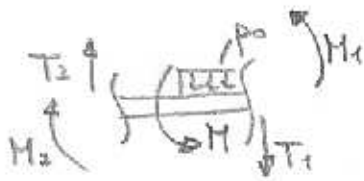


R.P.:

- 1)  $w_1(x=0) = 0$  ✓  
 $w_1'(x=0) \neq 0$  ✓
- 2)  $w_2(x=2L) = 0$  ✓
- 3)  $w_2'(x=2L) = 0$  ✓
- 4)  $M_1(x=0) = 0$  ✓

P.K.P.

- 1)  $w_1(x=L) = w_2(x=L)$  ✓
- 2)  $w_1'(x=L) = w_2'(x=L)$  ✓
- 3)  $M_1(x=L) + p_0 L^2 = M_2(x=L)$  ✓
- 4)  $T_2(x=L) = T_1(x=L)$  ✓



$$M_1 + M = M_2$$

$$T_2 - T_1 = 0$$

Dif. eq.

$$\textcircled{1}$$

$$w_1''(x) = p_0 \cdot \frac{1}{EI}$$

$$\textcircled{2}$$

$$w_2''(x) = 0$$

$$\textcircled{3}$$

$$-w_1''(x=L) EI_0 + p_0 L^2 = -w_2''(x=L) 2EI_0$$

$$w_1''(x=L) = 2w_2''(x=L) + \frac{p_0 L^2}{EI_0}$$

$$\textcircled{4}$$

$$-2EI_0 w_2'''(x=L) = -EI_0 w_1'''(x=L)$$

$$2w_2'''(x=L) = w_1'''(x=L)$$

Zapíšeme:

$$w_1(x) = \sum_{k=0}^{N=4} C_k x^k = C_0 + C_1 x + C_2 x^2 + C_3 x^3 + C_4 x^4$$

$$w_1(x) = x (C_0 + C_1 x + C_2 x^2 + C_3 x^3) \quad (\text{Nula pri } x=0)$$

$$w_2(x) = w_1(x) + \left[ \underbrace{B_2 (x-L)^2}_{\text{Moment}} + \underbrace{B_3 (x-L)^3}_{\text{Průvaha síla}} + \underbrace{B_0 (x-L)^4}_{\text{Dif. eq.}} \right]$$

Ostatné: R.P. 2,3,4 ; P.K.P. 3,4 ; D.e. 1,2.

$$w_1(x) = x(C_0 + C_1x + C_2x^2 + C_3x^3)$$

$$w_1'(x) = C_0 + 2C_1x + 3C_2x^2 + 4C_3x^3$$

$$w_1''(x) = 2C_1 + 6C_2x + 12C_3x^2$$

$$w_1'''(x) = 6C_2 + 24C_3x$$

$$w_1^{(4)}(x) = 24C_3$$

$$w_2(x) = w_1(x) + [B_2(x-L)^2 + B_3(x-L)^3 + \alpha_0(x-L)^4]$$

$$w_2'(x) = C_0 + 2C_1x + 3C_2x^2 + 4C_3x^3 + 2B_2(x-L) + 3B_3(x-L)^2 + 4\alpha_0(x-L)^3$$

$$w_2''(x) = 2C_1 + 6C_2x + 12C_3x^2 + 2B_2 + 6B_3(x-L) + 12\alpha_0(x-L)^2$$

$$w_2'''(x) = 6C_2 + 24C_3x + 6B_3 + 24\alpha_0(x-L)$$

$$w_2^{(4)}(x) = 24C_3 + 24\alpha_0$$

• I. Dif. eq.

$$w_1^{(4)}(x) = \frac{p_0}{EI}$$

$$24C_3 = \frac{p_0}{EI} \rightarrow \boxed{C_3 = \frac{p_0}{24EI}}$$

• II. Dif. eq.

$$w_2^{(4)}(x) = 0$$

$$24C_3 + 24\alpha_0 = 0 \rightarrow 24C_3 = -24\alpha_0 \rightarrow \boxed{\alpha_0 = -C_3 = -\frac{p_0}{24EI}}$$

• A. P.k.p.

$$T_2(x=L) = T_1(x=L); \quad 2w_2'''(x=L) = w_1'''(x=L)$$

$$12C_2 + 48C_3L + 12B_3 + 48\alpha_0(\cancel{L}) = 6C_2 + 24C_3x$$

$$6C_2 + 24C_3L + 12B_3 = 0$$

$$\rightarrow C_2 = -4C_3L - 2B_3 = -\frac{4p_0L}{24EI} - 2B_3$$

$$\boxed{C_2 = -\frac{Lp_0}{6EI} - 2B_3}$$

• B. P.k.p.

$$M_1(x=L) = M_2(x=L) - p_0L^2$$

$$w_1''(x=L) = 2w_2''(x=L) + \frac{p_0L^2}{EI}$$

$$2C_1 + 6C_2L + 12C_3L^2 = 4C_1 + 12C_2L + 24C_3L^2 + 4B_2 + 0 + 0 + \frac{p_0L^2}{EI}$$

$$2C_1 + 6C_2L + 12C_3L^2 + 4B_2 = -\frac{p_0L^2}{EI}$$

$$C_1 = -\frac{p_0L^2}{2EI} - 2B_2 - \frac{p_0L^2}{4EI} + \frac{p_0L^2}{2EI} + 6B_3L \rightarrow \boxed{C_1 = -2B_2 + 6B_3L - \frac{p_0L^2}{4EI}}$$

• 4. R. p.

$$M(x=0) = 0; \quad w_1''(x=0) = 0$$

$$2C_1 + 6C_2 + 12C_3 = 0$$

$$\rightarrow \boxed{C_1 = 0}$$

Zapišemo lahko se takoj

$$0 = -2B_2 + 6B_3L - \frac{p_0 L^2}{4EI_0}$$

$$\boxed{B_2 = 3B_3L - \frac{p_0 L^2}{8EI_0}}$$

• 3. R. p.

$$w_2'(x=2L) = 0$$

$$C_0 + 4C_1 + 12L^2C_2 + 32L^3C_3 + 2LB_2 + 3L^2B_3 + 4L^3\alpha_0 = 0$$

$$C_0 = -12L^2C_2 - 32L^3C_3 - 2LB_2 - 3L^2B_3 - 4L^3\alpha_0$$

$$C_0 = \frac{12L^3p_0}{6EI_0} + 24L^2B_3 - \frac{32L^3p_0}{24EI_0} - 6L^2B_3 + \frac{2L^3p_0}{8EI_0} - 3L^2B_3 + \frac{4L^3p_0}{24EI_0}$$

$$\boxed{C_0 = 15L^2B_3 + \frac{13L^3p_0}{12EI_0}}$$

• 2. R. p.

$$w_2(x=2L) = 0$$

$$2LC_0 + 4L^2C_1 + 8L^3C_2 + 16L^4C_3 + L^2B_2 + L^2B_3 + L^4\alpha_0 = 0$$

$$30L^2B_3 + \frac{26L^4p_0}{12EI_0} - \frac{8L^4p_0}{6EI_0} - 16L^3B_3 + \frac{16L^4p_0}{24EI_0} + 3L^2B_2 - \frac{L^4p_0}{8EI_0} + L^2B_3 - \frac{L^4p_0}{24EI_0} = 0$$

$$18L^2B_3 + \frac{32L^4p_0}{24EI_0} = 0$$

$$B_3 = -\frac{32L^4p_0}{24EI_0 \cdot L^2 \cdot 18}; \quad \boxed{B_3 = -\frac{2Lp_0}{27EI_0}}$$

• Sedaj lahko izrazimo vse konstante

$$C_0 = -\frac{30L^2p_0}{27EI_0} + \frac{13L^3p_0}{12EI_0}; \quad \boxed{C_0 = -\frac{L^3p_0}{36EI_0}}$$

$$B_2 = -\frac{6L^2p_0}{27EI_0} - \frac{p_0L^2}{8EI_0}; \quad \boxed{B_2 = -\frac{25L^2p_0}{72EI_0}}$$

$$C_2 = -\frac{Lp_0}{6EI_0} + \frac{4Lp_0}{27EI_0}; \quad \boxed{C_2 = -\frac{Lp_0}{54EI_0}}$$

• Rezultu lolaia tala zapiseama kot:

$$w_1(x) = x (C_0 + C_1 x + C_2 x^2 + C_3 x^3) = C_0 x + C_1 x^2 + C_2 x^3 + C_3 x^4$$

$$w_1(x) = -\frac{x L^3 p_0}{36 E I_0} - \frac{x^3 L p_0}{84 E I_0} + \frac{x^4 p_0}{24 E I_0}$$

$$w_1(x=L) = -\frac{L^4 p_0}{36 E I_0} - \frac{L^4 p_0}{84 E I_0} + \frac{L^4 p_0}{24 E I_0}$$

$$w_1(x=L) = -\frac{p_0 L^4}{216 E I_0}$$