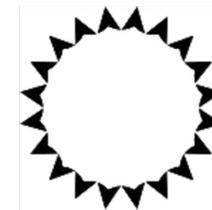




PEF2603
Estruturas na Arquitetura III
- Sistemas Reticulados e Laminares



Pórticos – Introdução

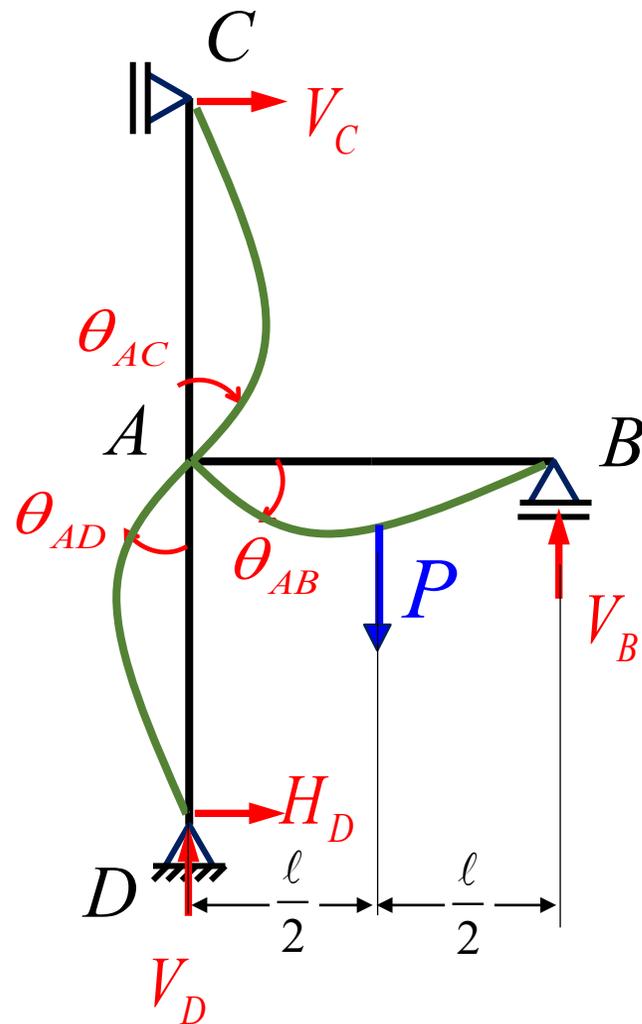
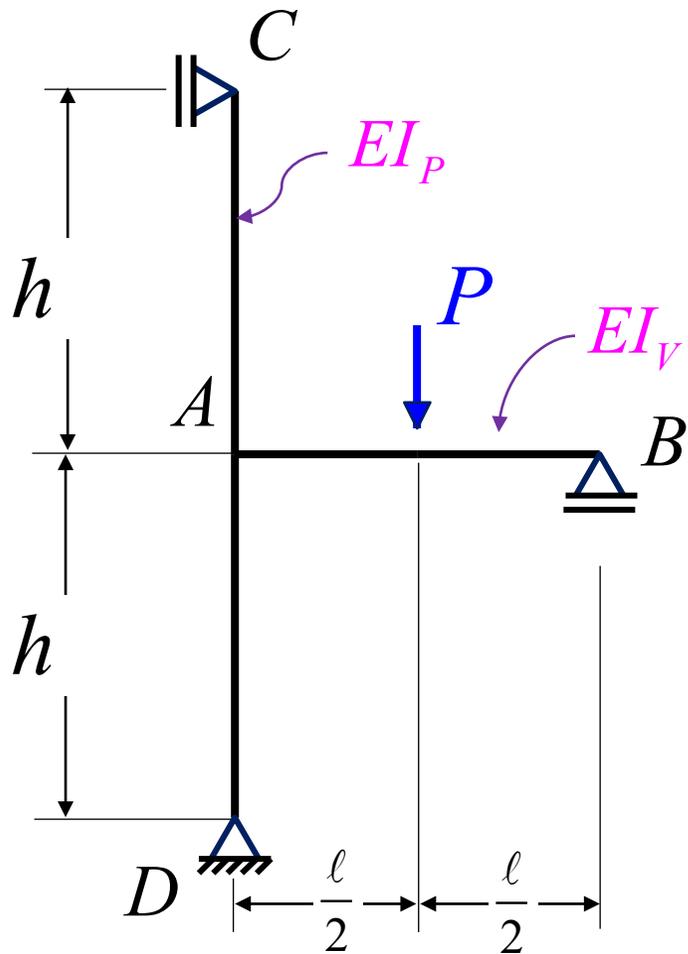
(Aula 3 – 10/04/2023)

Professores

Ruy Marcelo Pauletti, Leila Meneghetti Valverde, Luís A. G. Bitencourt Jr.

Convidado: Arq. Márcio Sequeira

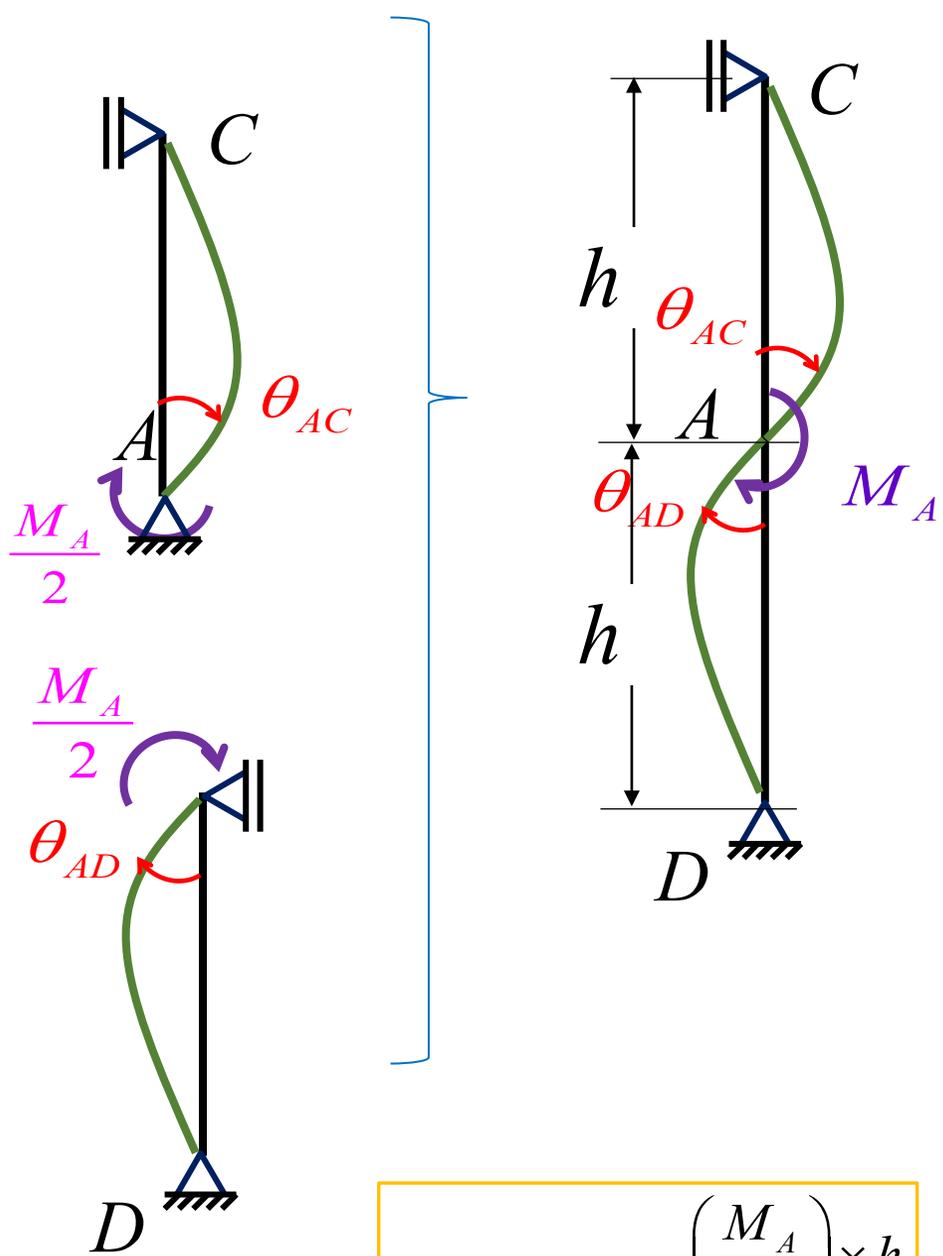
Exercício: Determinar as reações de apoio e os esforços solicitantes na estrutura abaixo.



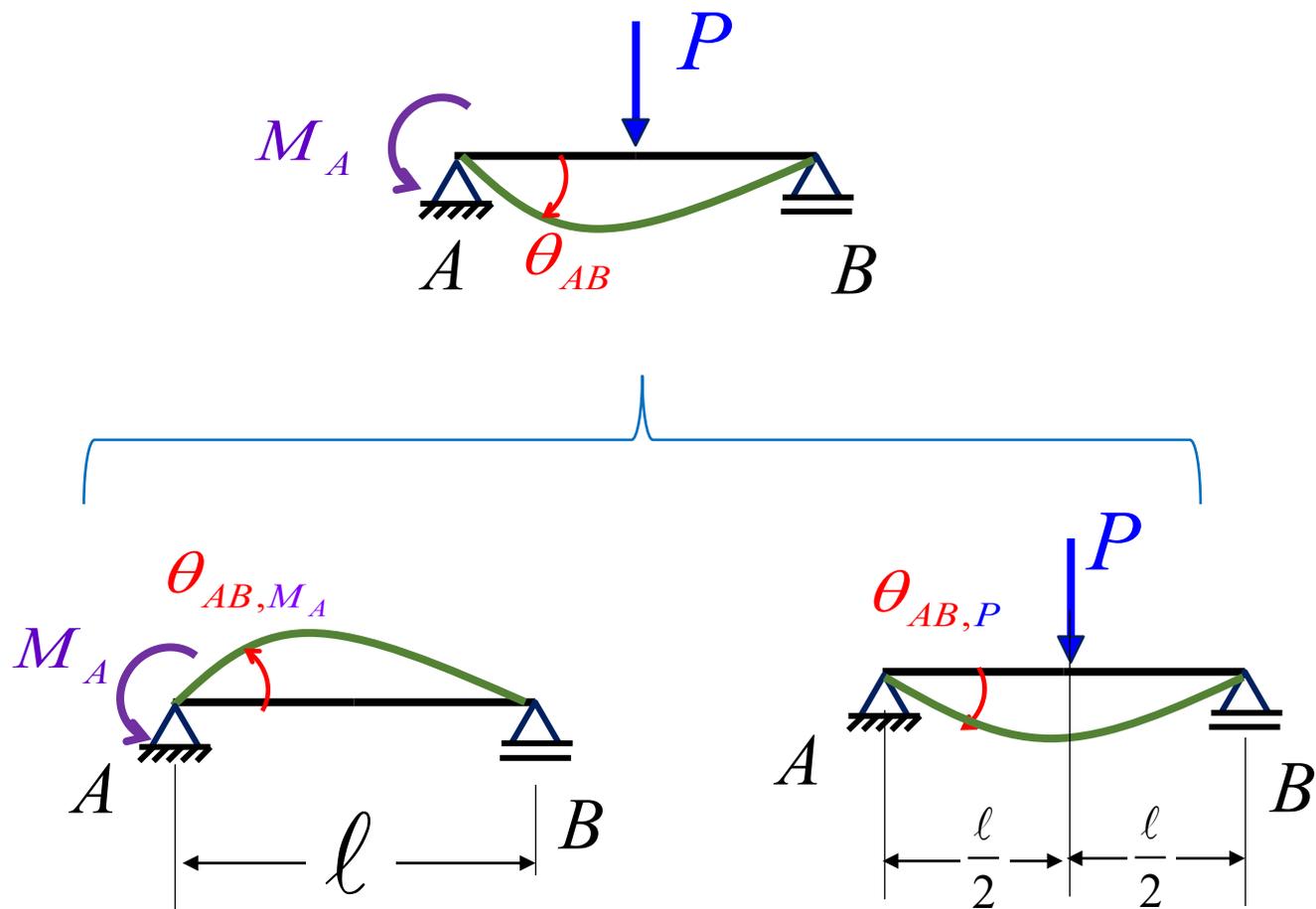
Estrutura plana com 4 reações de apoio, 1 x hiperestática

Equação de compatibilidade

$$\theta_{AB} = \theta_{AC} = \theta_{AD}$$



$$\theta_{AC} = \theta_{AD} = -\frac{\left(\frac{M_A}{2}\right) \times h}{3EI_P}$$



$$\theta_{AB} = \theta_{AB, M_A} + \theta_{AB, P} = \frac{M_A \times l}{3EI_V} - \frac{P \times l^2}{16EI_V}$$

Equação de compatibilidade

$$\theta_{AB} = \theta_{AC} = \theta_{AD}$$



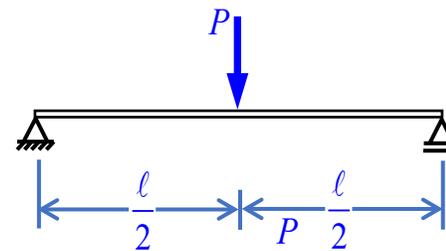
$$\frac{M_A \times l}{3EI_V} - \frac{P \times l^2}{16EI_V} = -\frac{\left(\frac{M_A}{2}\right) \times h}{3EI_P}$$

$$M_A = \left(\frac{3I_P}{16lI_P + 8hI_V} \right) P l^2$$

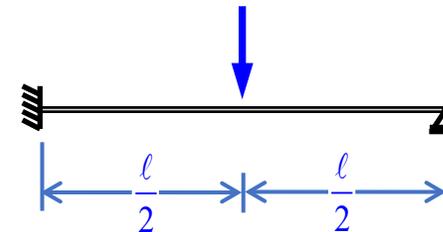
Casos Particulares

- $\left. \begin{array}{l} I_P = I_V \\ h = l \end{array} \right\} \Rightarrow M_A = \frac{P l^2}{8}$

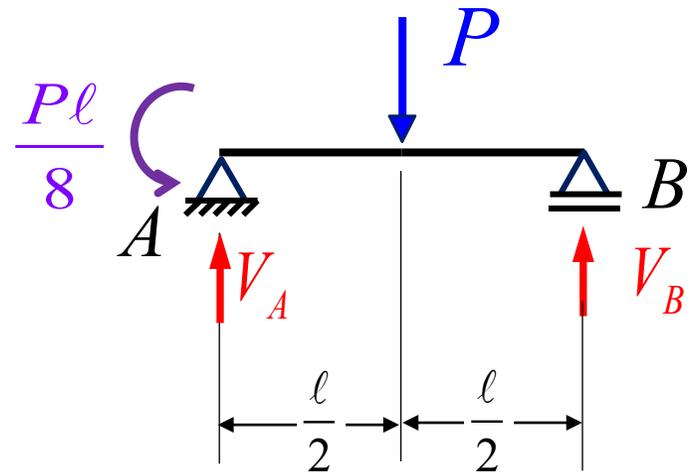
- $I_V \gg I_P \Rightarrow M_A \rightarrow 0$



- $I_P \gg I_V \Rightarrow M_A \rightarrow \frac{3}{16} P l^2$

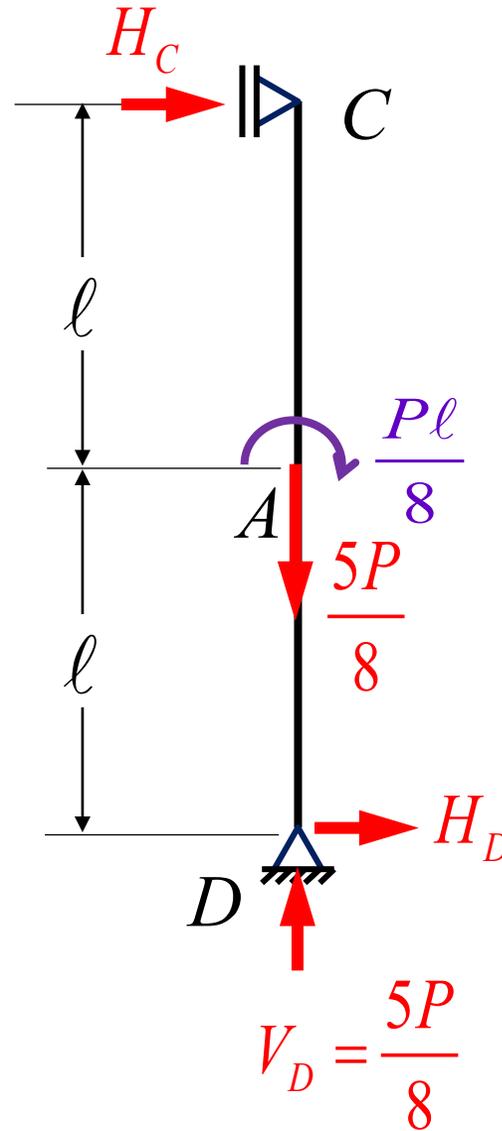


Reações de apoio para o caso $h = \ell$; $I_P = I_V$



$$\sum M_{(A)} = \frac{P\ell}{8} + V_B \ell - P \frac{\ell}{2} = 0$$

$$\therefore \begin{cases} V_B = \frac{3P}{8} \\ V_A = \frac{5P}{8} \end{cases}$$



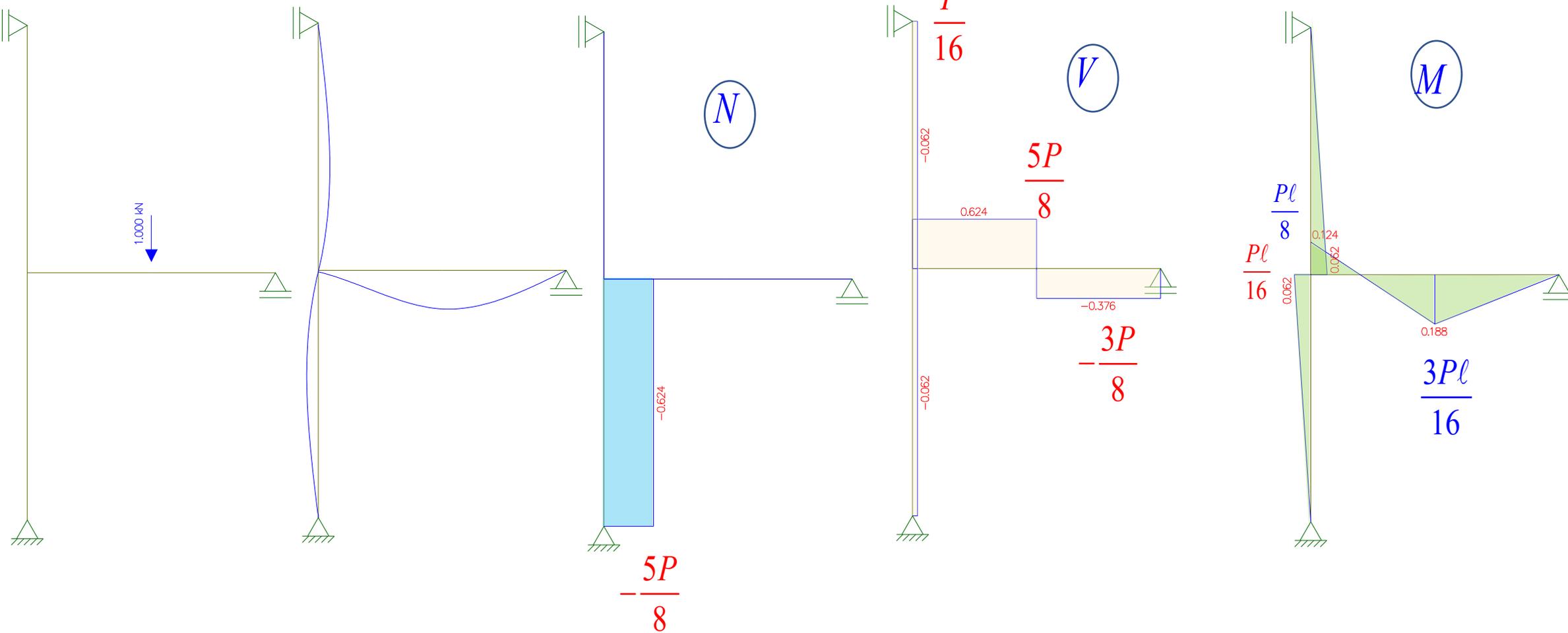
$$\sum M_{(D)} = H_C \times 2\ell - \frac{P\ell}{8} = 0$$

$$\therefore H_C = -\frac{P\ell}{16}$$

$$\sum F_x = H_C + H_D = 0$$

$$\therefore H_D = -H_C = \frac{P\ell}{16}$$

Deformações e diagramas de esforços solicitantes obtidos com Ftool:



Diagramas de Esforços Solicitantes

Equilíbrio do nó A

