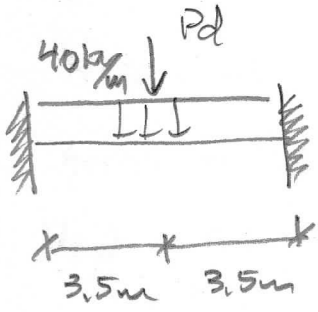
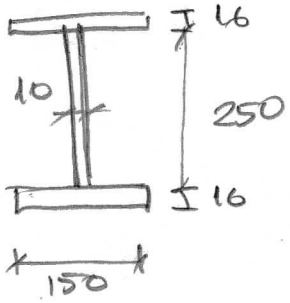
B2T5MA0522 — 0,5 PONTOS





- VIGA CONTIDA LATERALMENTE;
- AÇO AR315
- CARGAS PERM. ($\gamma_g = 1,4$)
- VIGA DE PISO;
- PERFIL SOLDADO;
- MÁXIMO Psd PARA AS VERIFICAÇÕES DE:
  - Q01) MOM.
  - Q02) CORTE
  - Q03) FLECHA

- VERIF. DE MOMENTOS:

FLA: $\lambda_{FLA} = 250/10 = 25$

$\lambda_{PFLA} = 3,76\sqrt{\frac{20000}{31,5}} = 94,743$ } ALMA COMPACTA P/ FLEXÃO

FLM: $\lambda_{FLM} = 0,5 \times 150/16 = 4,6875$

$\lambda_{PFLM} = 0,38\sqrt{\frac{20000}{31,5}} = 9,575$ } MESA COMPACTA

$M_{rd} = Z_x \cdot f_y/\gamma_{a1}$

$Z_x = 794,65\ cm^3$
$W_x = 695,25\ cm^3$
$I_x = 9803,3\ cm^4$

$M_{rd} = 794,65 \times 31,5/1,1 = 22756\ kNcm = \underline{227,56\ kNm}$

$M_{sd} = \frac{qL^2}{12} + \frac{PL}{8} = \frac{40 \times 7^2}{12} + P\frac{7}{8} = 0,875P_{sd} + 163,33$

IGUALANDO: $M_{sd} = M_{rd}$

$0,875P_{sd} + 163,33 = 227,56$

Q01

$P_{sd} = \frac{227,56 - 163,33}{0,875} = \underline{73,406\ kN}$

- VERIF. DE CORTE:

$\lambda_{cis} = 25 \qquad \lambda_{pcis} = 1{,}10\sqrt{\dfrac{5 \times 20000}{31{,}5}} = 61{,}978$

ALMA COMPACTA P/ CIS.

$$V_{Rd} = \frac{0{,}60 \times (25 + 2 \times 1{,}6) \times 1{,}0 \times 31{,}5}{1{,}1} = 484{,}53 \text{ kN}$$

$$V_{sd} = \frac{qL}{2} + \frac{P}{2} = \frac{40}{2} \times 7 + \frac{P_{sd}}{2} = 140 + 0{,}5 P_{sd}$$

IGUALANDO $V_{sd} = V_{Rd}$: Q02

$140 + 0{,}5\, P_{sd} = 484{,}53 \qquad P_{sd} = \dfrac{484{,}53 - 140}{0{,}5} = \underline{689{,}06 \text{ kN}}$ //

- VERIF. DE FLECHA:

$\delta_{lim} = L/350 = 700\text{cm}/350 = 2\text{cm}$

$$\delta_{cal} = \frac{1}{384}\frac{q_{ELS} L^4}{EI} + \frac{1}{192}\frac{P_{ELS} L^3}{EI} \qquad q_{ELS} = \frac{40}{1{,}4} = 28{,}571 \text{ kN/m} = 0{,}28571 \frac{\text{kN}}{\text{cm}}$$

$$\delta_{calc} = \frac{1}{384}\frac{0{,}28571 \times 700^4}{196{,}07 \times 10^6} + \frac{1}{192}\frac{P_{ELS}\, 700^3}{196{,}07 \times 10^6}$$

$EI = 20000 \text{ kN/cm}^2 \times 9803{,}3 \text{ cm}^4 = 196{,}07 \times 10^6 \text{ kN cm}^2$

$\delta_{calc} = 0{,}91111 + 9{,}1113 \times 10^{-3} P_{ELS}$

IGUALANDO $\delta_{calc} = \delta_{lim}$

$0{,}91111 + 9{,}1113 \times 10^{-3} P_{ELS} = 2$ Q03

$P_{ELS} = 119{,}5 \text{ kN} \rightsquigarrow P_{ELU} = 1{,}4 \times 119{,}5 = \underline{167{,}3 \text{ kN}}$ //