Resor


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przyczepy Pleszew
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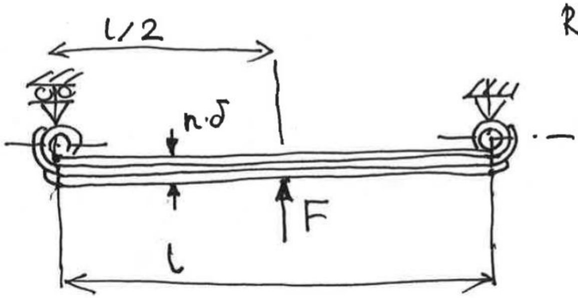
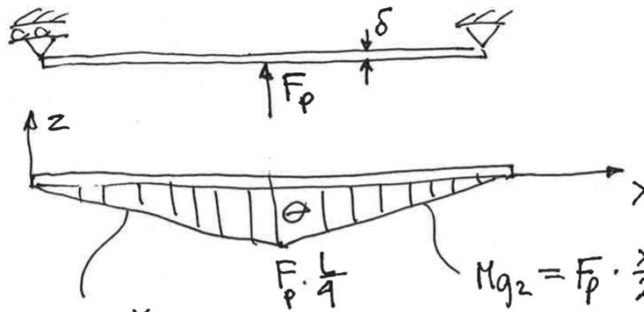
RESOR





$F_p = F/n$

M_g

$Mg_1 = -\frac{F_p \frac{L}{4}}{\frac{L}{2}} \cdot x = -F_p \cdot \frac{x}{2}$

$Mg_2 = F_p \cdot \frac{x}{2} - F_p \frac{L}{2} = \frac{F_p}{2}(x - L)$

δ - grubość pióra

b - szerokość pióra

$$w_1'' = \frac{Mg_1}{EJ_y} = -\frac{F_p}{2EJ_y} x = Ax \quad , \quad A = -\frac{F_p}{2EJ_y}$$

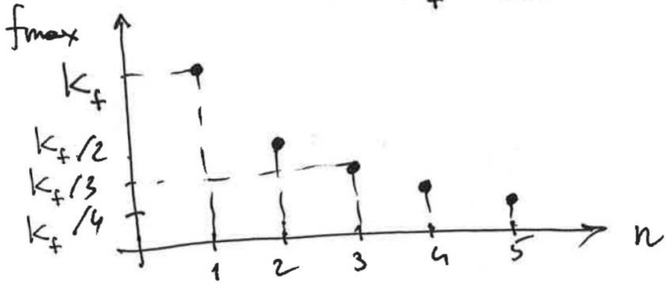
$$w_1' = \frac{Ax^2}{2} + C_1 \quad \text{symetria} \Rightarrow w_1'(L/2) = 0 \Rightarrow C_1 = -\frac{AL^2}{8} \Rightarrow w_1' = \frac{A}{2}\left(x^2 - \frac{L^2}{4}\right)$$

$$w_1 = \frac{A}{2}\left(\frac{x^3}{3} - \frac{L^2}{4}x\right) + C_2 \quad (w_1(0) = 0 \Rightarrow C_2 = 0$$

$$w_1 = \frac{A}{2}\left(\frac{4x^3}{12} - \frac{3L^2x}{12}\right) = \frac{A}{24}(4x^2 - 3L^2)x = \frac{F_p \cdot x}{48EJ_y}(3L^2 - 4x^2)$$

$$w_1\left(\frac{L}{2}\right) = \frac{F_p \cdot L}{96EJ_y}\left(3L^2 - 4\frac{L^2}{4}\right) = \frac{F_p L^3}{48EJ_y} \quad , \quad J_y = \frac{b\delta^3}{12}$$

$$k_f = \frac{FL^3}{4b\delta^3}$$



$$f_{max} = w_1\left(\frac{L}{2}\right) = \frac{FL^3 \cdot 12}{48nEb\delta^3} = \frac{FL^3}{4nb\delta^3} = \frac{K_f}{n}$$

$$w_2'' = \frac{M_{y2}}{EJ_y} = \frac{F_p}{2EJ_y}(x-l) = A\cdot(l-x)$$

$$w_2' = A\left(lx - \frac{x^2}{2}\right) + C_3 \quad \left(w_2'\left(\frac{l}{2}\right) = 0 \Rightarrow\right.$$

$$\left. C_3 + A\left(\frac{l^2}{2} - \frac{l^2}{8}\right) = 0 \Rightarrow C_3 = -\frac{3}{8}Al^2 \right)$$

$$w_2' = A\left(lx - \frac{x^2}{2} - \frac{3}{8}l^2\right)$$

$$w_2 = A\left(\frac{l}{2}x^2 - \frac{x^3}{6} - \frac{3}{8}l^2x\right) + C_4$$

$$w_2(l) = 0 \quad \Rightarrow \quad C_4 = -A\left(\frac{l^3}{2} - \frac{l^3}{6} - \frac{3l^3}{8}\right) =$$

$$= -A\left(\frac{12}{24} - \frac{4}{24} - \frac{9}{24}\right)l^3 = \frac{Al^3}{24}$$

$$w_2 = A\left(\frac{l}{2}x^2 - \frac{x^3}{6} - \frac{3}{8}l^2x + \frac{l^3}{24}\right) = \frac{F_p}{2EJ_y}\left(\frac{x^3}{6} + \frac{3}{8}l^2x - \frac{l}{2}x^2 - \frac{l^3}{24}\right) =$$

$$= \frac{F_p}{48EJ_y}\left(4x^3 + 9l^2x - 12lx^2 - l^3\right)$$

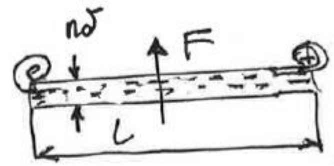
$$w_2\left(\frac{l}{2}\right) = \frac{F_p}{48EJ_y}\left(4\frac{l^3}{8} + \frac{9\cdot l^3}{2} - 12\frac{l^3}{4} - l^3\right) =$$

$$= \frac{F_p}{48EJ_y}\left(\frac{1}{2}l^3 + \frac{9}{2}l^3 - 3l^3 - l^3\right) = \frac{F_p\cdot l^3}{48EJ_y}\left(= w_1\left(\frac{l}{2}\right)\right)$$

$$\sigma_{max} = -\frac{M_g\left(\frac{L}{2}\right)\cdot \delta/2}{J_y} = \frac{F_p\cdot\frac{L}{4}\cdot \delta/2}{J_y} = \frac{F}{n}\cdot\frac{L}{4}\cdot\frac{\delta}{2}\cdot\frac{12}{b\delta^3} = \frac{3FL}{2nb\delta^2} = \frac{k_\sigma}{n}$$

$$k_\sigma = \frac{3FL}{2b\delta^2}$$ (przebieg podobny jak dla f max)

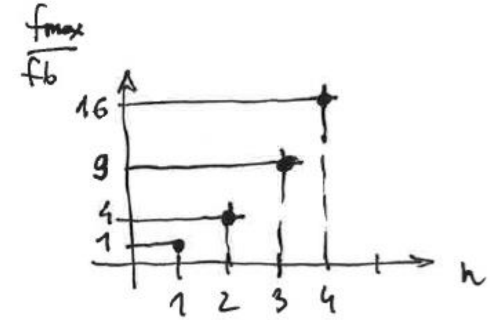
„ZESPAWANE" PIÓRA



$$J_y^b = \frac{b(n\delta)^3}{12} = n^3\cdot\frac{b\delta^3}{12}$$ (b – belka)

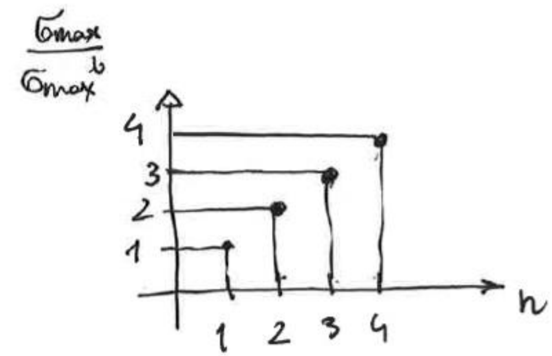
$$f_b = \frac{F\cdot L^3}{48EJ_y^b} = \frac{FL^3\cdot 12}{48n^3b\delta^3} = \frac{FL^3}{4n^3b\delta^3} = \frac{k_f}{n^3}$$

$$\frac{f_{max}}{f_b} = \frac{k_f}{n}\cdot\frac{n^3}{k_f} = n^2$$



$$\sigma_{max}^b = -\frac{M_g\left(\frac{L}{2}\right)\cdot\frac{n\delta}{2}}{J_y^b} = \frac{F\frac{L}{4}\cdot\frac{n\delta}{2}\cdot 12}{n^3b\delta^3} = \frac{3FL}{2n^2b\delta^2} = \frac{k_\sigma}{n^2}$$

$$\frac{\sigma_{max}}{\sigma_{max}^b} = \frac{k_\sigma}{n}\cdot\frac{n^2}{k_\sigma} = n$$



n=2