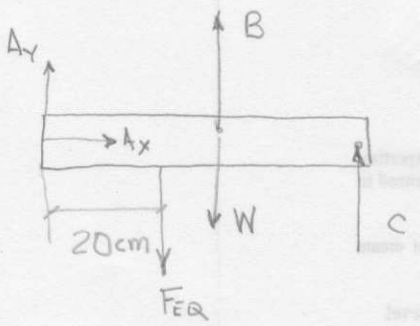
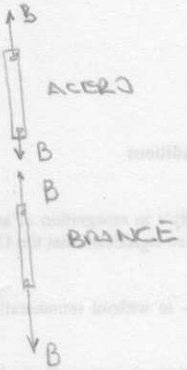
* BARRAS DE ACERO, BRONCE Y ALUMINIO SON IDEALES



DCL (1)



DCL(2)

I → DCL (1)

$\rightarrow +\sum F_x^E = 0, \quad A_x = 0$

$+\uparrow \sum F_y^E = 0, \quad A_Y + B + C = F_{EQ} + W$

$F_{EQ} = 45 \cdot \frac{60}{2} = 45 \cdot 30 \text{ Kgf}$

$F_{EQ} = 1350 \cdot 9.8 = 13230 \text{ N}$

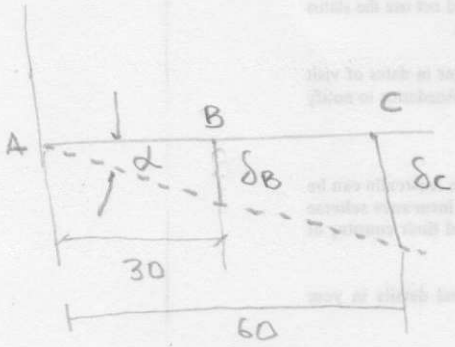
$W = 150 \cdot 9.8 = 1470 \text{ N}$; $A_Y + B + C = 14700$ .. ①

$+\circlearrowleft \sum M_A^E = 0, \quad -30B - 60C + 20F_{EQ} + 30W = 0$

$3B + 6C = -30870$ .. ②

→ PROBLEMA ESTÁTICAMENTE INDETERMINADO

II ECUACIONES DE COMPATIBILIDAD



$\frac{\delta_B}{30} = \frac{\delta_C}{60} \Rightarrow \boxed{\delta_C = 2\delta_B}$ .. ③

$\delta_B = \alpha_{ACERO} \Delta T L_{O_{ACERO}} + \alpha_{BRONCE} \Delta T \cdot L_{O_{BRONCE}} + \frac{B L_{O_{ACERO}}}{(A \cdot E)_{ACERO}} + \frac{B \cdot L_{O_{BRONCE}}}{(A \cdot E)_{BRONCE}}$

$\delta_B = (1.2 \cdot 10^{-5} + 1.9 \cdot 10^{-5}) 30 \cdot (0.15) + \left[\frac{0.1}{2 \cdot 10^{11}} + \frac{1}{10^{11}} \right] \frac{B(0.15)}{2 \cdot 10^{-4}}$

$\delta_B = 1.395 \cdot 10^{-4} + 1.125 \cdot 10^{-8} B$ .. ②

$\delta_C = \frac{C L_{O_{ALUMINIO}}}{(AE)_{ALUMINIO}} = \frac{0.3C}{(2 \cdot 10^{-1}) 7.5 \cdot 10^{10}} = 2 \cdot 10^{-8} C$ .. ⑤

②, ⑤ → ③ : $2 \cdot 10^{-8} C = 2(1.395 \cdot 10^{-4} + 1.125 \cdot 10^{-8} B)$

$10^{-8} C - 1.125 \cdot 10^{-8} B = 1.395 \cdot 10^{-4}$

$C - 1.125 B = 1.395 \cdot 10^{4}$ .. ④

$\begin{cases} 3B + 6C = -30870 \\ -1.125B + C = 1.395 \cdot 10^4 \end{cases}$ $B = -11750.77 \text{ N}$, $C = 730.38 \text{ N}$ $\Rightarrow$

$\boxed{A_Y = 14700 - B - C}$

$\boxed{A_Y = 25720.4 \text{ N}}$

$|\sigma_{ACERO}| = \frac{|B|}{A_{ACERO}} = |\sigma_{BRONCE}| = \frac{|B|}{A_{BRONCE}} = 58.75 \text{ MPa} > \sigma_{ADM}$ (FALLAN)

$\sigma_{ALUMINIO} = \frac{C}{A_{ALUMINIO}} = 3.65 \text{ MPa}$; ESFUERZOS MENORES A σ_{ADM} $\Rightarrow$ NO SUCEDE FALLA PARA BARRA DE Al.