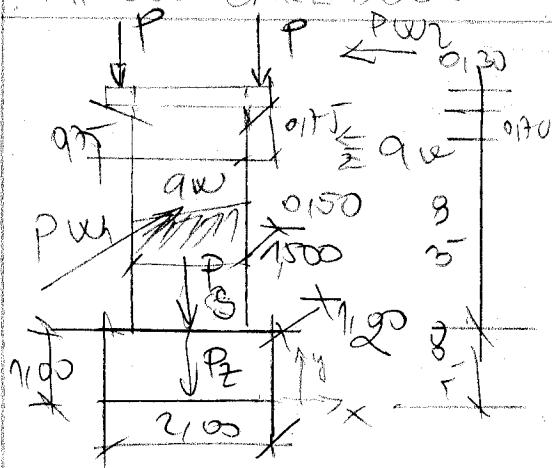
$$W_{potr} = \frac{0.01435}{235000} = 0.18 \text{ cm}^3$$

$$30/30/4 \quad W_x = 0.860 \text{ cm}$$

$$W_y = 0.610 \text{ cm}$$

$$N_d^{sc} = \frac{2.65}{0.10 \times 2} = 13.0 \text{ kN}$$

$$\phi 10 \quad N_u = 18.30 \text{ kN}$$



$$q\psi = 1.0 \text{ eV/mr}$$

$$P_s = (0.30 \times 3.0 + 1.5 \times 3.70 + 0.75 \times 0.7 \times 2.0) \times 0.150 \times 25 \times 1.35 = 118.96$$

$$P_{wy} = 1150 \times 40 \times 110 = 600 \text{ kN}$$

$$P_{w2} = 90 \times 1.0 \times 1.50 = 135 \text{ kJ}$$

$$M_y^{\text{Tot}} = 90 \times (2.0 + 1.0) = 180 \text{ kNm} \quad 0.521 \text{ RAD (A)}$$

$$M_x^{\max} = 9360 \times 1.0 + 12.0 \times (1.0 + 4.0 + 0.50) = 159.6 \text{ kN}$$

$$M_x = 66,0 \text{ kNm}$$

$$P_{max} = 2 \times 93.60 + 118.96 + 6210 = 368,30 \text{ kN}$$

$$P_{\text{max}} = 360,6 - 93,60 = 274,66$$

$$q_{\text{ZAK}} = \frac{368,0}{(2,0 - 0,36)(1,0 - 0,10)} = 249,00 \text{ kPa} < p_d = 250 \text{ kPa}$$

$$e_{1x} = \frac{660}{369,30} = 0,18m \quad e_{1y} = \frac{180}{369,30} = 0,05$$

$$e_{2x} = \frac{179,66}{279,66} = 0,56 \quad Q_x = 0,05 \text{ m}$$

$$q_{3AC} = \frac{229.66}{2 - 1.16 \times 1.0} = \frac{326.0 \text{ MPa}}{1.20} = 271.0 \text{ Kpa}$$
$$\Rightarrow R_d = 250 \text{ Kpa}$$

PÄTNA 1,00 x 2,00 - Rd = 300 kPa