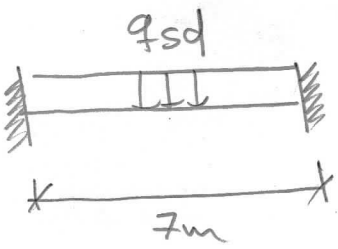
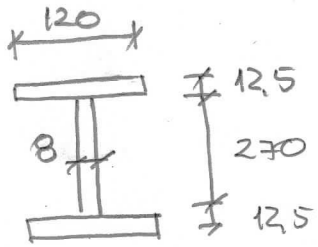
B2T5MA0529 — 0,6 PONTOS

- AÇO MR250
- PERFIL SOLDADO
- VIGA CONTIDA SOMENTE NOS APOIOS;





Q01) Cb Q02) qsd p/ FLT Q03) CLASSIFICAÇÃO P/ FLT

- PROP. GEOMÉTRICAS DA SEÇÃO

$I_x = 7301,6\ cm^4$ $I_y = 361,15\ cm^4$ $J = 20,233\ cm^4$

$W_x = 495,02\ cm^3$ $Z_x = 569,55\ cm^3$ $A_g = 51,6\ cm^2$

$$r_y = \sqrt{\frac{361,15}{51,6}} = 2,6456\ cm$$

- FLT: $\lambda_{FLT} = L_b/r_y = 700/2,6456\ cm = 264,59$

$$\lambda_{PFLT} = 1,76\sqrt{\frac{20000}{25}} = 49,78$$

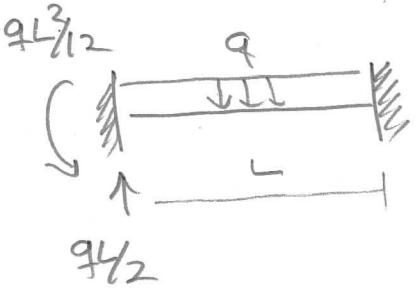
$$C_w = I_y(d-t_f)^2/4 = 361,15(27+1,25)^2/4 = 72055,1\ cm^6$$

$$\beta_1 = \frac{0,7 f_y W_x}{EJ} = \frac{0,7\times25\times495,02}{20000\times20,233} = 0,02141\ /cm$$

$$\lambda_{rFLT} = \frac{1,38\sqrt{361,15\times20,233}}{2,6456\times20,233\times0,02141}\sqrt{1+\sqrt{1+\frac{27\times72055,1\times0,02141^2}{361,15}}}$$

$\lambda_{rFLT} = 174,15$ VIGA LONGA Q03) C

FATOR Cb



$$M(x) = -qL^2/12 + qL/2\,x - qx^2/2$$

$q = 1 \quad L = 7$

$M(x) = -49/12 + 7/2\,x - 1/2\,x^2$

POR SIMETRIA $M_A = M_C$;

$M_A = M_C = (1/4\,7) = -49/12 + 7/2 \cdot 7/4 - 1/2\,(7/4)^2 = 49/96$

$M_B\,(1/2\,7) = -49/12 + 7/2 \cdot 7/2 - 1/2\,(7/2)^2 = 49/24$

$M_{máx} = |-49/12| = 49/12$

Q01)

$$C_b = \frac{12{,}5 \times 49/12}{2{,}5 \times 49/12 + 3 \times 49/96 + 4 \times 49/24 + 3 \times 49/96} = \boxed{2{,}38095}$$

$$M_{Rd_{FLT}} = \frac{2{,}38095}{1{,}1}\,\pi^2\,\frac{20000 \times 361{,}15}{700^2}\sqrt{\frac{72055{,}1}{361{,}15}\left(1 + 0{,}039 \times \frac{20{,}233 \times 700^2}{72055{,}1}\right)}$$

$M_{Rd_{FLT}} = 11222\ kN.cm = \underline{112{,}22\ kN.m}$ //

$\frac{M_{Rd}}{flan} = \frac{569{,}55 \times 25}{1{,}1} = 12944\ kN.cm = 129{,}44\ kN.m$ ok

$M_{Rd\,lim} = \frac{1{,}5 \times 495{,}02 \times 25}{1{,}1} = 16876\ kN.cm = 168{,}76\ kN.m$

$M_{sd\,máx} = q \times 7^2/12 \qquad M_{Rd} = 112{,}22\ kN.m$

Igualando: $q_{sd} = \frac{12}{72} \times 112{,}22 = \boxed{27{,}482\ kN/m}$ //

Q02)