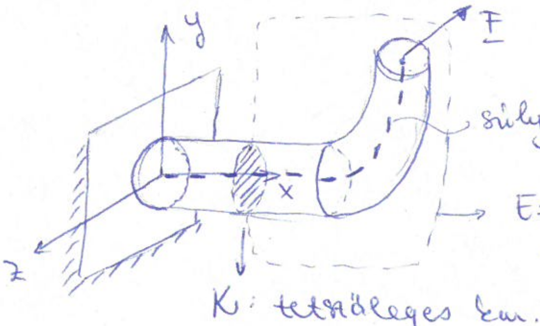
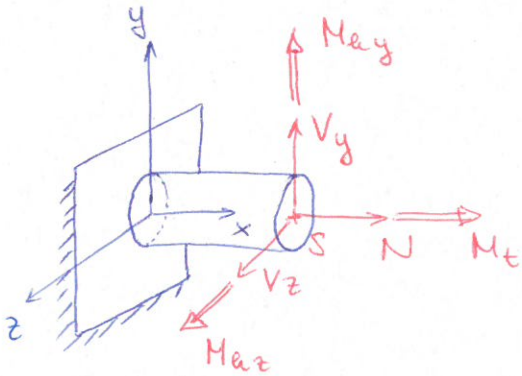
STATIKA – 8. gyakorlat

Igénybevételek



→ Ezt a részt eldobjuk, és a rá ható terhelést a K km-be redukáljuk. (km. súlypontjába)



Keresztmetszet: súlypontvonalra merőleges.

Az erők és a nyomatékok lehetnek a km. síkjára

1.) merőlegesek: erő: normálerő (N)

nyomaték: csavarónyomaték (M_t)

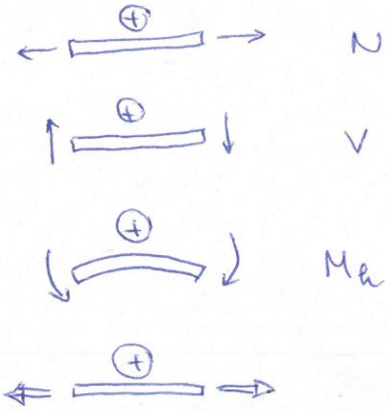
2.) párhuzamosak: erő: nyíróerő (V)

nyomaték: hajlítónyomaték (M_h)

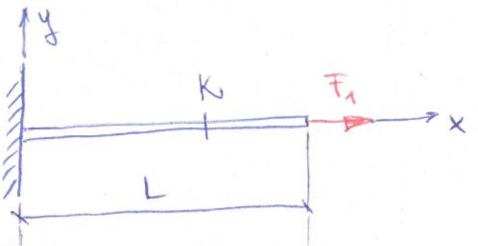
<u>Km. igénybevétele:</u> km. egyik oldalán lévő erőrendszernek a km. súlypontjába való redukáltja.

<u>Igénybevételi ábra:</u> a súlypontvonal (a rúd tengelye) mentén ábrázolt igénybevételek gráfja.

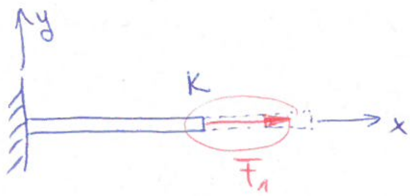
<u>Előjelkonvenció:</u>

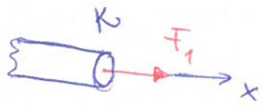


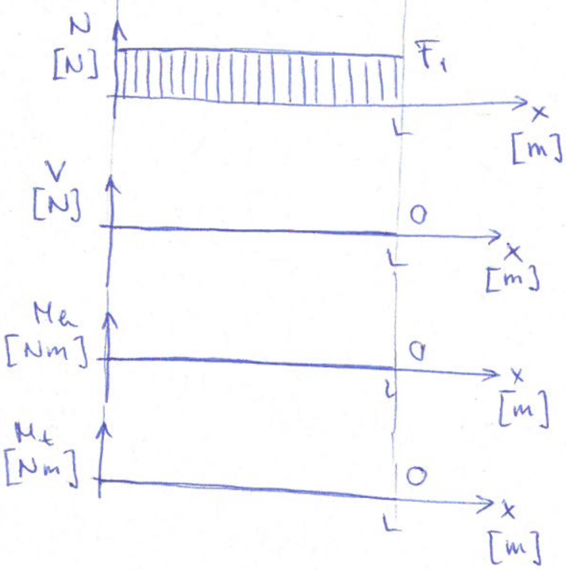
8.1 Hat. meg az igv. fv-ket és ábrákat! (Egész órán ez lesz a feladat.)

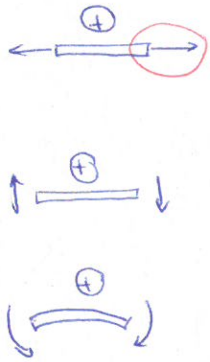


redukálás









Függvények.

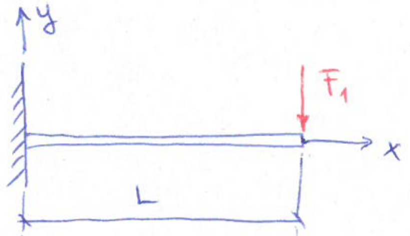
$N(x) = +F_1$

$V(x) = 0$

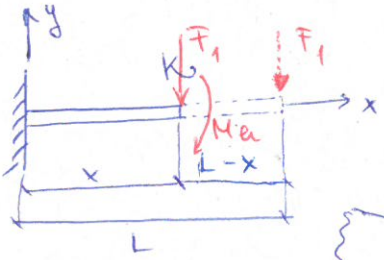
$M_h(x) = 0$

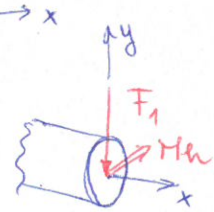
$M_t(x) = 0$

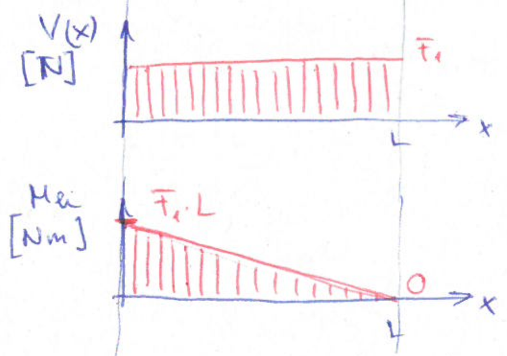
8.2

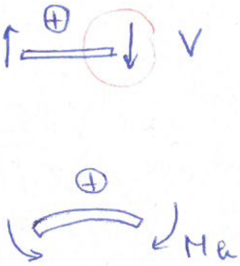


redukálás









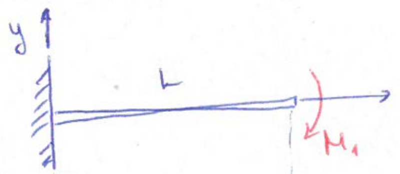
$N(x) = 0$

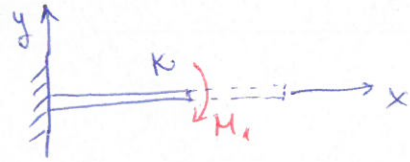
$V(x) = F_1$

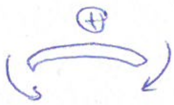
$M_h(x) = F_1(L-x) = F_1 L - F_1 x$

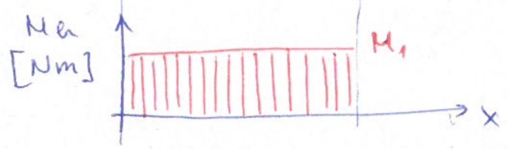
$M_t(x) = 0$

8.3









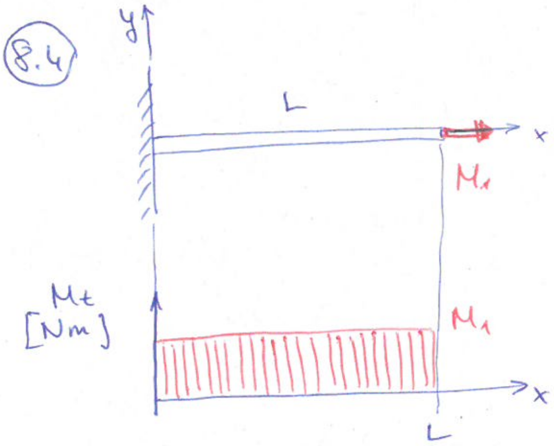
$N(x) = 0$

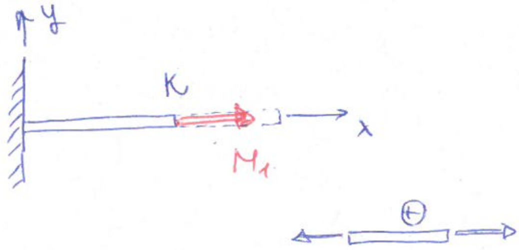
$V(x) = 0$

$M_h(x) = M_1$

$M_t(x) = 0$

8.4





$N(x)=0$

$V(x)=0$

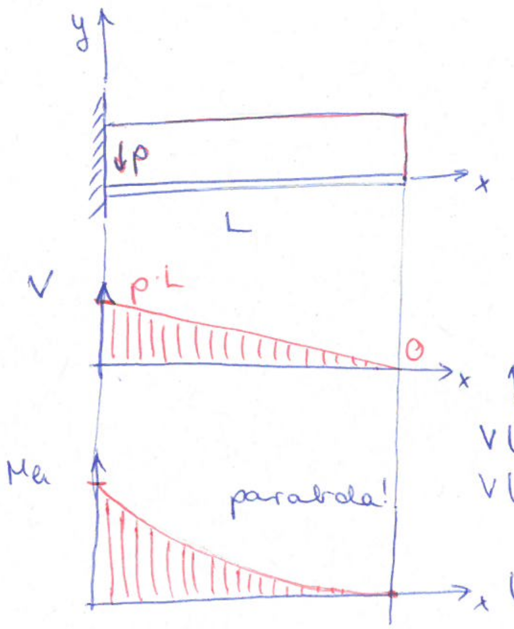
$M_h(x)=0$

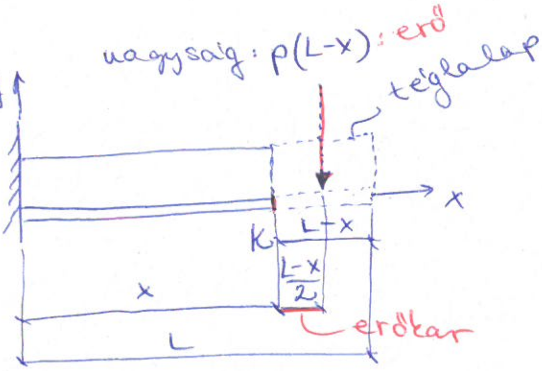
$M_t(x)=M_1$

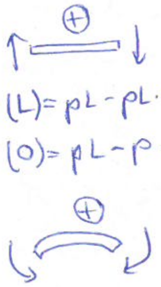
8.5

Megoszló erő: ~nagyság a síkidom területe

~súlypontba redukáljuk az erőt (nyomatéknál lesz fontos)







$V(L)=pL-pL=0$

$V(0)=pL-p\cdot 0=pL$

$N(x)=0$

$V(x)=p(L-x)=pL-px$

$M_h(x)=\underbrace{p(L-x)}_{\text{erő}}\cdot\underbrace{\frac{(L-x)}{2}}_{\text{erőkar}}=\frac{p}{2}(L-x)^2$

$M_t(x)=0$

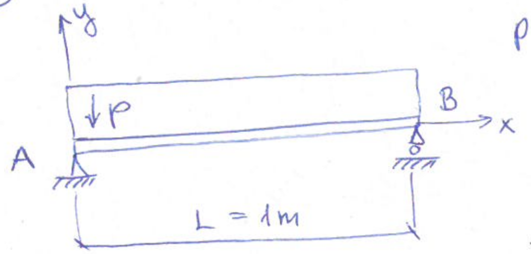
$M_h(x)=\frac{p}{2}(L^2-2Lx+x^2)$

x^2 együtthatója ⊕ → ∪ ilyen lesz

$x=0$-nál: $\frac{p}{2}\cdot L^2$

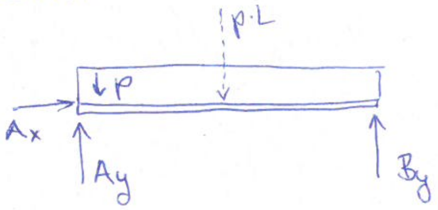
$x=L$-nél: $\frac{p}{2}(L^2-2L^2+L^2)=0$

(8.7)



$p = 4\,\frac{kN}{m}$

SZTA:



$\sum F_x = 0 \qquad A_x = 0$

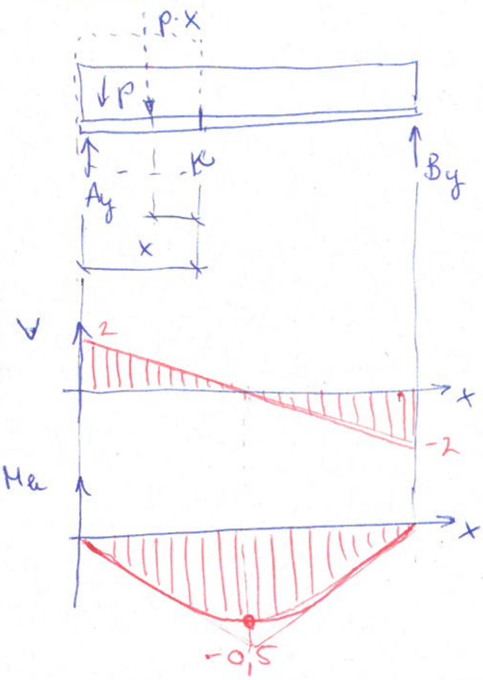
$\sum F_y = 0 \qquad A_y + B_y - p\cdot L = 0$

$\sum M_{A(z)} = 0 \qquad B_y L - pL\cdot\frac{L}{2} = 0$

$B_y = 2\,kN$

$A_y = 2\,kN$

Terhelések:

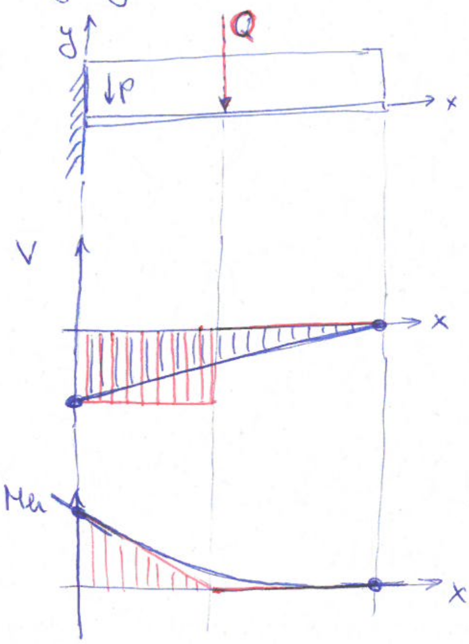


$V(x) = A_y - p\cdot x$

$M_h(x) = -A_y x + px\cdot\frac{x}{2}$

$\boxed{\frac{dM_h(x)}{dx} = -V(x)}$

Igénybevételi fv-ek szerkesztése:



$M_h'(x) = -V(x)$