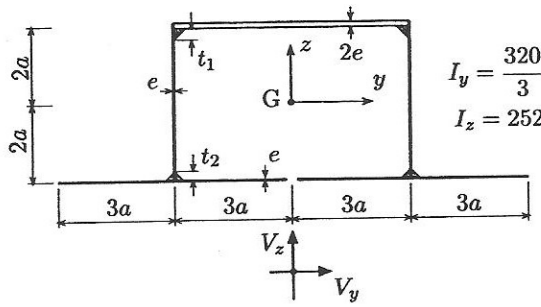
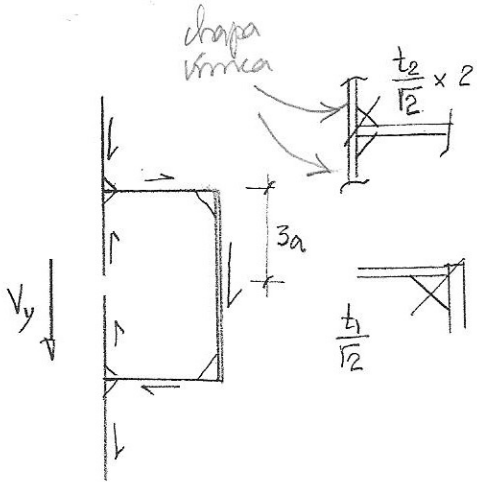


$I_y = \frac{320}{3} ea^3$

$I_z = 252 ea^3$

$q = \bar{\tau}_s \cdot (b_{res} \cdot \overbrace{\Delta}^{Ares})$

$$\boxed{\frac{V \bar{S}}{I} = \bar{\tau}_s \, b_{res}}$$



a) $V_y = 60\ kN$ $\qquad q = \frac{V_y \bar{S}_z}{I_z} = \bar{\tau}_s \, b_{res}$

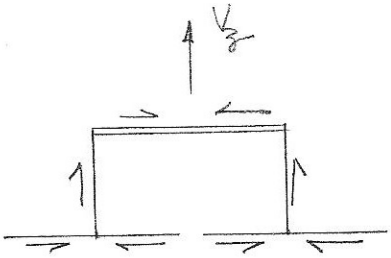
$225\ cm^3$

t_2: $\frac{60 \times (6ea \cdot 3a)}{252 ea^3} = 6 \times \frac{t_2}{\sqrt{2}} \times 2$ $\quad \left(q = \frac{4,29}{a} = 0,858 \frac{kN}{cm}\right)$

$$t_2 = \frac{60 \times 18 \times \sqrt{2}}{252 \times 6 \times 2a} = \underline{0,101\ cm}$$

t_1: $\frac{60 \times (18ea^2 + 12ea^2)}{252\, ea^3} = 6 \times \frac{t_1}{\sqrt{2}}$ $\quad \left(q = \frac{3,14}{a} = 1,429 \frac{kN}{cm}\right)$

$$t_1 = \frac{60 \times 30 \times \sqrt{2}}{252 \times 6 \times a} = \underline{0,337\ cm}$$



b) $V_z = 40\ kN$ $\qquad \frac{V_z \bar{S}_y}{I_y} = \bar{\tau}_s \, b_{res}$

$150\ cm^3$

t_2: $\frac{40 \times (6ea \times 2a)}{\frac{320}{3} ea^3} = 6 \times \frac{t_2}{\sqrt{2}} \times 2$ $\quad \left(q = \frac{4,50}{a} = 0,900 \frac{kN}{cm}\right)$

$$t_2 = \frac{40 \times 12 \times \sqrt{2}}{\frac{320}{3} \times 6 \times 2a} = \underline{0,106\ cm}$$

t_1: $\frac{40 \times (12ea^2)}{\frac{320}{3} ea^3} = 6 \times \frac{t_1}{\sqrt{2}}$ $\quad \left(q = \frac{4,50}{a} = 0,900 \frac{kN}{cm}\right)$

$$t_1 = 2 t_2 = \underline{0,212\ cm}$$

c) Tanto para os filetes de espessura t_1 quanto os de t_2, existem filetes em que os sentidos das tensões nos planos longitudinais se somam.

$t_1^{(c)} = 0,337 + 0,212 = \underline{0,549\ cm}$ $\qquad t_2^{(c)} = 0,101 + 0,106 = \underline{0,207\ cm}$