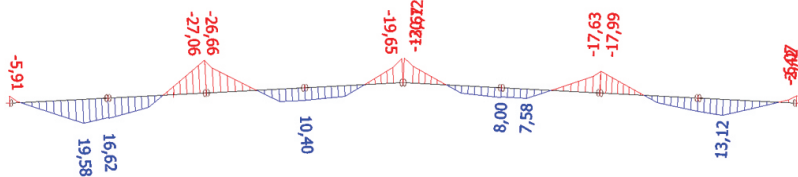


1) Vazba 1

a) Vazník 1



Obr. 1 – Průběh ohybového momentu  $M_y$  na vazníku 1



$$M_h = -27,06 \text{ kNm}$$

$$\psi * M_h = \psi * (-27,06) = -5,91 \text{ kNm} \rightarrow \psi = \frac{-5,91}{-27,06} = 0,218$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{19,58}{-27,06} = -0,724$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,724) = 0,679 \geq 0,4 \rightarrow \text{vyhovuje}$$

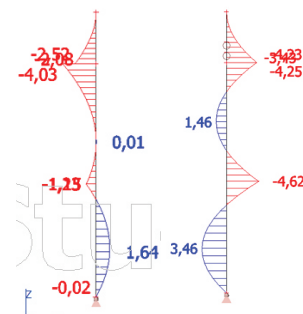


$$M = -27,06 \text{ kNm}$$

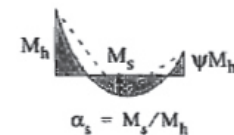
$$\psi * M = \psi * (-27,06) = 16,62 \text{ kNm} \rightarrow \psi = \frac{16,62}{-27,06} = -0,614$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,614) = 0,354 \leq 0,4 \rightarrow C_{mLT} = 0,4$$

b) Sloup E1



Obr. 2 – Průběh ohybového momentu  $M_y$  (vlevo) a  $M_z$  (vpravo) na sloupu E1

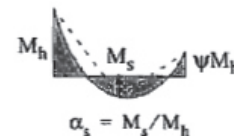


$$M_h = -4,03 \text{ kNm}$$

$$\psi * M_h = \psi * (-4,03) = -1,25 \text{ kNm} \rightarrow \psi = \frac{-1,25}{-4,03} = 0,31$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,01}{-4,03} = -0,002$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,002) = 0,102 < 0,4 \rightarrow C_{my} = 0,4$$



$$M_h = -4,03 \text{ kNm}$$

$$\psi * M_h = \psi * (-4,03) = -1,25 \text{ kNm} \rightarrow \psi = \frac{-1,25}{-4,03} = 0,31$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,01}{-4,03} = -0,002$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,002) = 0,102 < 0,4 \rightarrow C_{my} = 0,4$$



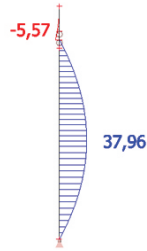
$$M_h = -4,62 \text{ kNm}$$

$$\psi * M_h = \psi * (-4,62) = -4,25 \text{ kNm} \rightarrow \psi = \frac{-4,25}{-4,62} = 0,92$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{1,46}{-4,62} = -0,316$$

$$\rightarrow C_{mz} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,316) = 0,353 < 0,4 \rightarrow C_{mz} = 0,4$$

c) Sloup D1



Obr. 3 – Průběh ohybového momentu  $M_y$  na sloupu D1



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{0}{-37,96} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

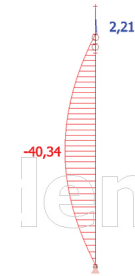


$$M = -37,96 \text{ kNm}$$

$$\psi * M = \psi * (-37,96) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-37,96} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

d) Sloup C1



Obr. 4 – Průběh ohybového momentu  $M_y$  na sloupu C1



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_n = \frac{M_h}{M_s} = \frac{0}{-40,34} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

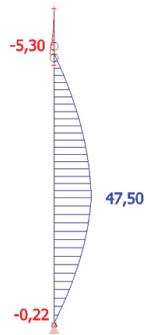


$$M = -40,34 \text{ kNm}$$

$$\psi * M = \psi * (-40,34) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-40,34} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

e) Sloup B1



Obr. 5 – Průběh ohybového momentu  $M_y$  na sloupu B1



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{0}{-47,5} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

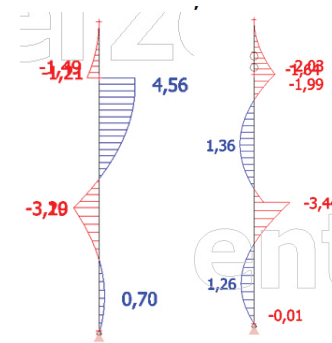


$$M = -47,5 \text{ kNm}$$

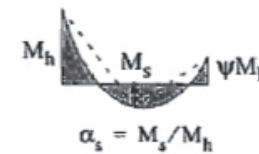
$$\psi * M = \psi * (-47,5) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-47,5} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

f) Sloup A1



Obr. 6 – Průběh ohybového momentu  $M_y$  (vlevo) a  $M_z$  (vpravo) na sloupu A1

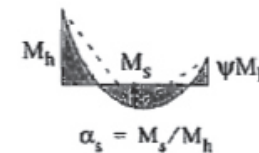


$$M_h = -3,2 \text{ kNm}$$

$$\psi * M_h = \psi * (-3,2) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-3,2} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,7}{-3,2} = -0,219$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,219) = 0,275 < 0,4 \rightarrow C_{my} = 0,4$$



$$M_h = -3,2 \text{ kNm}$$

$$\psi * M_h = \psi * (-3,2) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-3,2} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,7}{-3,2} = -0,219$$

$$\rightarrow C_{mLT} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,219) = 0,275 < 0,4 \rightarrow C_{mLT} = 0,4$$



$$M_h = -3,44 \text{ kNm}$$

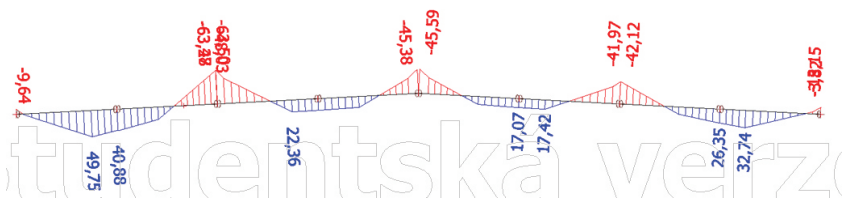
$$\psi * M_h = \psi * (-3,44) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-3,44} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{1,26}{-3,44} = -0,366$$

$$\rightarrow C_{mz} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,366) = 0,393 < 0,4 \rightarrow C_{mz} = 0,4$$

## 2) Vazba 3

a) Vazník 3



Obr. 7 – Průběh ohybového momentu  $M_y$  na vazníku 3



$$M_h = -63,5 \text{ kNm}$$

$$\psi * M_h = \psi * (-63,5) = -9,64 \text{ kNm} \rightarrow \psi = \frac{-9,64}{-63,5} = 0,152$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{49,75}{-63,5} = -0,783$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,783) = 0,726 \geq 0,4 \rightarrow \text{vyhovuje}$$

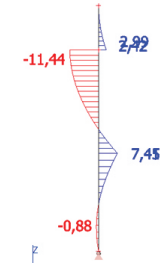


$$M = -63,5 \text{ kNm}$$

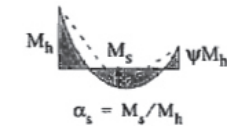
$$\psi * M = \psi * (-63,5) = 40,88 \text{ kNm} \rightarrow \psi = \frac{40,88}{-63,5} = -0,644$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,644) = 0,342 < 0,4 \rightarrow C_{mLT} = 0,4$$

b) Sloup E3



Obr. 8 – Průběh ohybového momentu  $M_y$  na sloupu E3

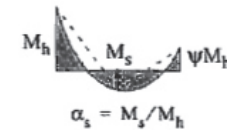


$$M_h = 7,45 \text{ kNm}$$

$$\psi * M_h = \psi * 7,45 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{7,45} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-0,88}{7,45} = -0,118$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,118) = 0,194 < 0,4 \rightarrow C_{my} = 0,4$$



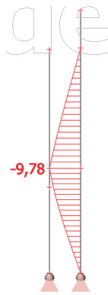
$$M_h = 7,45 \text{ kNm}$$

$$\psi * M_h = \psi * 7,45 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{7,45} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-0,88}{7,45} = -0,118$$

$$\rightarrow C_{mLT} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,118) = 0,194 < 0,4 \rightarrow C_{mLT} = 0,4$$

c) Sloup D3



Obr. 9 – Průběh ohybového momentu  $M_y$  na sloupu D3



$$M = -9,78 \text{ kNm}$$

$$\psi * M = \psi * (-9,78) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-9,78} = 0$$

$$C_{m,y} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

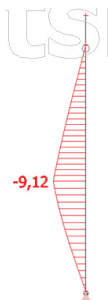


$$M = -9,78 \text{ kNm}$$

$$\psi * M = \psi * (-9,78) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-9,78} = 0$$

$$C_{m,Lt} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

d) Sloup C3



Obr. 10 – Průběh ohybového momentu  $M_y$  na sloupu C3



$$M = -9,12 \text{ kNm}$$

$$\psi * M = \psi * (-9,12) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-9,12} = 0$$

$$C_{m,y} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

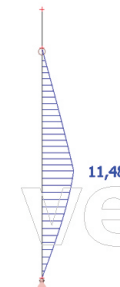


$$M = -9,12 \text{ kNm}$$

$$\psi * M = \psi * (-9,12) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-9,12} = 0$$

$$C_{m,Lt} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

e) Sloup B3



Obr. 11 – Průběh ohybového momentu  $M_y$  na sloupu B3



$$M = 11,48 \text{ kNm}$$

$$\psi * M = \psi * 11,48 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{11,48} = 0$$

$$C_{m,y} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

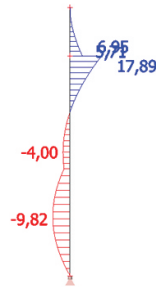


$$M = 11,48 \text{ kNm}$$

$$\psi * M = \psi * 11,48 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{11,48} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

f) Sloup A3



Obr. 12 – Průběh ohybového momentu My na sloupu A3



$$M_h = -3,4 \text{ kNm}$$

$$\psi * M_h = \psi * (-3,4) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-3,4} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{-3,4}{-9,82} = 0,346$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0,346 = 0,967$$



$$M_h = -3,4 \text{ kNm}$$

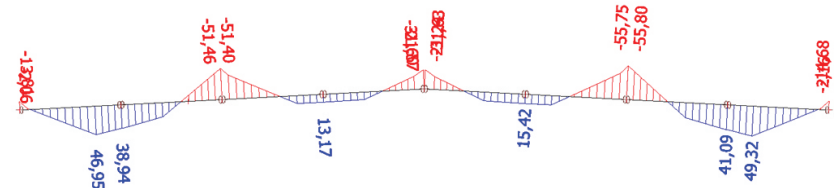
$$\psi * M_h = \psi * (-3,4) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-3,45} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{-3,4}{-9,82} = 0,346$$

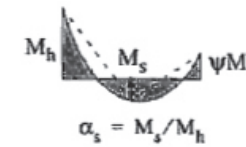
$$\rightarrow C_{mLT} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0,346 = 0,967$$

### 3) Vazba 4

a) Vazník 4



Obr. 13 – Průběh ohybového momentu My na vazníku 4



$$M_h = -55,8 \text{ kNm}$$

$$\psi * M_h = \psi * (-55,8) = -14,68 \text{ kNm} \rightarrow \psi = \frac{-14,68}{-55,8} = 0,263$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{49,32}{-55,8} = -0,884$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,884) = 0,807 \geq 0,4 \rightarrow \text{vyhovuje}$$

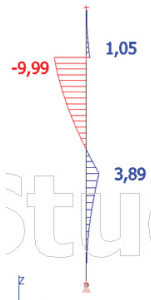


$$M = -55,8 \text{ kNm}$$

$$\psi * M = \psi * (-55,8) = 41,09 \text{ kNm} \rightarrow \psi = \frac{41,09}{-55,8} = -0,736$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,736) = 0,306 \leq 0,4 \rightarrow C_{mLT} = 0,4$$

b) Sloup E4



Obr. 14 – Průběh ohybového momentu  $M_y$  na sloupu E4



$$M = 3,89 \text{ kNm}$$

$$\psi * M = \psi * 3,89 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,89} = 0$$

$$C_{my} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

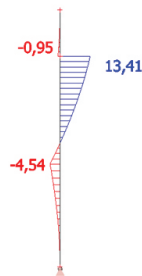


$$M = 3,89 \text{ kNm}$$

$$\psi * M = \psi * 3,89 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,89} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

c) Sloup A4



Obr. 15 – Průběh ohybového momentu  $M_y$  na sloupu A4



$$M = -4,54 \text{ kNm}$$

$$\psi * M = \psi * (-4,54) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-4,54} = 0$$

$$C_{my} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$



$$M = -4,54 \text{ kNm}$$

$$\psi * M = \psi * (-4,54) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-4,54} = 0$$

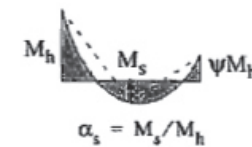
$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

4) Vazba 8

a) Vazník 8



Obr. 16 – Průběh ohybového momentu  $M_y$  na vazníku 8



$$M_h = -253,96 \text{ kNm}$$

$$\psi * M_h = \psi * (-253,96) = -17,88 \text{ kNm} \rightarrow \psi = \frac{-17,88}{-253,96} = 0,07$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{237}{-253,96} = -0,933$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,933) = 0,846 \geq 0,4 \rightarrow \text{vyhovuje}$$

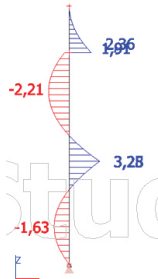


$$M = -253,96 \text{ kNm}$$

$$\psi * M = \psi * (-253,96) = 63,79 \text{ kNm} \rightarrow \psi = \frac{63,79}{-253,96} = -0,251$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,251) = 0,5 \geq 0,4 \rightarrow \text{vyhovuje}$$

b) Sloup E8



Obr. 17 – Průběh ohybového momentu  $M_y$  na sloupu E8



$$M_h = 3,28 \text{ kNm}$$

$$\psi * M_h = \psi * 3,28 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,28} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-1,63}{3,28} = -0,497$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,497) = 0,498 \geq 0,4 \rightarrow \text{vyhovuje}$$



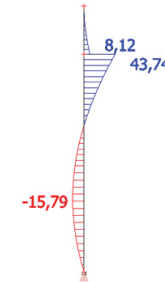
$$M_h = 3,28 \text{ kNm}$$

$$\psi * M_h = \psi * 3,28 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,28} = 0$$

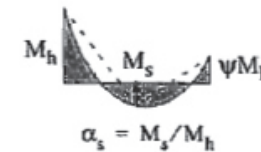
$$\alpha_s = \frac{M_s}{M_h} = \frac{-1,63}{3,28} = -0,497$$

$$\rightarrow C_{mLT} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,497) = 0,498 \geq 0,4 \rightarrow \text{vyhovuje}$$

c) Sloup A8



Obr. 18 – Průběh ohybového momentu  $M_y$  na sloupu A8



$$M_h = 43,74 \text{ kNm}$$

$$\psi * M_h = \psi * 43,74 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{43,74} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-15,79}{43,74} = -0,361$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,361) = 0,389 < 0,4 \rightarrow C_{my} = 0,4$$



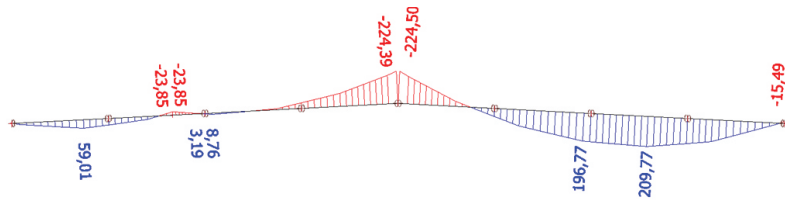
$$M = 43,74 \text{ kNm}$$

$$\psi * M = \psi * 43,74 = -12,64 \text{ kNm} \rightarrow \psi = \frac{-12,64}{43,74} = -0,289$$

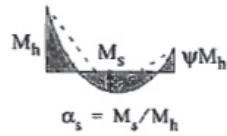
$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,289) = 0,484 \geq 0,4 \rightarrow \text{vyhovuje}$$



5) Vazba 9  
a) Vazník 9



Obr. 19 – Průběh ohybového momentu  $M_y$  na vazníku 9



$$M_h = -224,5 \text{ kNm}$$

$$\psi * M_h = \psi * (-224,5) = -15,49 \text{ kNm} \rightarrow \psi = \frac{-15,49}{-224,5} = 0,069$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{209,77}{-224,5} = -0,934$$

$$\rightarrow C_{m_y} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,934) = 0,847 \geq 0,4 \rightarrow \text{vyhovuje}$$

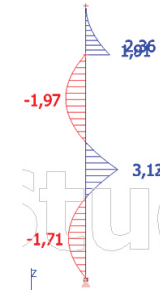


$$M = -224,5 \text{ kNm}$$

$$\psi * M = \psi * (-224,5) = 55,9 \text{ kNm} \rightarrow \psi = \frac{55,9}{-224,5} = -0,249$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,249) = 0,5 \geq 0,4 \rightarrow \text{vyhovuje}$$

b) Sloup E9



Obr. 20 – Průběh ohybového momentu  $M_y$  na sloupu E9



$$M_h = 3,13 \text{ kNm}$$

$$\psi * M_h = \psi * 3,13 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,13} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-1,71}{3,13} = -0,546$$

$$\rightarrow C_{m_y} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,546) = 0,537 \geq 0,4 \rightarrow \text{vyhovuje}$$



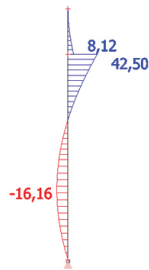
$$M_h = 3,13 \text{ kNm}$$

$$\psi * M_h = \psi * 3,13 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{3,13} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-1,71}{3,13} = -0,546$$

$$\rightarrow C_{mLT} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,546) = 0,537 \geq 0,4 \rightarrow \text{vyhovuje}$$

c) Sloup A9



Obr. 21 – Průběh ohybového momentu  $M_y$  na sloupu A9



$$M_h = 42,5 \text{ kNm}$$

$$\psi * M_h = \psi * 42,5 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{42,5} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-16,16}{42,5} = -0,38$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,38) = 0,404 \geq 0,4 \rightarrow \text{vyhovuje}$$



$$M = 42,5 \text{ kNm}$$

$$\psi * M = \psi * 42,58 = -13,28 \text{ kNm} \rightarrow \psi = \frac{-13,28}{42,5} = -0,312$$

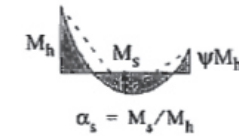
$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,312) = 0,475 \geq 0,4 \rightarrow \text{vyhovuje}$$

6) Typická vazba

a) Vazník 11



Obr. 22 – Průběh ohybového momentu  $M_y$  na vazníku 11



$$M_h = -353,86 \text{ kNm}$$

$$\psi * M_h = \psi * (-353,86) = -9,65 \text{ kNm} \rightarrow \psi = \frac{-9,65}{-353,86} = 0,027$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{217,43}{-353,86} = -0,614$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,614) = 0,591 \geq 0,4 \rightarrow \text{vyhovuje}$$

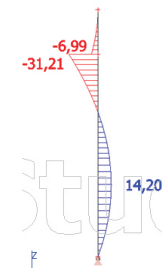


$$M = -353,86 \text{ kNm}$$

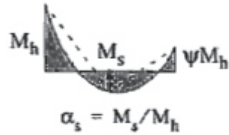
$$\psi * M = \psi * (-353,86) = -0,47 \text{ kNm} \rightarrow \psi = \frac{-0,47}{-353,86} = 0,001$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0,001 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

b) Sloup E11



Obr. 23 – Průběh ohybového momentu  $M_y$  na sloupu E11



$$M_h = -31,21 \text{ kNm}$$

$$\psi * M_h = \psi * (-31,21) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{-31,21} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{14,2}{-31,21} = -0,455$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,455) = 0,464 \geq 0,4 \rightarrow \text{vyhovuje}$$

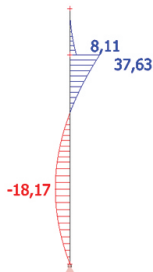


$$M = -31,21 \text{ kNm}$$

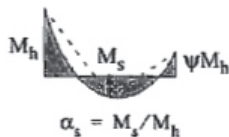
$$\psi * M = \psi * (-31,21) = 12,38 \text{ kNm} \rightarrow \psi = \frac{12,38}{-31,21} = -0,397$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,397) = 0,441 \geq 0,4 \rightarrow \text{vyhovuje}$$

c) Sloup A10



Obr. 24 – Průběh ohybového momentu  $M_y$  na sloupu A10



$$M_h = 37,63 \text{ kNm}$$

$$\psi * M_h = \psi * 37,63 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{37,63} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-18,17}{37,63} = -0,483$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,483) = 0,486 \geq 0,4 \rightarrow \text{vyhovuje}$$



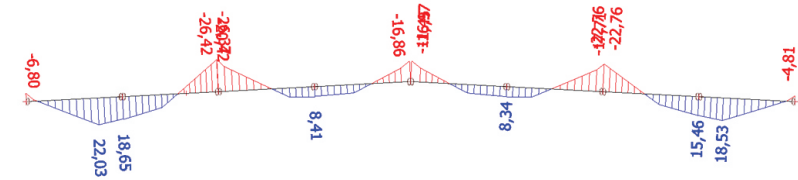
$$M = 37,63 \text{ kNm}$$

$$\psi * M = \psi * 37,63 = -15,88 \text{ kNm} \rightarrow \psi = \frac{-15,88}{37,63} = -0,422$$

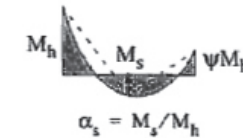
$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,422) = 0,431 \geq 0,4 \rightarrow \text{vyhovuje}$$

## 7) Vazba 12

a) Vazník 12



Obr. 25 – Průběh ohybového momentu  $M_y$  na vazníku 12



$$M_h = -26,42 \text{ kNm}$$

$$\psi * M_h = \psi * (-26,42) = -6,8 \text{ kNm} \rightarrow \psi = \frac{-6,8}{-26,42} = 0,257$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{22,03}{-26,42} = -0,834$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,834) = 0,767 \geq 0,4 \rightarrow \text{vyhovuje}$$

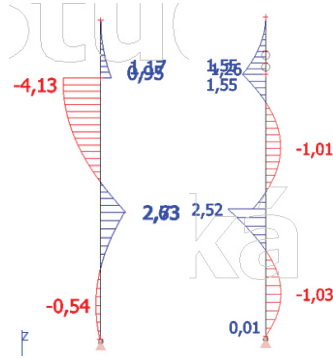


$$M = -26,42 \text{ kNm}$$

$$\psi * M = \psi * (-26,42) = 18,65 \text{ kNm} \rightarrow \psi = \frac{18,65}{-26,42} = -0,706$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * (-0,706) = 0,318 < 0,4 \rightarrow C_{mLT} = 0,4$$

b) Sloup E12



Obr. 26 – Průběh ohybového momentu  $M_y$  (vlevo) a  $M_z$  (vpravo) na sloupu E12

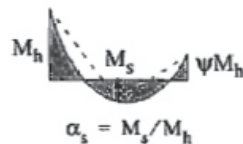


$$M_h = 2,73 \text{ kNm}$$

$$\psi * M_h = \psi * 2,73 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{2,73} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-0,54}{2,73} = -0,198$$

$$\rightarrow C_{my} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,198) = 0,258 < 0,4 \rightarrow C_{my} = 0,4$$

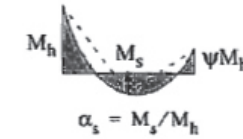


$$M_h = 2,73 \text{ kNm}$$

$$\psi * M_h = \psi * 2,73 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{2,73} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-0,54}{2,73} = -0,198$$

$$\rightarrow C_{mLT} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,198) = 0,258 < 0,4 \rightarrow C_{mLT} = 0,4$$



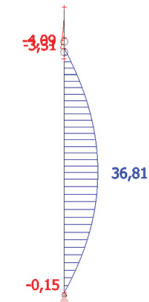
$$M_h = 2,52 \text{ kNm}$$

$$\psi * M_h = \psi * 2,52 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{2,52} = 0$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-1,03}{2,52} = -0,409$$

$$\rightarrow C_{mz} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,409) = 0,427 \geq 0,4 \rightarrow \text{vyhovuje}$$

c) Sloup D12



Obr. 27 – Průběh ohybového momentu  $M_y$  na sloupu D12



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_n = \frac{M_h}{M_s} = \frac{0}{36,81} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

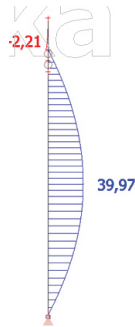


$$M = 36,81 \text{ kNm}$$

$$\psi * M = \psi * 36,81 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{36,81} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

d) Sloup C12



Obr. 28 – Průběh ohybového momentu  $M_y$  na sloupu C12



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{0}{39,97} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

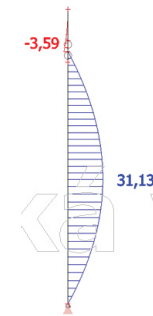


$$M = 39,97 \text{ kNm}$$

$$\psi * M = \psi * 39,97 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{39,97} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

e) Sloup B12



Obr. 29 – Průběh ohybového momentu  $M_y$  na sloupu B12



$$M_h = 0 \text{ kNm}$$

$$\psi * M_h = \psi * (0) = 0 \text{ kNm} \rightarrow \psi = \frac{0}{0} = 0$$

$$\alpha_h = \frac{M_h}{M_s} = \frac{0}{31,13} = 0$$

$$\rightarrow C_{my} = 0,95 + 0,05 * \alpha_s = 0,95 + 0,05 * 0 = 0,95$$

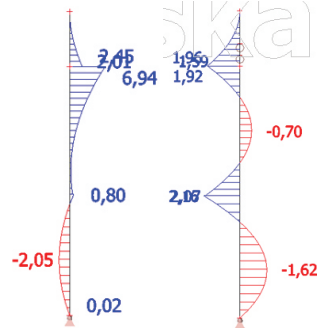


$$M = 31,13 \text{ kNm}$$

$$\psi * M = \psi * 31,13 = 0 \text{ kNm} \rightarrow \psi = \frac{0}{31,13} = 0$$

$$C_{mLT} = 0,6 + 0,4 * \psi = 0,6 + 0,4 * 0 = 0,6 \geq 0,4 \rightarrow \text{vyhovuje}$$

f) Sloup A12



Obr. 30 – Průběh ohybového momentu  $M_y$  (vlevo) a  $M_z$  (vpravo) na sloupu A12

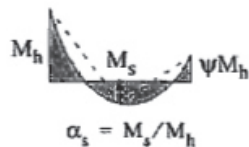


$$M_h = 6,94 \text{ kNm}$$

$$\psi * M_h = \psi * 6,94 = 0,8 \text{ kNm} \rightarrow \psi = \frac{0,8}{6,94} = 0,115$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,23}{6,94} = 0,033$$

$$\rightarrow C_{my} = 0,2 + 0,8 * \alpha_s = 0,2 + 0,8 * 0,033 = 0,226 < 0,4 \rightarrow C_{my} = 0,4$$



$$M_h = 6,94 \text{ kNm}$$

$$\psi * M_h = \psi * 6,94 = 0,8 \text{ kNm} \rightarrow \psi = \frac{0,8}{6,94} = 0,115$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{0,23}{6,94} = 0,033$$

$$\rightarrow C_{mLT} = 0,2 + 0,8 * \alpha_s = 0,2 + 0,8 * 0,033 = 0,226 < 0,4 \rightarrow C_{mLT} = 0,4$$



$$M_h = 2,16 \text{ kNm}$$

$$\psi * M_h = \psi * 2,16 = 1,96 \text{ kNm} \rightarrow \psi = \frac{1,96}{2,16} = 0,907$$

$$\alpha_s = \frac{M_s}{M_h} = \frac{-0,7}{2,16} = -0,324$$

$$\rightarrow C_{mz} = 0,1 - 0,8 * \alpha_s = 0,1 - 0,8 * (-0,324) = 0,359 < 0,4 \rightarrow C_{mz} = 0,4$$