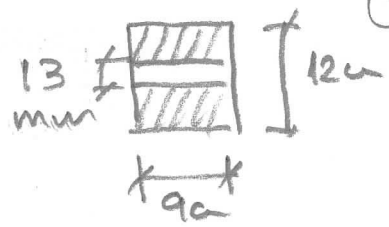
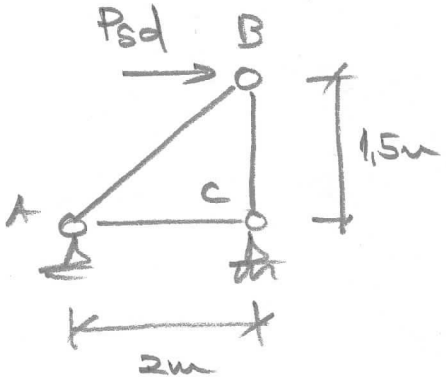
BITEMA0909B

SEÇÃO TRANSVERSAL DAS BARRAS :





→ MADEIRA DICOTILEDÔNEA C30
CARGAS PERMANENTES APENAS
PEÇAS SERRADAS DE 2ª CATEGORIA
AMBIENTE CLASSE 3 DE UMIDADE

Q01) f_{tod} [kN/cm²] Q02) f_{cod} [kN/cm²]

Q03) MÁXIMO Psd P/ QUE AB AINDA VERIFIQUE À TRAÇÃO; [kN]

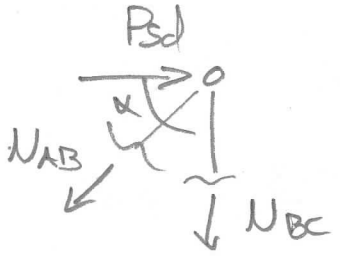
Q04) RELAÇÃO σ_{sd}/σ_{rd} P/ PEÇA BC EM COMPRESSÃO COM Psd CALCULADO EM Q03; [ADIM.]

$K_{mod} = 0{,}6 \times 0{,}8 \times 0{,}8 = 0{,}384$

$f_{cod} = 0{,}384 \times 30/1{,}4 = 8{,}2286\ MPa = \underline{0{,}82286\ kN/cm^2}$ Q02

$f_{tod} = 0{,}384 \times 30/0{,}77/1{,}8 = 8{,}3117\ MPa = \underline{0{,}83117\ kN/cm^2}$ Q01

$E_{cod} = 0{,}384 \times 14500 = 5568\ MPa = \underline{556{,}8\ kN/cm^2}$



$\cos\alpha = 0{,}8 \quad \operatorname{sen}\alpha = 0{,}6$

$\Sigma F_H = 0 \rightarrow (+) \qquad P_{sd} - N_{AB}\cos\alpha = 0$

$N_{AB} = P_{sd}/\cos\alpha$

$\Sigma F_V = 0 \uparrow (+) \quad -N_{AB}\operatorname{sen}\alpha - N_{BC} = 0$

$N_{BC} = -N_{AB}\operatorname{sen}\alpha = -P_{sd}\operatorname{sen}\alpha/\cos\alpha$

Logo: $N_{AB} = P_{sd}/0{,}8 = 1{,}25\,P_{sd}$

$N_{BC} = -P_{sd}\,0{,}6/0{,}8 = -0{,}75\,P_{sd}$

$P_{sd} = N_{AB}/1{,}25$

$A_{gd} = 9cm \times 12cm = 108 cm^2$ $\quad \frac{11,7}{108} = 0,10833 \geq 0,1$

$A_{FURO} = 1,3cm \times 9cm = 11,7 cm^2$

$A_{ÚTIL} = 108 - 11,7 = 96,3 cm^2$

$N_{AB\,Rd} = 96,3 cm^2 \times 0,83117 kN/cm^2 = 80,042 kN$

$P_{sd} = N_{AB\,Rd}/1,25 = 80,042kN/1,25 = \underline{64,034 kN}$ Q03

→ BARRA BC:

$I_x = 9 \times 12^3/12 = 1296 cm^4$ $\quad I_y = 729 cm^4$

$r_x = \sqrt{\frac{1296}{108}} = 3,4641 cm$ $\quad r_y = \sqrt{729/108} = 2,5981 cm$

$L_{ox} = L_{oy} = L_o = 150 cm$

$\lambda_x = 150/3,4641 = 43,301$ $\quad \lambda_y = 150/2,5981 = \underline{57,734}$

ESBELTEZ DO EIXO Y:

$e_{a\,y} = L_o/300 = 150/300 = 0,5cm \geq h/30 = 9/30 = 0,30cm$

$e_{i\,y} = 0,30cm$ $\quad e_{1\,y} = 0,5 + 0,3 = 0,8cm$

$F_{E_y} = \pi^2 \times 556,8 kN/cm^2 \times 729 cm^4/(150cm)^2 = 178,05 kN$

$N_{sd\,BC} = 0,75\,P_{sd} = 0,75 \times 64,034 kN = 48,026 kN$

$M_{sd} = 48,026kN \times 0,8cm \left(178,05/(178,05 - 48,026)\right) = 52,612 kN.cm$

$\sigma N_{sd} = 48,026kN/108cm^2 = 0,44469 kN/cm^2$

$W_y = 12 \times 9^2/6 = 162 cm^3$

$\sigma M_{sd} = \frac{52,612 kN.cm}{162 cm^3} = 0,32477 kN/cm^2$

$\frac{\sigma_{sd}}{\sigma_{Rd}} = \frac{0,44469 + 0,32477}{0,82286} = \underline{0,93510}$ Q04