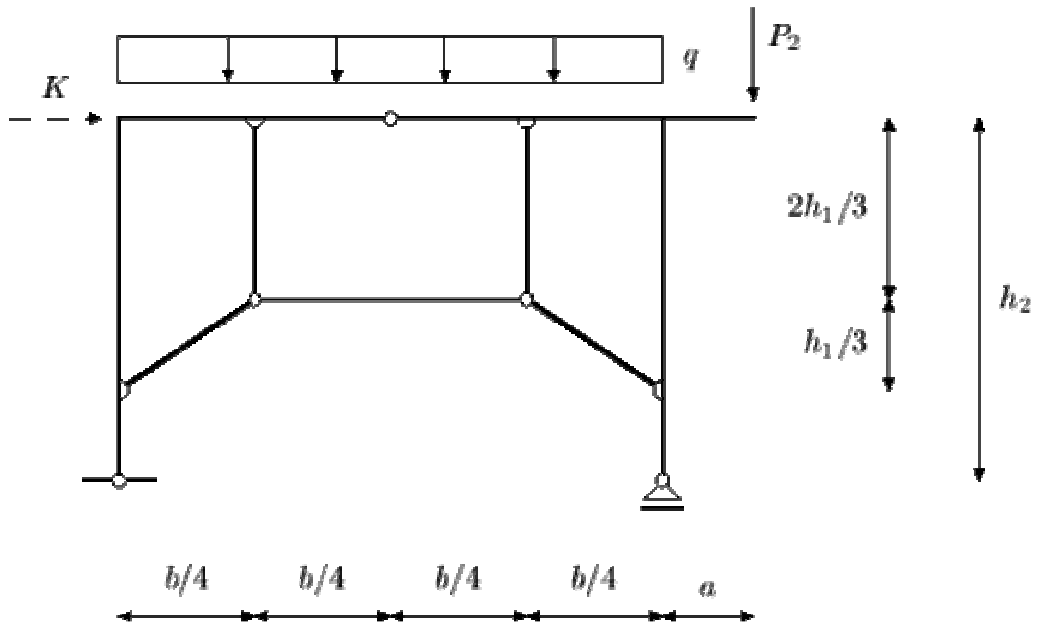
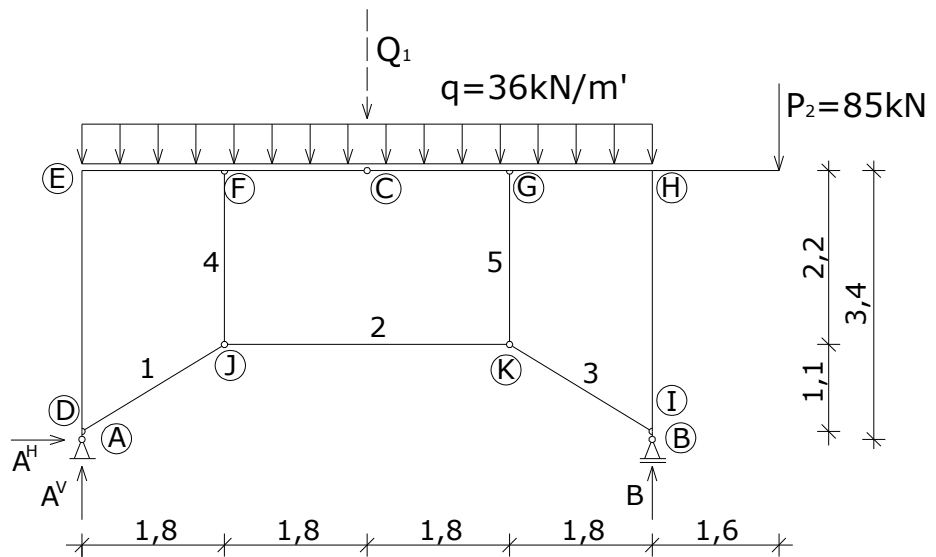


## ZADATAK 1

ZA TROZGLOBNI OKVIR ANALITIČKIM POSTUPKOM M,T,N  
DIJAGRAME ZA ZADANO OPTEREĆENJE



	Student	Zadatak	TO	LG	PN	a	b	c	$h_1$	$h_2$	$P_1$	$P_2$	$q$	$K$
40	Vedran Slunjski	3	A	G	GA	1.6	7.2	2.4	3.3	3.4	90	85	36	100



### REAKCIJE:

$$\sum M_A = 0 \Rightarrow -Q_1 3,6 - P_2 8,8 + B 7,2 = 0 \Rightarrow B = \frac{1}{7,2} (259,2 \cdot 3,6 + 85 \cdot 8,8)$$

$$\mathbf{B = 233,48 \text{ kN}}$$

$$\sum M_B = 0 \Rightarrow -A^V 7,2 + Q_1 3,6 - P_2 1,6 = 0 \Rightarrow A = \frac{1}{7,2} (259,2 \cdot 3,6 - 85 \cdot 1,6)$$

$$\mathbf{A^V = 110,71 \text{ kN}}$$

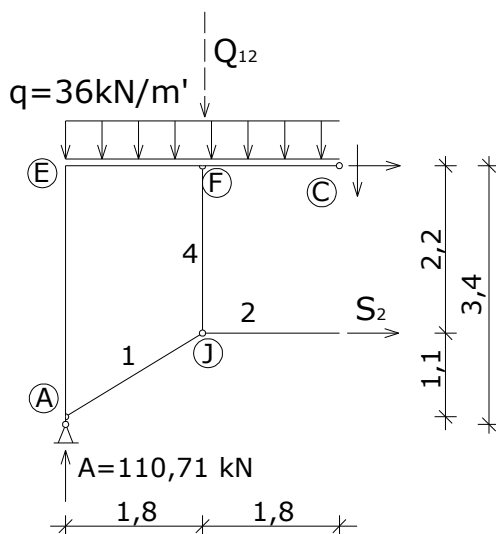
$$\sum F_x = 0 \Rightarrow \mathbf{A^H = 0 \text{ kN}}$$

Kontrola:

$$\sum F_y = 0 \Rightarrow A^V - Q_1 + B - P_2 = 0 \Rightarrow 110,71 + 233,48 - 259,2 - 85 = 0$$

$$\mathbf{0 = 0}$$

### SILE U ŠTAPOVIMA



$$Q_{12} = 2,6q = 2,6 \cdot 36 = 129,6 \text{ kN}$$

$$\sum M_C = 0 \Rightarrow -A 3,6 + Q_{12} 1,8 + S_2 2,2 = 0$$

$$S_2 = \frac{1}{2,2} (110,71 \cdot 3,6 - 129,6 \cdot 1,8)$$

$$\mathbf{S_2 = 75,13 \text{ kN}}$$

Ravnoteža čvora J:

$$S_{1X} = \frac{1,8}{\sqrt{4,45}} S \quad S_{1Y} = \frac{1,1}{\sqrt{4,45}} S$$

$$\sum F_X = 0 \Rightarrow -S_{1X} + S_2 = 0 \Rightarrow S_1 = \frac{\sqrt{4,45}}{1,8} 75,13$$

$$\mathbf{S_1 = 88,05 \text{ kN}}$$

$$\sum F_Y = 0 \Rightarrow S_4 - S_{1Y} = 0 \Rightarrow S_4 = \frac{1,1}{\sqrt{4,45}} 88,05$$

$$\mathbf{S_4 = 45,91 \text{ kN}}$$

Ravnoteža čvora K:

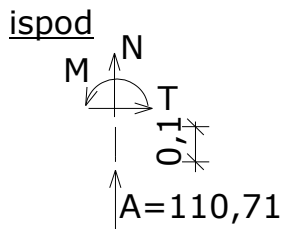
Čvor je simetričan čvoru J:

$$\mathbf{S_3 = 88,05 \text{ kN}}$$

$$\mathbf{S_5 = 45,91 \text{ kN}}$$

## UNUTARNJE SILE U KARAKTERISTIČNIM TOČKAMA

### TOČKA D

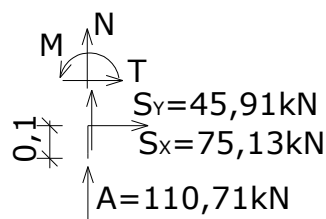


$$M_D^{IS} = 0 \text{ kNm}$$

$$T_D^{IS} = 0 \text{ kN}$$

$$N_D^{IS} = -A = -110,71 \text{ kN}$$

iznad

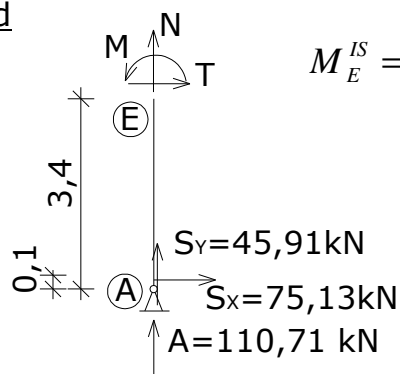


$$T_D^{IZ} = -S_{1X} = -75,13 \text{ kN}$$

$$N_D^{IZ} = -A - S_{1X} = -110,71 - 45,91 = -156,62 \text{ kN}$$

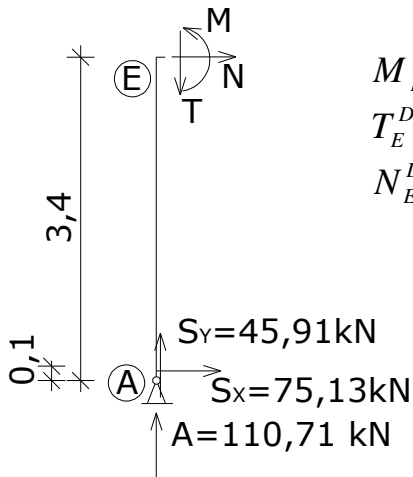
### TOČKA E

ispod



$$M_E^{IS} = -S_{1X} \cdot 3,3 = -75,13 \cdot 3,3 = -247,93 \text{ kNm}$$

desno



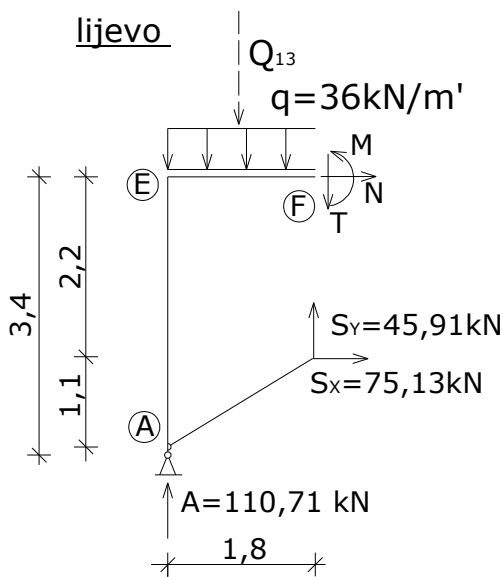
$$M_E^D = -S_{x1} \cdot 3,3 = -247,93 \text{ kNm}$$

$$T_E^D = S_{y1} + A = 45,91 + 110,71 = 156,62 \text{ kN}$$

$$N_E^D = -S_{x1} = -75,13 \text{ kN}$$

TOČKA F

lijevo



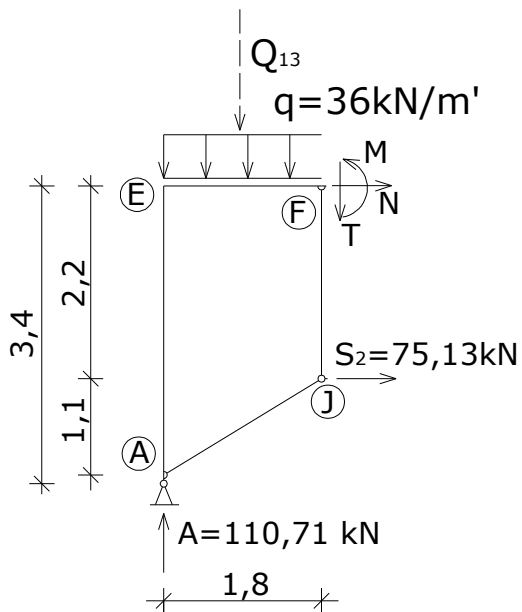
$$Q_{13} = q \cdot 1,8 = 36 \cdot 1,8 = 64,8 \text{ kN}$$

$$M_F^L = A \cdot 1,8 - S_{x1} \cdot 2,2 - Q_{13} \cdot 0,9 = -24,33 \text{ kNm}$$

$$T_F^L = A + S_{y1} - Q_{13} = 91,82 \text{ kN}$$

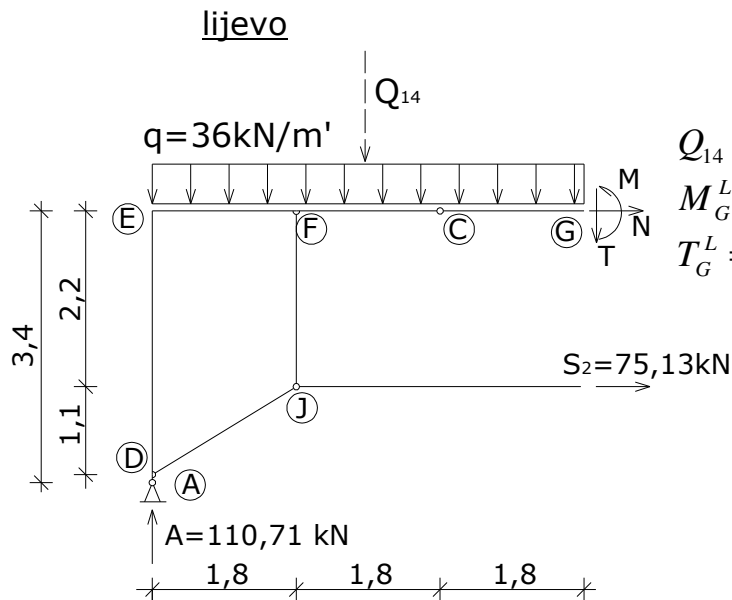
$$N_F^L = -S_{x1} = -75,13 \text{ kN}$$

desno



$$T_F^D = A - Q_{13} = 45,91 \text{ kN}$$

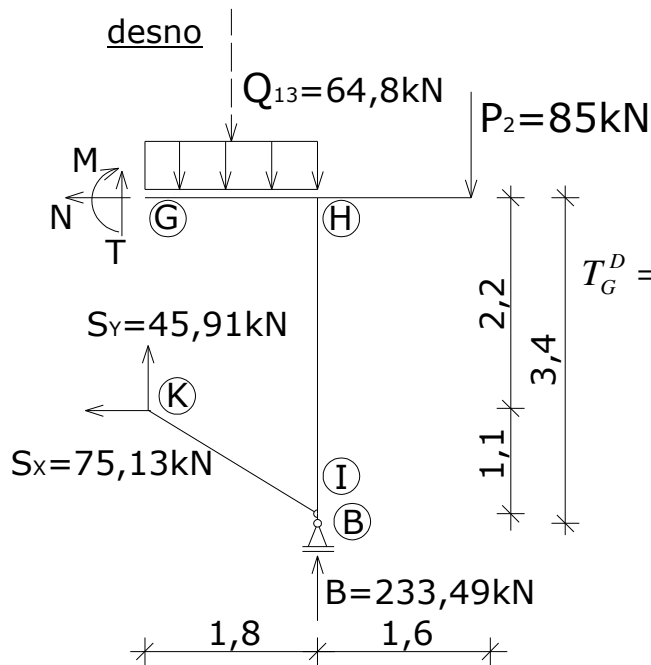
## TOČKA G



$$Q_{14} = q \cdot 5,4 = 194,4 \text{ kN}$$

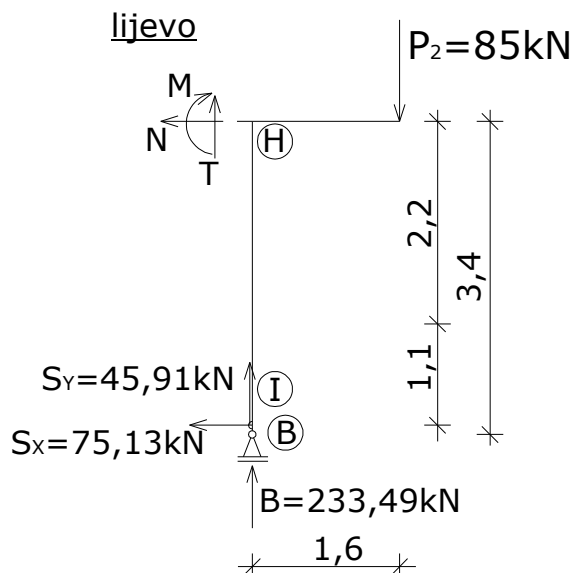
$$M_G^L = A \cdot 5,4 - Q_{14} \cdot 2,7 - S_2 \cdot 2,2 = -92,32 \text{ kNm}$$

$$T_G^L = A - Q_{14} = -83,69 \text{ kN}$$



$$T_G^D = P_2 - B - S_y + Q_{13} = -129,6 \text{ kN}$$

## TOČKA H

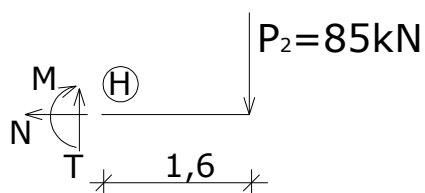


$$M_H^L = -P_2 \cdot 1,6 - S_x \cdot 3,3 = 383,93 \text{ kNm}$$

$$T_H^L = P_2 - B - S_y = -194,4 \text{ kN}$$

$$N_H^L = -S_x = -75,13 \text{ kN}$$

desno

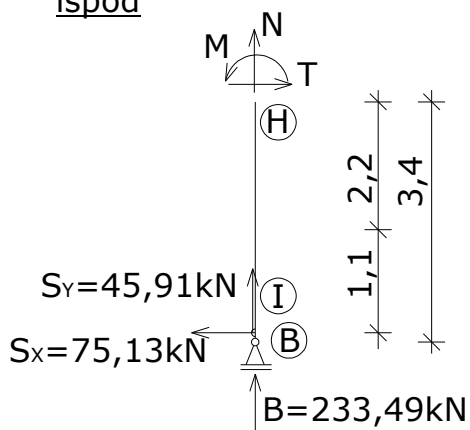


$$M_H^D = -P_2 \cdot 1,6 = -136 \text{ kNm}$$

$$T_H^D = P_2 = 85 \text{ kN}$$

$$N_H^D = 0 \text{ kN}$$

ispod



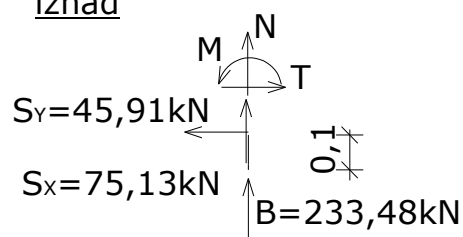
$$M_H^{IS} = S_x \cdot 3,3 = 247,93 \text{ kN}$$

$$T_H^{IS} = S_x = 75,13 \text{ kN}$$

$$N_H^{IS} = -B - S_y = -279,4 \text{ kN}$$

TOČKA I

iznad

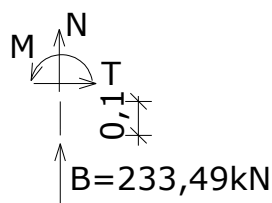


$$M_I^{IZ} = 0 \text{ kNm}$$

$$T_I^{IZ} = S_y = 75,13 \text{ kN}$$

$$N_I^{IZ} = -B - S_y = -279,4 \text{ kN}$$

ispod



$$T_I^{IS} = 0 \text{ kN}$$

$$N_I^{IS} = -B = -233,49 \text{ kN}$$

### **PROVIJESI PARABOLA (q=36kN/m')**

Raspona 1,8m

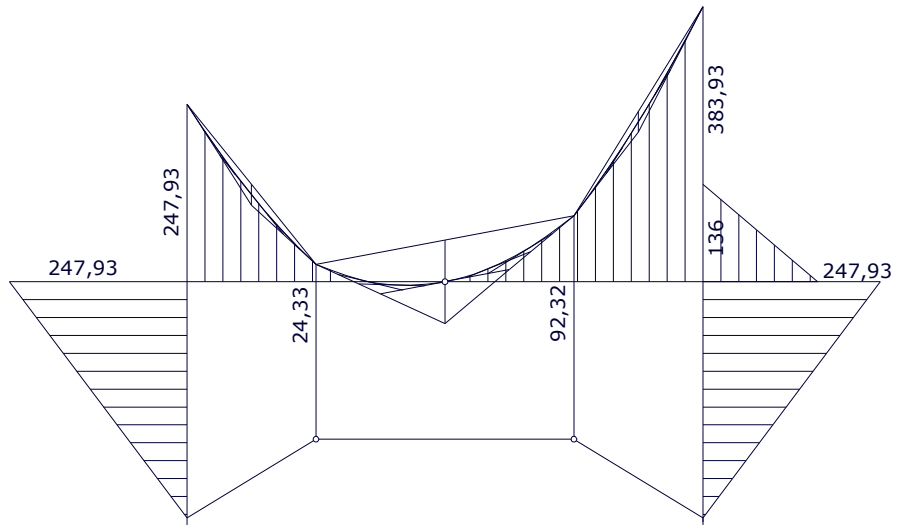
$$f = \frac{ql^2}{8} = \frac{36 \cdot 1,8^2}{8} = 14,58 \text{ kNm}$$

Raspona 3,6m

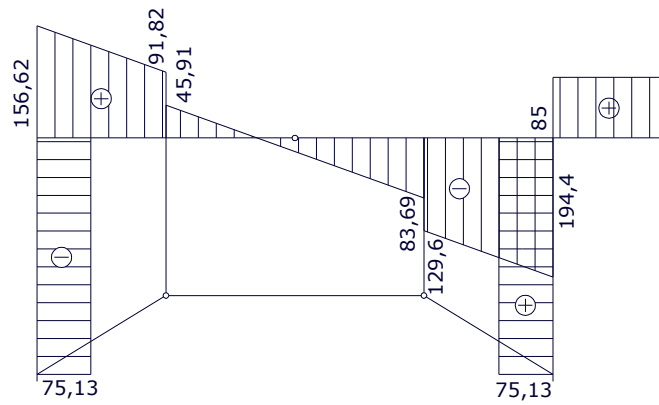
$$f = \frac{ql^2}{8} = \frac{36 \cdot 3,6^2}{8} = 58,32 \text{ kNm}$$

## DIJAGRAMI UNUTARNJIH SILA

**M**  
 MJ  
 1cm=100kNm



**T**  
 MJ  
 1cm=100kN



**N**  
 MJ  
 1cm=100kN

