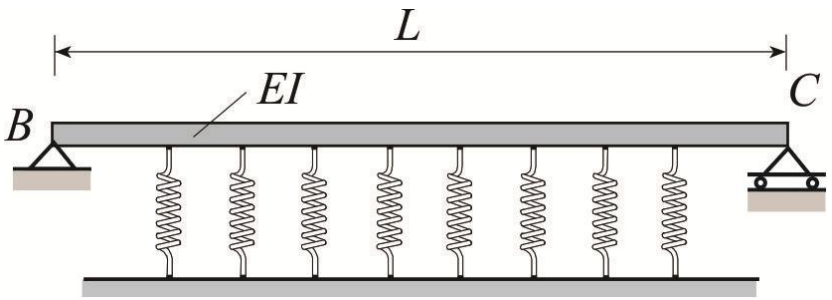
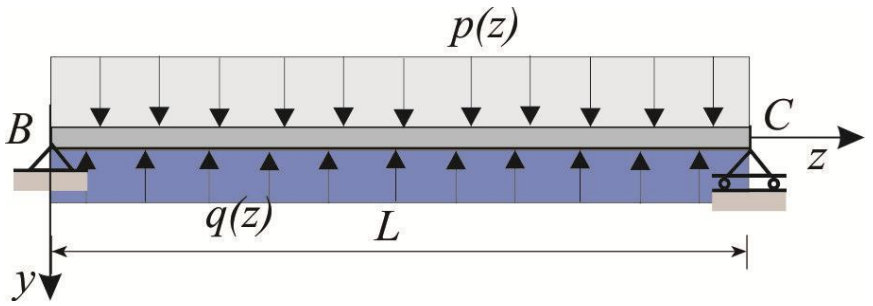
ODABRANA POGLAVLJA IZ OTPORNOSTI MATERIJALA

Greda na elastičnoj podlozi



Winklerov model tla

$$q(z) = kv(z)$$



$$EI\frac{d^4v(z)}{dz^4} + kv(z) = p(z)$$

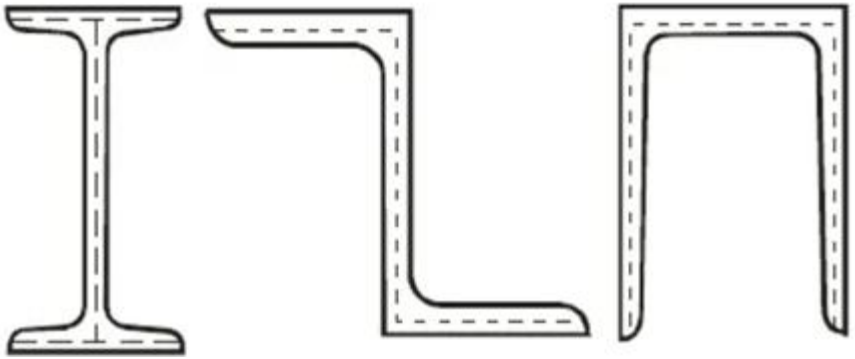
k-modul reakcije podloge (tla ili posteljice) u kN/m3

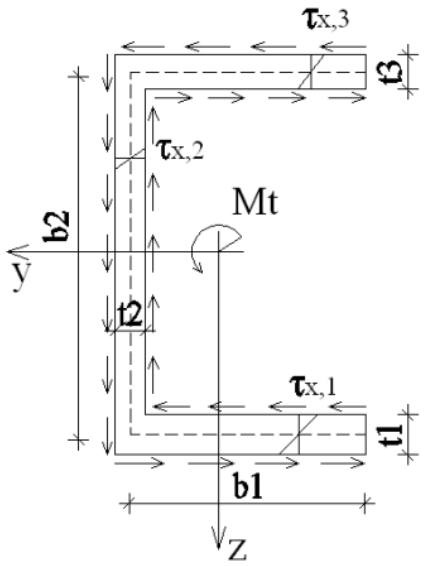
Centar smicanja

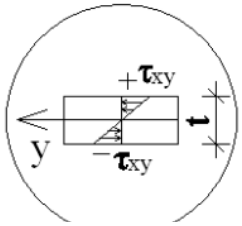
Ako u glavnoj ravni, u kojoj sile deluju nije ravan simetrije, takvo savijanje je praćeno torzijom grede. Da bismo sprečili torziju ravan opterećenja mora prolaziti kroz tačku koja se zove CENTAR SMICANJA.

Torzija tankozidnih čeličnih profila

Otvoreni profili



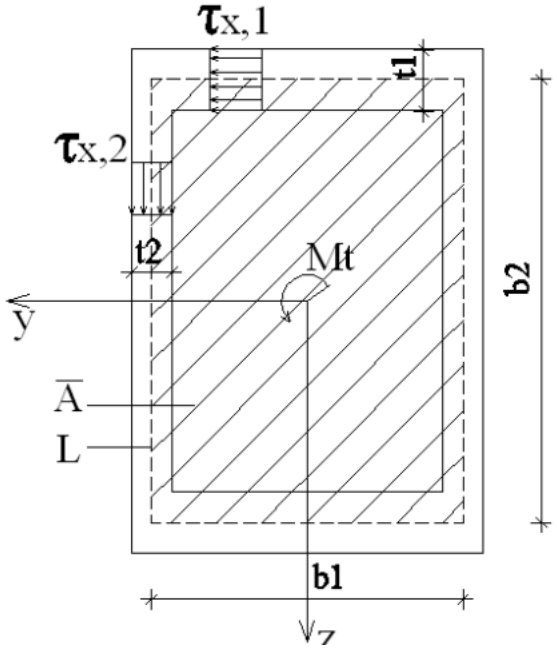


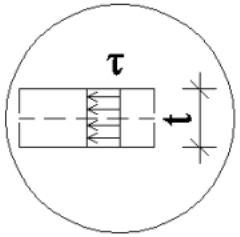


$$I_t = \frac{1}{3} \cdot \sum b_i \cdot t_i^3$$

$$\tau_{x,i\,max} = \frac{M_t}{I_t} \cdot t_i$$

Zatvoreni profili





q - tok smicanja

$$q = \tau_{x,i} \cdot \tau_i = const$$

$$M_t = 2 \cdot q \cdot \overline{A}$$

L - dužina srednje linije

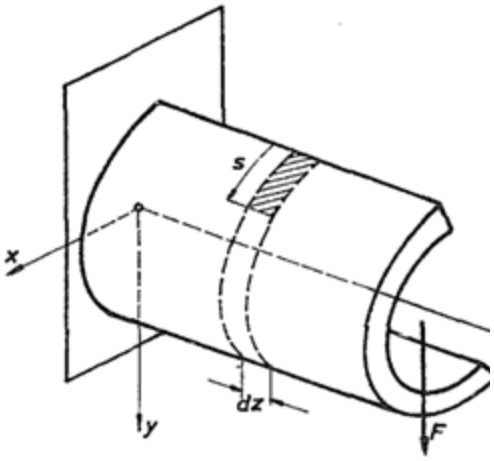
$\overline{A}$ - površina ograničena srednjom linijom

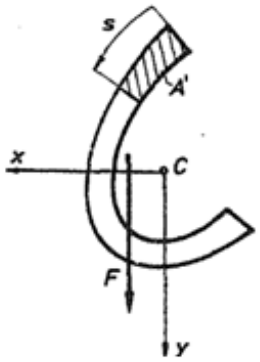
$$\overline{A} = b_1 \cdot b_2$$

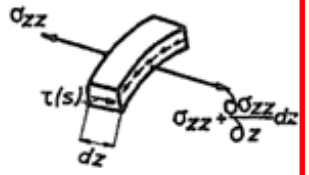
I Bredtova formula $\tau_{x,i} = \frac{q}{t_i} = \frac{M_t}{2 \cdot \overline{A} \cdot t_i} = \frac{M_t}{W_{t,i}}$ $W_{t,i} = 2 \cdot \overline{A} \cdot t_i$ otporni moment

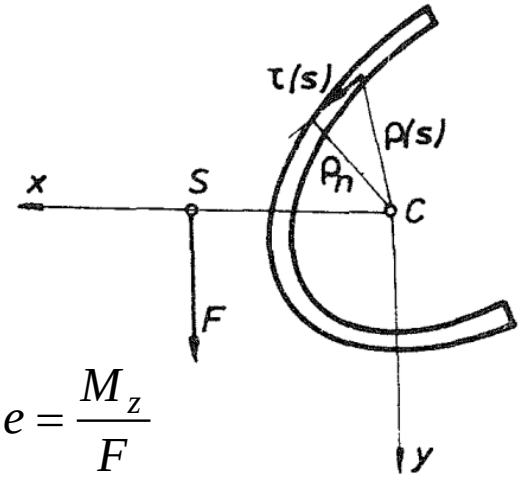
II Bredtova formula $I_t = \frac{4 \cdot \overline{A}^2}{\oint_L \frac{ds}{t}}$ torziona konstanta ; za $t = const$: $I_t = \frac{4 \cdot \overline{A}^2 \cdot t}{L}$

Savijanje tankozidnih čeličnih profila



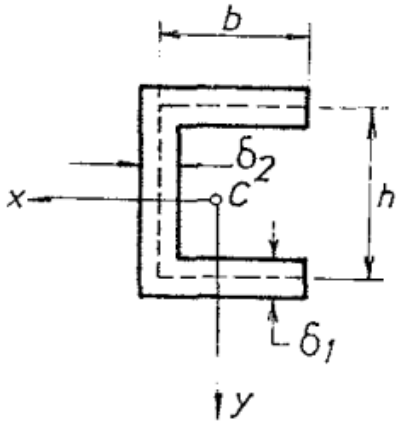


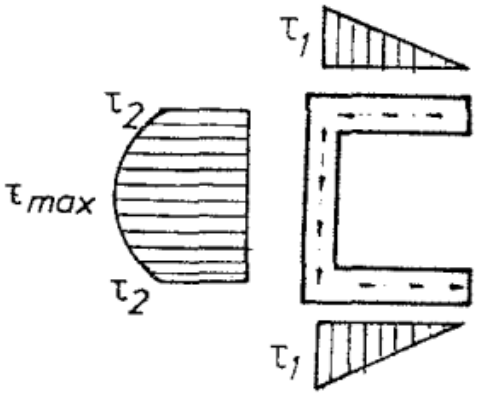


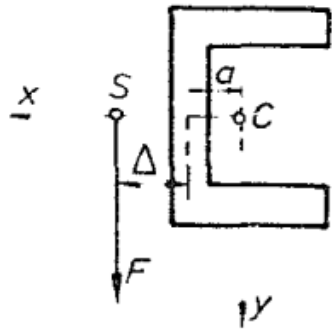


$$e = \frac{M_z}{F}$$

Tačka S kroz koju prolazi linija dejstva sile F naziva se centar savijanja (iii smicanja) datog profila



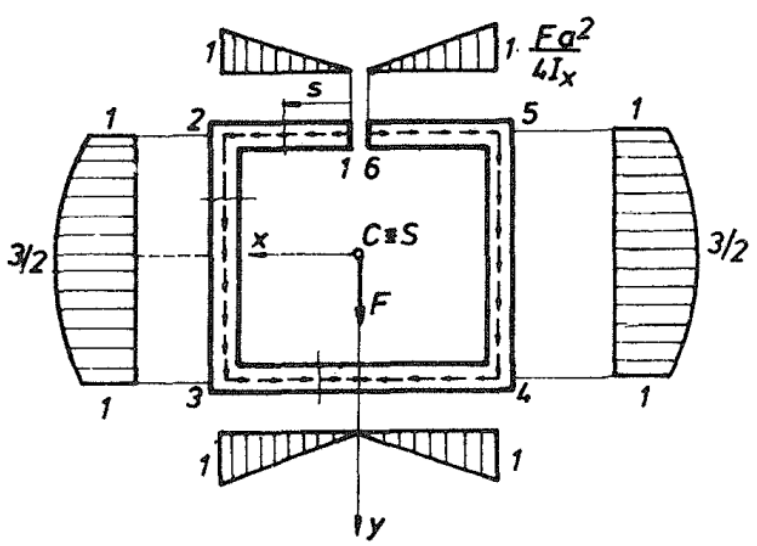


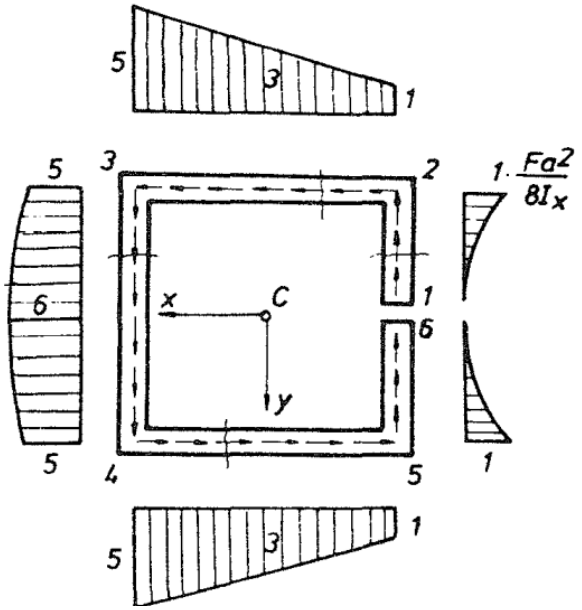


$$\tau_1 = \frac{bh}{2}\frac{F}{I_x}$$

$$\tau_2 = \frac{\delta_1}{\delta_2}\tau_1$$

$$\tau_{max} = \left(b\delta_1 + \frac{h\delta_2}{4}\right)\frac{Fh}{4\delta_2 I_x}$$





Dinamička opterećenja

Pod pojmom promenljivo opterećenje podrazumeva se vremenski promenljivo opterećenje tj. takvo opterećenje koje uzrokuje vremenski promenljivo naprezanje u materijalu.