

Resistência dos Materiais - Aula 1

Exercício 1

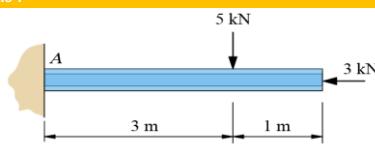
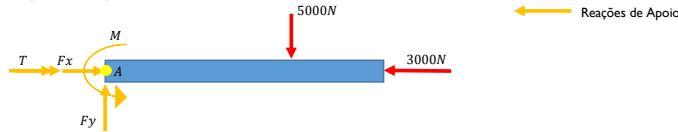


Diagrama de Corpo Livre:



Equilíbrio de Forças:

$$\begin{aligned}\sum F_h &= 0 \quad +\rightarrow \\ F_x - 3000 &= 0 \\ F_x &= 3000N\end{aligned}$$

$$\begin{aligned}\sum F_v &= 0 \quad +\uparrow \\ +F_y - 5000 &= 0 \\ F_y &= 5000N\end{aligned}$$

Equilíbrio de Momentos e Torques:

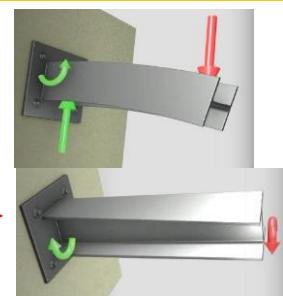
$$\begin{aligned}\sum M_A &= 0 \quad +\circ \\ +M - 5000 * 3 &= 0 \\ M &= 15000Nm\end{aligned}$$

$$\begin{aligned}\sum T &= 0 \quad +\rightarrow \\ +T = 0 &= 0Nm \\ T &= 0\end{aligned}$$

Flexão



Torção



Exercício 2

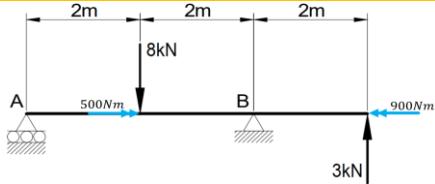
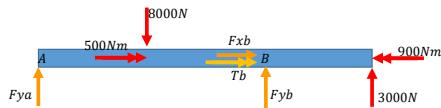


Diagrama de Corpo Livre:



Equilíbrio de Forças:

$$\begin{aligned}\sum F_h &= 0 \quad +\rightarrow \\ +F_{xb} &= 0 \\ F_{xb} &= 0N\end{aligned}$$

$$\begin{aligned}\sum F_v &= 0 \quad +\uparrow \\ +F_{ya} - 8000 + F_{yb} + 3000 &= 0 \\ F_{ya} + F_{yb} &= 5000N \quad \text{Equação 1}\end{aligned}$$

Equilíbrio de Momentos:

$$\begin{aligned}\sum M_B &= 0 \quad +\circ \\ +F_{ya} * 4 - 8000 * 2 - 3000 * 2 &= 0 \\ F_{ya} &= 5500N\end{aligned}$$

Substituir F_{ya} na Equação 1:
 $5500 + F_{yb} = 5000$
 $F_{yb} = -500N$

Equilíbrio de Torques:

$$\begin{aligned}\sum T &= 0 \quad +\rightarrow \\ 500 + T_b - 900 &= 0 \\ T_b &= 400Nm\end{aligned}$$

Exercício 3

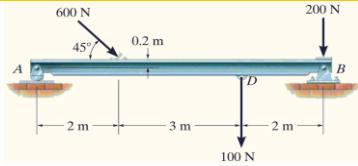
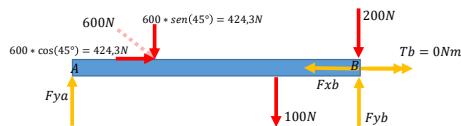


Diagrama de Corpo Livre:



Equilíbrio de Forças:

$$\begin{aligned}\sum F_h &= 0 \quad +\rightarrow \\ +424,3 - F_{xb} &= 0 \\ F_{xb} &= 424,3N\end{aligned}$$

$$\begin{aligned}\sum F_v &= 0 \quad +\uparrow \\ +F_{ya} - 424,3 - 100 - 200 + F_{yb} &= 0 \\ F_{ya} + F_{yb} &= 724,3N \quad \text{Equação 1}\end{aligned}$$

Equilíbrio de Momentos:

$$\begin{aligned}\sum M_B &= 0 \quad +\circ \\ +F_{ya} * 7 - 424,3 * 5 + 424,3 * 0,2 - 100 * 2 &= 0 \\ F_{ya} &= 319,5N\end{aligned}$$

Substituir F_{ya} na Equação 1:
 $319,5 + F_{yb} = 724,3$
 $F_{yb} = 403,8N$