



$$\sum F_y = 0$$

$$F_{AB} + F_{DC} - F = 0$$

$$F_{AB} + F_{DC} - 20000 = 0$$

$$F_{AB} = 20000 - F_{DC} \quad (1)$$

$$\sum M_A = 0$$

$$- F \cdot 0,56 + F_{DC} \cdot 1,41 = 0$$

$$20000 \cdot 0,56 + F_{DC} \cdot 1,41$$

$$1) \quad \boxed{F_{DC} = 7,943 \text{ kN}}$$

em (1)

$$F_{AB} = 20000 - F_{DC}$$

$$2) \quad \boxed{F_{AB} = 12,057 \text{ kN}}$$

Deslocamento:

$$\delta_{CD} = \frac{7,943 \cdot 10^3 \cdot 2000}{350 \cdot 10^3 \cdot 45} = 1,009 \text{ mm}$$

$$\delta_{AB} = \frac{12,06 \cdot 10^3 \cdot 2000}{350 \cdot 10^3 \cdot 60} = 1,148 \text{ mm}$$

$$\frac{\delta_c - \delta_{CD}}{b} = \frac{\delta_{AB} - \delta_{CD}}{a+b}$$

$$(\delta_c - 1,009) \cdot (0,56 + 0,85) = (1,148 - 1,009) \cdot (0,85)$$

$$\delta_E - 1,009 = \frac{0,1185}{1,41}$$

$$\delta_E = 0,08379 + 1,009$$

$$3) \boxed{\delta_E = 1,093 \text{ mm}}$$

4)

$$\delta_{EF} = \frac{20000 \cdot 1500}{350 \cdot 10^3 \cdot 75}$$

$$\delta_{EF} = 1,143 \text{ mm}$$

$$\delta_F = \delta_{EF} + \delta_E$$

$$\delta_F = 1,143 + 1,093$$

$$\boxed{\delta_F = 2,236 \text{ mm}}$$