



Mehaničke karakteristike ziđa

$$f_b = \sigma_{sr} \cdot \delta \cdot a$$

$a = 1,0$ - sušen na zraku
 $a = 1,20$ - uronjen u vodu
 $a = 0,80$ - sušen u peći

$$f_k = K \cdot f_b^{0,7} \cdot f_m^{0,3}$$

$$f_k = 0,80 K \cdot f_b^{0,7} \cdot f_m^{0,3}$$

$$f_{vk} = f_{vk,0} + 0,4 \cdot \sigma_d$$

$$f_{vk} = 0,065 \cdot f_b$$

$$f_{vk} = 0,5 \cdot f_{vk,0} + 0,4 \cdot \sigma_d$$

$$f_{vk} = 0,045 \cdot f_b$$

$$\sigma_d = \frac{N_{Sd}}{t \cdot L_c}$$

Vitkost ziđa

$$h_{ef} = \rho_n \cdot h$$

$$l_{ukrute} > \frac{1}{5} h$$

$$t_{ukrute} > 30\% t$$

$$t_{ukrute} > 8,5 \text{ cm}$$

$$\rho_2 = 0,75 \text{ ili } 1,00$$

$$h \leq 3,5L \rightarrow \rho_3 = \frac{\rho_2}{1 + \left[\frac{\rho_2 \cdot h}{3 \cdot L} \right]^2}$$

$$h > 3,5L \rightarrow \rho_3 = \frac{1,5 \cdot L}{h}$$

$$L \geq 15 \cdot t \rightarrow \rho_2$$

$$h \leq 1,15L \rightarrow \rho_4 = \frac{\rho_2}{1 + \left[\frac{\rho_2 \cdot h}{L} \right]^2}$$

$$h > 1,15L \rightarrow \rho_4 = \frac{0,5 \cdot L}{h}$$

$$L \geq 30 \cdot t \rightarrow \rho_2$$

$$t_{ef} = \sqrt[3]{t_1^3 + t_2^3}$$

$$\lambda = \frac{h_{ef}}{t_{ef}}$$

Vertikalna nosivost ziđa

$$N_{Rd,i} = \frac{\Phi_i \cdot t \cdot L \cdot f_k}{\gamma_M} = \Phi_i \cdot t \cdot L \cdot f_d \quad N_{Rd,m} = \frac{\Phi_m \cdot t \cdot L \cdot f_k}{\gamma_M} = \Phi_m \cdot t \cdot L \cdot f_d \quad \Phi_m = A_1 \cdot e^{-\frac{u^2}{2}}$$

$$\Phi_i = 1 - 2 \cdot \frac{e_i}{t}$$

$$e_{mk} = e_m + e_k \geq 0,05 \cdot t$$

$$A_1 = 1 - 2 \cdot \frac{e_{mk}}{t}$$

$$e_i = \frac{M_{di}}{N_{di}} + e_{hi} + e_a \geq 0,05 \cdot t$$

$$e_m = \frac{M_{dm}}{N_{dm}} + e_{hm} + e_a$$

$$u = \frac{\lambda - 0,063}{0,73 - 1,17 \cdot \frac{e_{mk}}{t}}$$

$$e_a = \frac{h_{ef}}{450}$$

$$e_k = 0,002 \cdot \Phi_\infty \cdot \frac{h_{ef}}{t_{ef}} \cdot \sqrt{t \cdot e_m}$$

$$\lambda = \frac{h_{ef}}{t_{ef}} \sqrt{\frac{f_k}{E}}$$



Horizontalna nosivost zida

$$V_{Rd} = V_{Rd,1} + V_{Rd,2}$$

$$V_{Rd,1} = \frac{f_{vk} \cdot t \cdot L_c}{\gamma_M}$$

$$V_{Rd,2} = 0,25 \phi^2 \pi \cdot f_{yd} \cdot n \cdot m$$

$$L_c = 3 \cdot \left(\frac{L}{2} - \frac{M_{Sd}}{N_{Sd}} \right) \leq L$$

$$L_c = \left(\frac{L}{2} \right) \cdot \left(1 + \frac{L \cdot N_{Sd}}{6 \cdot M_{Sd}} \right) \leq L$$

$$V_{RHd} = C_r \cdot A_m \cdot \tau_{Rd}$$

$$C_r = 0,90 ; A_m = t \cdot L$$

$$\tau_{Rd} = \frac{f_t}{1,5 \cdot \gamma_M} \cdot \sqrt{1 + \gamma_M \cdot \frac{\sigma_d}{f_t}}$$

$$\sigma_d = \frac{N_{Sd}}{t \cdot L}$$

Dokaz na moment savijanja

$$M_{Rd} = \frac{\sigma_d \cdot t \cdot L^2}{2} \cdot \left(1 - \frac{\sigma_d}{f_d} \right)$$

$$\sigma_d = \frac{N_{Sd}}{t \cdot L}$$

$$\frac{N_{Sd}}{t \cdot L} < 0,3 \cdot f_d$$

$$z = d \cdot \left(1 - 0,5 \cdot \frac{A_s \cdot f_{yd}}{f_d \cdot t \cdot d} \right) \leq 0,95 \cdot d$$

$$d = L - \frac{d_c}{2}$$

$$M_{Rd} = \min \left\{ A_s \cdot f_{yd} \cdot z ; \alpha \cdot f_d \cdot t \cdot d^2 \right.$$

$$\alpha = 0,4 \rightarrow \text{skupina 1}$$

$$\alpha = 0,3 \rightarrow \text{skupina 2, 3 i 4}$$

$$\frac{N_{Sd}}{t \cdot L} \geq 0,3 \cdot f_d$$

$$z = \frac{M_{Sd} + N_{Sd} \cdot \left(\frac{L}{2} - \frac{d_c}{2} \right)}{N_{Sd} + A_s \cdot f_{yd}}$$

$$x_u = 2 \cdot (d - z)$$

$$d = L - \frac{d_c}{2}$$

$$F_d = \frac{M_{Sd}}{z} + \frac{N_{Sd}}{2}$$

$$F_{d,R} = x_u \cdot t \cdot f_d$$

Centar krutosti i mase

$$K = \frac{G \cdot A}{1,2 \cdot h \cdot \left[1 + \alpha \cdot \frac{G}{E} \cdot \left(\frac{h}{L} \right)^2 \right]} \approx \frac{G \cdot A}{1,2 \cdot h}$$

$$E = 1000 \cdot f_k ; G = 0,4E$$

$$k_k = 1 - \frac{t \cdot \sum L_i}{0,85 \cdot A}$$

$$y_{T,k} = \frac{\sum k_i \cdot y_i}{\sum k_i} \quad x_{T,k} = \frac{\sum k_i \cdot x_i}{\sum k_i}$$

$$x_{T,M} = \frac{\sum G_i \cdot x_i}{\sum G_i} \quad y_{T,M} = \frac{\sum G_i \cdot y_i}{\sum G_i}$$