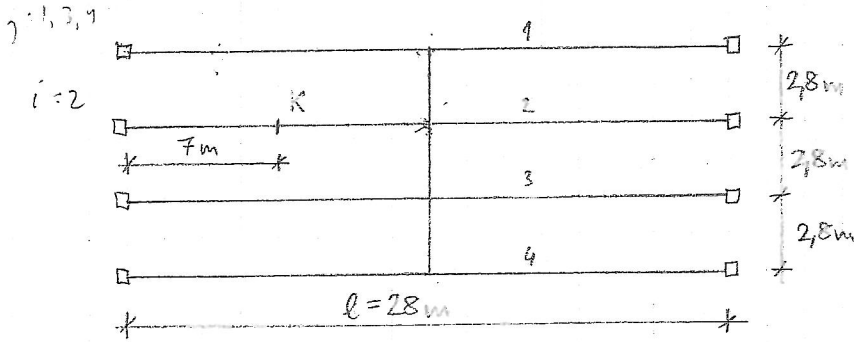


TARTÓK STATIKÁJA

TARTÓRÁCSOK (Leonhardt-módszer)

Határozzuk meg az alábbi tartórács igénybevételei ábráit és hatásábráit!

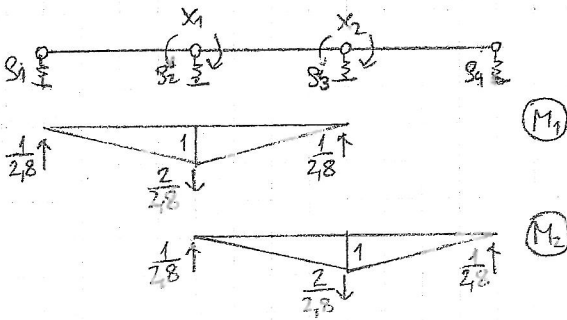


Főtartók: $T_1 = T_4 = 1,2$
 $T_2 = T_3 = 1$
 keresettartók: $T_k = 0,583$

Keresettartók:

$$S_i = \frac{l_i^3}{48 T_i} \quad S_1 = S_4 = \frac{28^3}{48 \cdot 1,2} = 381,1$$

$$S_2 = S_3 = \frac{28^3}{48 \cdot 1} = 457,3$$



$$a_{11} = 2 \cdot \frac{1}{2} \cdot \frac{28 \cdot 1}{0,583} \cdot \frac{2}{3} + 381,1 \left(\frac{1}{28}\right)^2 + 457,3 \left(\frac{2}{28}\right)^2 + 457,3 \left(\frac{1}{28}\right)^2 = 3,202 + 48,610 + 233,316 + 58,329 = 343,457 = a_{22}$$

$$a_{12} = \frac{1}{2} \cdot \frac{28 \cdot 1}{0,583} \cdot \frac{1}{3} - 2 \cdot 457,3 \cdot \frac{2}{28} \cdot \frac{1}{28} = 0,800 - 233,316 = -232,516$$

$$A = \begin{bmatrix} 343,457 & -232,516 \\ -232,516 & 343,457 \end{bmatrix} \quad Z = \begin{bmatrix} 5,375 & 3,639 \\ 3,639 & 5,375 \end{bmatrix} \cdot 10^{-3}$$

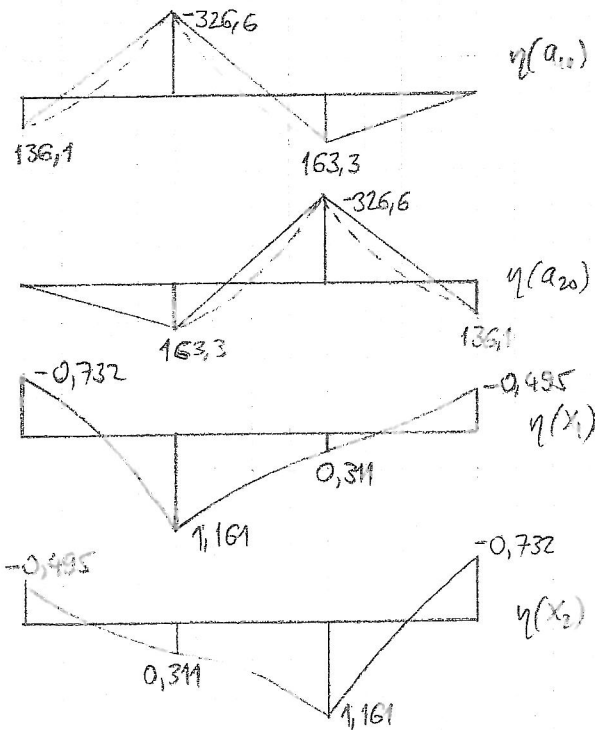
$$\eta(x_1) = -Z_{11} \eta(a_{10}) - Z_{12} \eta(a_{20})$$

$$\eta(x_2) = -Z_{21} \eta(a_{10}) - Z_{22} \eta(a_{20})$$

$$\eta(B_i) = \eta(B_i)_0 + B_{i1} \eta(x_1) + B_{i2} \eta(x_2)$$

$$\eta(B_1) = \eta(B_1)_0 + \frac{1}{28} \eta(x_1) + 0 \cdot \eta(x_2)$$

$$\eta(B_2) = \eta(B_2)_0 - \frac{2}{28} \eta(x_1) + \frac{1}{28} \eta(x_2)$$



TARTÓRÉSOK (Leonhardt-Wölbsow)

Keresetelosítási tényezők:

$$\eta(B_1) \rightarrow q_{11} = 0,739 \quad q_{12} = 0,415 \quad q_{13} = 0,111 \quad q_{14} = -0,177$$

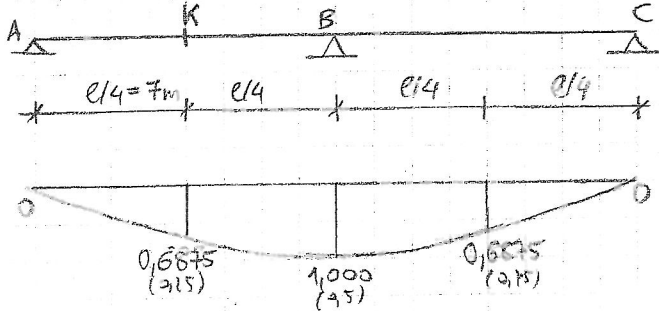
$$\eta(B_2) \rightarrow q_{21} = 0,346 \quad q_{22} = 0,282 \quad q_{23} = 0,193 \quad q_{24} = 0,092$$

$$\eta(B_3) \rightarrow q_{31} = 0,092 \quad q_{32} = 0,193 \quad q_{33} = 0,282 \quad q_{34} = 0,346$$

$$\eta(B_4) \rightarrow q_{41} = -0,177 \quad q_{42} = 0,111 \quad q_{43} = 0,415 \quad q_{44} = 0,739$$

ellenőrzés: $\sum_i q_{ik} = 1$, ill. $q_{ik} = \frac{l_i}{l_k} q_{ki}$

Hossztartók

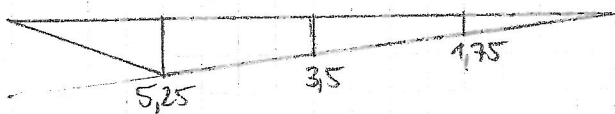


A K keresztmetszet legyen a 2. főtartón

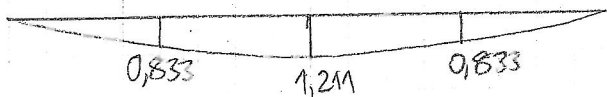
$\eta(B)$ $\eta(B) = 3x - 4x^3$
középső támasz hatáskörében

Terhelés főtartás(i): $\eta(C_k)^i = \eta(C_{k0})^i - (1 - q_{ii}) \eta(C_{k0})|_{\frac{l}{2}} \cdot \eta(B_i)$

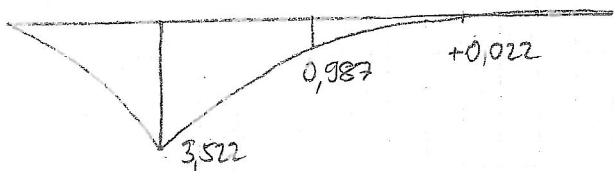
Terheléslen (j+i): $\eta(C_k)^j = q_{ji} \cdot \eta(C_{k0})^j |_{\frac{l}{2}} \cdot \eta(B_j)$



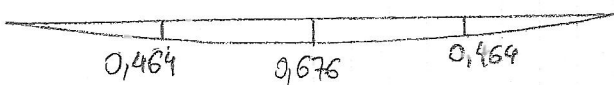
$\eta(M_{k0})$ $\eta(M_{k0})|_{\frac{l}{2}} = 3,5$



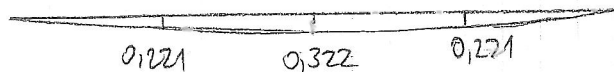
$\eta(M_k)^1 = q_{21} \cdot \eta(M_{k0})|_{\frac{l}{2}} \cdot \eta(B_2) = 0,346 \cdot 3,5 \cdot \eta(B_2)$



$\eta(M_k)^2 = \eta(M_{k0}) - (1 - q_{22}) \eta(M_{k0})|_{\frac{l}{2}} \cdot \eta(B_2) = \eta(M_{k0}) - 0,718 \cdot 3,5 \cdot \eta(B_2)$

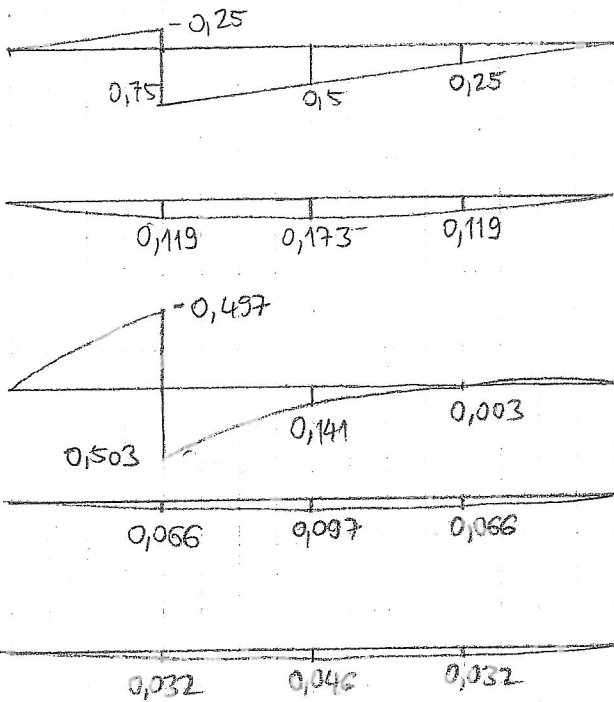


$\eta(M_k)^3 = q_{23} \eta(M_{k0})|_{\frac{l}{2}} \cdot \eta(B_2) = 0,193 \cdot 3,5 \cdot \eta(B_2)$



$\eta(M_k)^4 = q_{24} \eta(M_{k0})|_{\frac{l}{2}} \cdot \eta(B_2) = 0,092 \cdot 3,5 \cdot \eta(B_2)$

TARTÓRÁCSOK (Leonhardt-módszer)



$\eta(T_{k0})$

$$\eta(T_k)^1 = q_{21} \eta(T_{k0}) / \frac{1}{2} \eta(B_2) = 0,346 \cdot 0,5 \eta(B_2)$$

$$\eta(T_k)^2 = \eta(T_{k0}) - (1 - q_{22}) \eta(T_{k0}) / \frac{1}{2} \eta(B_2) = \eta(T_{k0}) - 0,718 \cdot 0,5 \eta(B_2)$$

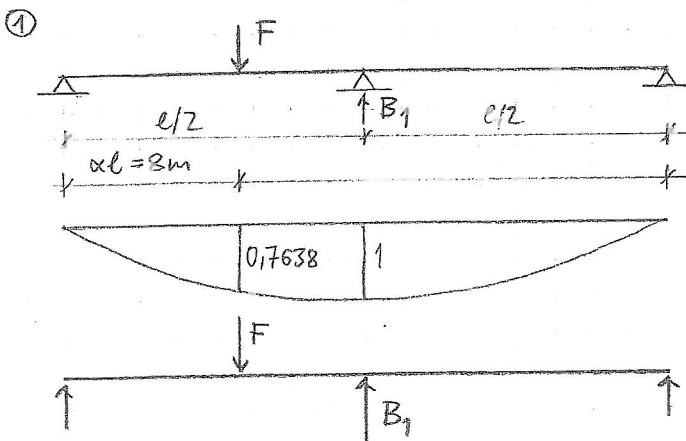
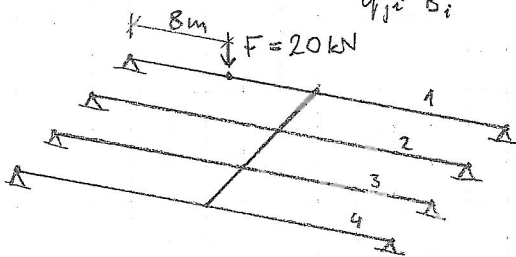
$$\eta(T_k)^3 = q_{23} \eta(T_{k0}) / \frac{1}{2} \eta(B_2) = 0,193 \cdot 0,5 \eta(B_2)$$

$$\eta(T_k)^4 = q_{24} \eta(T_{k0}) / \frac{1}{2} \eta(B_2) = 0,092 \cdot 0,5 \eta(B_2)$$

Allófelek

Törthelyt főtartó (i): $C_k = C_{k0} - (1 - q_{ii}) \cdot B_i \cdot C_{k, \frac{l}{2}}$, $\textcircled{C} = \textcircled{C}_0 - (1 - q_{ii}) B_i \cdot \textcircled{C}_{\frac{l}{2}}$

Törthelytlen (j/i): $C_k = \frac{q_{ij} B_j}{q_{ji} B_i} C_{k, \frac{l}{2}}$, $\textcircled{C} = \frac{q_{ij} B_j}{q_{ji} B_i} \textcircled{C}_{\frac{l}{2}}$



$$\alpha = \frac{8}{28} = 0,2857$$

$$3\alpha - 4\alpha^3 = 0,7638$$

$\eta(B_1)$

$$B_1 = 0,7638 \cdot 20 = 15,276$$

TARTÓK STATIKÁJA

TARTÓRÁCSOK (Leonhardt-módszer)

