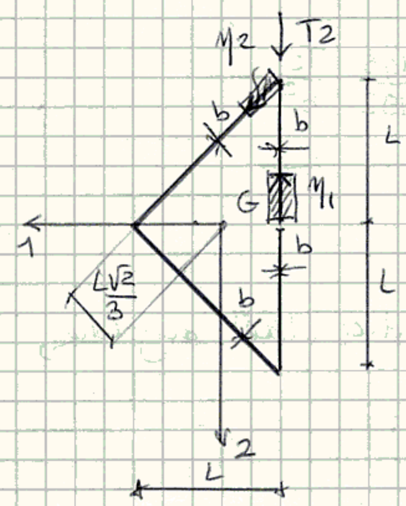
Preliminarmente allo studio di questo esercizio, si consiglia lo studio dell'esercizio 6.28 (Angolare simmetrico) a pagina 506 del libro di Nunziante, Gambarotta e Tralli, "Scienza delle Costruzioni" McGraw-Hill seconda edizione



$$I_1 = 2\left[\frac{1}{12}\, b (L\sqrt{2})^3 \left(\frac{\sqrt{2}}{2}\right)^2 + bL\sqrt{2}\left(\frac{L}{2}\right)^2\right] + \frac{1}{12}\, b (2L)^3$$

$$= 2\left[\frac{1}{12}\, bL^3\, 2\sqrt{2}\, \frac{1}{8} + bL^3 \frac{\sqrt{2}}{4}\right] + \frac{8}{12}\, bL^3$$

$$= bL^3\left[\frac{(1+3)}{6}\sqrt{2} + \frac{2}{3}\right] = bL^3\left(\frac{2}{3} + \frac{2}{3}\sqrt{2}\right)$$

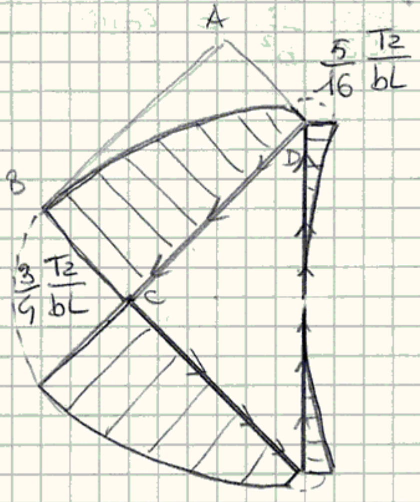
$$\sqrt{2} \cong \frac{7}{5}$$

$$= bL^3\left(1+\frac{7}{5}\right)\frac{2}{3} = \frac{2}{3}\cdot\frac{12}{5}\, bL^3 = \frac{8}{5}\, bL^3$$

$$\tau = -\frac{T_2}{I_1}\,\frac{S_1(A^*)}{b}$$

$$\tau_2(\eta_1) = +\frac{T_2}{8bL^3}\, 5\, \frac{1}{b}(b\eta_1)\left(+\frac{\eta_1}{2}\right) = \frac{5}{16}\,\frac{T_2\eta_1^2}{bL^3}$$

$$\tau_2(L) = \frac{5}{16}\,\frac{T_2}{bL}$$

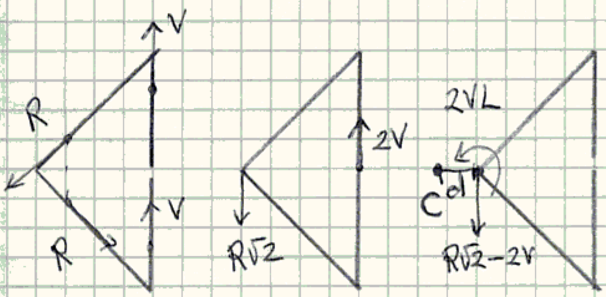


$$\tau(\eta_2) = \frac{5}{16}\,\frac{T_2}{bL} - \frac{T_2}{8bL^3}\, 5\, \frac{1}{b}(b\eta_2)\left[-L + \frac{\eta_2}{2}\frac{\sqrt{2}}{2}\right]$$

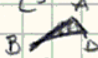
$$= \frac{5}{16}\,\frac{T_2}{bL} + \frac{5}{8}\,\frac{T_2}{bL^3}\,\eta_2\left(L - \eta_2\frac{\sqrt{2}}{4}\right)$$

$$\tau(L\sqrt{2}) = \frac{5}{16}\,\frac{T_2}{bL} + \frac{5}{8}\,\frac{T_2}{bL^3}\, L\sqrt{2}\,\frac{L}{2} = \frac{5}{16}\,\frac{T_2}{bL}(1+\sqrt{2})$$

$$\cong \frac{5}{16}\,\frac{12}{5}\,\frac{T_2}{bL} = \frac{3}{4}\,\frac{T_2}{bL}$$



$$V = b\int_0^L \tau_2(\eta_1)\, d\eta_1 = b\int_0^L \frac{5}{16}\,\frac{T_2}{b}\,\frac{\eta_1^2}{L^3}\, d\eta_1 = \frac{5}{48}\, T_2$$



area del triangolo parabolico

$$R = L\sqrt{2}\,\frac{3}{4}\,\frac{T_2}{bL}\cdot b - \frac{1}{3}\, L\sqrt{2}\left(\frac{3}{4}\,\frac{T_2}{bL} - \frac{5}{16}\,\frac{T_2}{bL}\right)\cdot b$$

$$= T_2\left[\frac{3}{4}\sqrt{2} - \frac{1}{3}\cdot\frac{7}{16}\sqrt{2}\right] \cong T_2\left[\frac{3}{4} - \frac{7}{48}\right]\frac{7}{5} = \frac{203}{240}\, T_2$$

$$R\frac{\sqrt{2}}{\cancel{2}}\cdot\cancel{2} - 2V = T_2\,\frac{203}{240}\cdot\frac{7}{5} - \frac{10}{48}\, T_2 = \frac{1171}{1200} \cong T_2$$

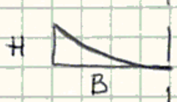
$$T_2 \cdot d = 2V\cdot L$$

$$\cancel{T_2}\cdot d = \frac{10}{48}\,\cancel{T_2}\, L$$

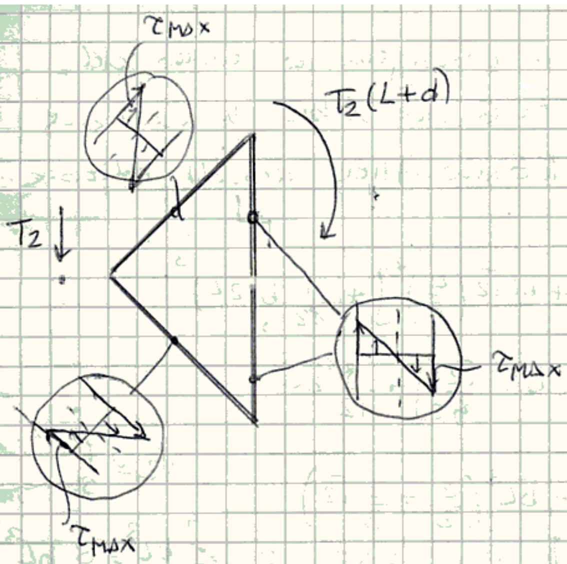
$$d = \frac{5}{24}\, L$$

NB: asse della parabola!

Area del triangolo parabolico:



$$A = \frac{1}{3}\, BH.$$



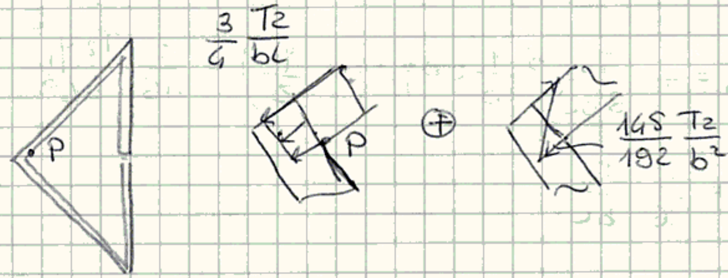
$$\tau_{MAX} = \frac{3\, T_2 (L+d)\, \cancel{b}}{b^{\cancel{3}}(2L + 2L\sqrt{2})}$$

$\sqrt{2} \simeq \frac{7}{5}$

$$\cong \frac{3 T_2 \, \frac{29}{24} \cancel{L}}{b^2 \, 2\cancel{L} \, \frac{12}{5}} = \frac{15 \cdot 29}{24 \cdot 24} \frac{T_2}{b^2} = \frac{145}{192} \frac{T_2}{b^2}$$

La corda più sollecitata è quella baricentrica nel vertice dell'angolare, il punto più sollecitato è all'interno.

Verifica:



$$\frac{3}{4} \frac{T_2}{bL} + \frac{145}{192} \frac{T_2}{b^2} \leq \tau_{AMM}$$