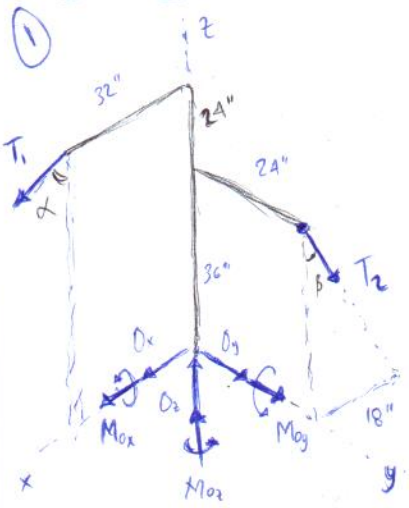


FSP3 - MCR - 23022

①



• Equações vectoriais de equilíbrio:

$$\sum \vec{F} = \vec{0}; \quad \vec{T}_1 + \vec{T}_2 + \vec{R}_0 = \vec{0}$$

$$\sum \vec{M}_0 = \vec{0}; \quad \vec{M}_0^{T_1} + \vec{M}_0^{T_2} + \vec{M}_0 = \vec{0}$$

$$\beta = \tan^{-1}\left(\frac{18}{36}\right) = 26.57^\circ$$

$$\alpha = \tan^{-1}\left(\frac{36}{60}\right) = 30.96^\circ$$

• De la sumatoria de fuerzas

$$\vec{R}_0 = (0_x \hat{i} + 0_y \hat{j} + 0_z \hat{k}) \text{ lb}$$

$$\vec{T}_1 = (-\sin \alpha \hat{j} - \cos \alpha \hat{k}) T_1$$

$$\vec{T}_1 = (-92.6 \hat{j} - 154.4 \hat{k}) \text{ lb}$$

$$\vec{T}_2 = (-\sin \beta \hat{i} - \cos \beta \hat{k}) T_2$$

$$\vec{T}_2 = (-53.7 \hat{i} - 107.3 \hat{k}) \text{ lb}$$

$$\vec{M}_0 = (M_{0x} \hat{i} + M_{0y} \hat{j} + M_{0z} \hat{k}) \text{ lb.in}$$

• Calculando numericos

Comp. $\hat{i} \rightarrow$	$0_x - 53.7 = 0 \quad \dots (i)$	\rightarrow	$0_x = 53.7 \text{ lb}$
Comp. $\hat{j} \rightarrow$	$0_y - 92.6 = 0 \quad \dots (ii)$	\rightarrow	$0_y = 92.6 \text{ lb}$
Comp. $\hat{k} \rightarrow$	$0_z - 154.4 - 107.3 = 0 \quad \dots (iii)$	\rightarrow	$0_z = 261.7 \text{ lb}$

$$\vec{M}_0^{T_1} = \vec{r}_{0c} \times \vec{T}_1 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 32 & 0 & 60 \\ 0 & -92.6 & -154.4 \end{vmatrix} = (5556 \hat{i} + 4941 \hat{j} + 2963 \hat{k}) \text{ lb.in}$$

$$\vec{M}_0^{T_2} = \vec{r}_{0p} \times \vec{T}_2 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 24 & 36 \\ -53.7 & 0 & -107.3 \end{vmatrix} = (-2575 \hat{i} - 1933 \hat{j} + 1289 \hat{k}) \text{ lb.in}$$

• Eqs. escalares:

Comp. $\hat{i} \rightarrow$	$M_{0x} + 5556 - 2575 = 0 \quad \dots (iv)$	\rightarrow	$M_{0x} = -2981 \text{ lb.in}$
Comp. $\hat{j} \rightarrow$	$M_{0y} + 4941 - 1933 = 0 \quad \dots (v)$	\rightarrow	$M_{0y} = -3008 \text{ lb.in}$
Comp. $\hat{k} \rightarrow$	$M_{0z} - 2963 + 1289 = 0 \quad \dots (vi)$	\rightarrow	$M_{0z} = 1674 \text{ lb.in}$