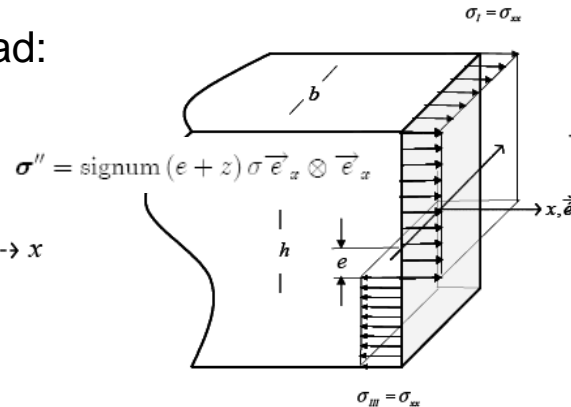
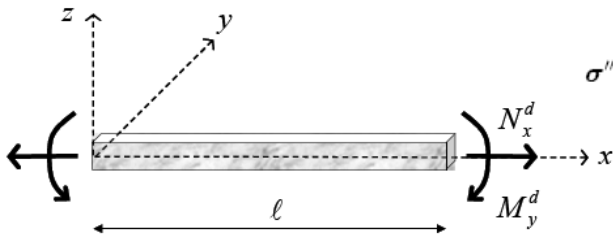


Lecture 14- summary

Beam section strength criterion:

$$\forall x; (\bar{F}_S, \bar{M}_S) \in D_S(x) \Leftrightarrow f(x, \bar{F}_S(x), \bar{M}_S(x)) \leq 0$$

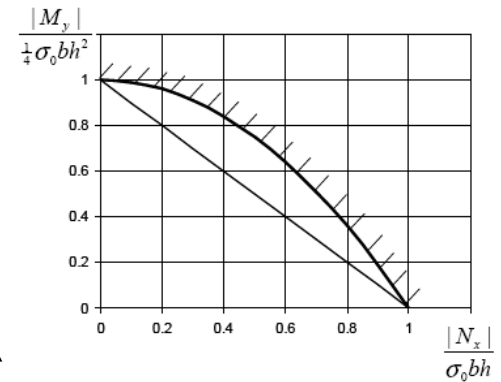
Coupled moment and normal load:



$$N_x'' = \sigma \int_{z=-h/2}^{z=h/2} \int_{y=-b/2}^{y=b/2} \text{signum}(e+z) dy dz = 2\sigma b e \quad (3.100a)$$

$$M_y'' = \sigma \int_{z=-h/2}^{z=h/2} \int_{y=-b/2}^{y=b/2} z \text{signum}(e-z) dy dz = \frac{1}{4} \sigma b h^2 \left(1 - 4 \left(\frac{e}{h}\right)^2\right) \quad (3.100b)$$

$$f(M_y'', N_x'') = \frac{|M_y''|}{M_0} + \left(\frac{N_x''}{N_0}\right)^2 - 1 \leq 0$$



Compatibility with strength criterion

$$\max |N_x^d| \leq |N_x''|_{\text{lim}} = N_0 \frac{e}{h}$$

$$\max |M_y^d| \leq |M_y''|_{\text{lim}} = M_0 \left(1 - 4 \left(\frac{e}{h}\right)^2\right)$$

Example: Structure with coupled M-N

