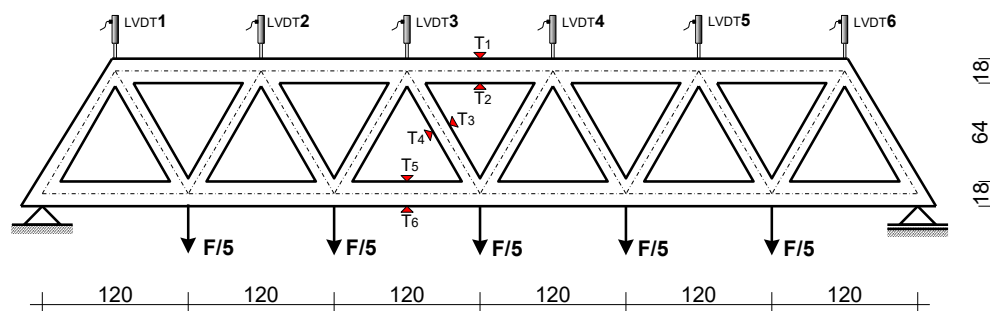


## MJERENJE POMAKA I DEFORMACIJA NA MODELIMA OD PLEKSIKLASA

### 1. MODEL REŠETKE



#### Geometrijske karakteristike štapova

Gornji i donji pojas:  $b/h = 10,5/18,0 \text{ mm}$

$$A = 189,0 \text{ mm}^2$$

$$I = 5103,0 \text{ mm}^4$$

$$W = 567,0 \text{ mm}^3$$

Ispuna:  $b/h = 10,5/15,0 \text{ mm}$

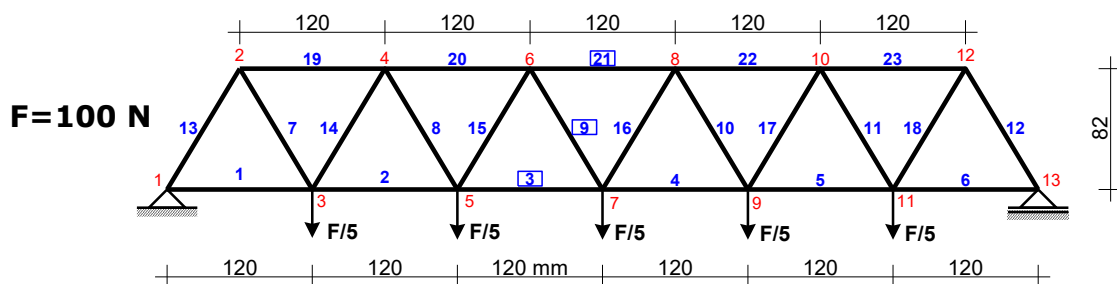
$$A = 157,5 \text{ mm}^2$$

$$I = 2953,125 \text{ mm}^4$$

$$W = 393,75 \text{ mm}^3$$

Modul elastičnosti pleksiglasa:  $E = 3300 \text{ MPa}$

#### RAČUNSKI MODEL REŠETKE



#### Unutarnje sile u štapovima br. 3, 9 i 21 za silu $F=100 \text{ N}$

Štap br. 3:  $N_5 = N_7 = +124,70 \text{ N}$

$M_5 = +78,95 \text{ Nmm}$

$M_7 = +110,12 \text{ Nmm}$

Štap br. 9:  $N_6 = N_7 = +12,10 \text{ N}$

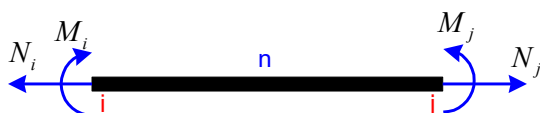
$M_6 = -31,87 \text{ Nmm}$

$M_7 = +35,50 \text{ Nmm}$

Štap br. 21:  $N_6 = N_8 = -132,00 \text{ N}$

$M_6 = +97,01 \text{ Nmm}$

$M_8 = +97,01 \text{ Nmm}$



#### Pomaci čvorova br. 2, 4 i 6 za silu $F=100 \text{ N}$

$$f_2 = 0,172 \text{ mm}$$

$$f_4 = 0,292 \text{ mm}$$

$$f_6 = 0,334 \text{ mm}$$



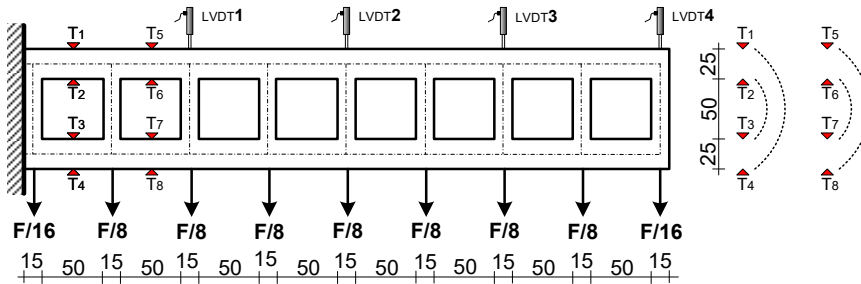
## REZULTATI MJERENJA

Mjerno mjesto	Faze opterećivanja				
	$F = 0$	$F = 50 \text{ N}$	$F = 0$	$F = 100 \text{ N}$	$F = 0$
EOT T1					
EOT T2					
EOT T3					
EOT T4					
EOT T5					
EOT T6					
LVDT 1					
LVDT 2					
LVDT 3					
LVDT 4					
LVDT 5					
LVDT 6					

EOT – elektrootporni tenzometri ( $120 \Omega$ ) za mjerenje deformacija

LVDT – senzori za mjerenje pomaka (**L**inear **V**ariable **D**ifferential **T**ransformer)

## 2. MODEL STIJENE S OTVORIMA



### Geometrijske karakteristike štapova

Gornji i donji pojas:  $b/h = 10,5/25,0 \text{ mm}$

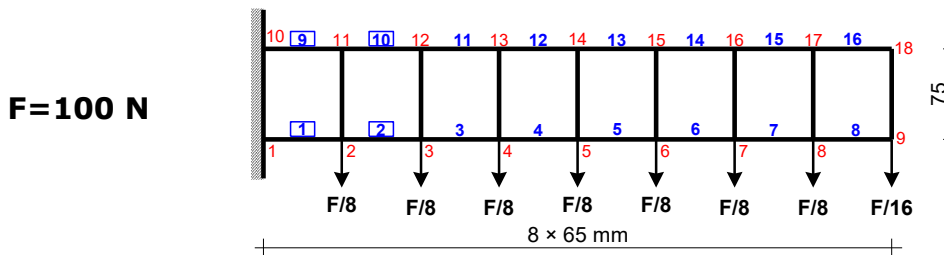
$$A = 262,5 \text{ mm}^2$$

$$I = 13671,875 \text{ mm}^4$$

$$W = 1093,75 \text{ mm}^3$$

Modul elastičnosti pleksiglasa:  $E = 3300 \text{ MPa}$

### RAČUNSKI MODEL STIJENE S OTVORIMA



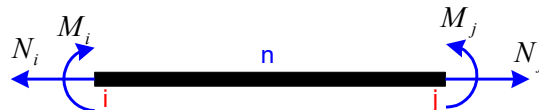
### Unutarnje sile u štapovima br. 1, 2, 9 i 10 za silu $F=100 \text{ N}$

Štap br. 1:  $N_1 = N_2 = -254,72 \text{ N}$        $M_1 = M_2 = -1927,80 \text{ Nmm}$

Štap br. 9:  $N_{10} = N_{11} = +254,72 \text{ N}$        $M_{10} = M_{11} = -1927,58 \text{ Nmm}$

Štap br. 2:  $N_2 = N_3 = -213,97 \text{ N}$        $M_2 = M_3 = -639,27 \text{ Nmm}$

Štap br. 10:  $N_{11} = N_{12} = +213,07 \text{ N}$        $M_{11} = M_{12} = -646,27 \text{ Nmm}$



### Pomaci čvorova br. 12, 14, 16 i 18 za silu $F=100 \text{ N}$

$$f_{12} = 0,567 \text{ mm}$$

$$f_{14} = 0,904 \text{ mm}$$

$$f_{16} = 1,366 \text{ mm}$$

$$f_{18} = 1,700 \text{ mm}$$

## REZULTATI MJERENJA

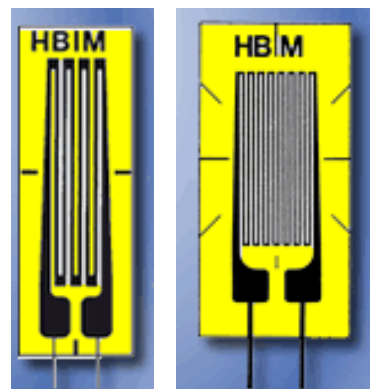
Mjerno mjesto	Faze opterećivanja				
	$F = 0$	$F = 50 \text{ N}$	$F = 0$	$F = 100 \text{ N}$	$F = 0$
EOT T1 – T4					
EOT T2 – T3					
EOT T5 – T8					
EOT T6 – T7					
M 1					
M 2					
M 3					
M 4					

EOT – elektrotoporni tenzometri ( $120 \Omega$ ) za mjerenje deformacija  
M – mikroure za mjerenje pomaka točnosti 1/100 mm

### 1. ELEKTROTOPORNI TENZOMETAR

Račun relativne deformacije

$$\varepsilon = \frac{\Delta R}{R} \cdot \frac{1}{K} \quad \begin{array}{l} \Delta R/R - \text{relativna promjena otpora} \\ K - 2,07 \text{ konstanta} \end{array}$$



### 2. WHEATSTONE –ov MOST

Oznake:

P – potenciometar

$T_m$  – mjerni otporni tenzometar

$T_k$  – komparativni otporni tenzometar

G – galvanometar

R – otpornici

B - baterije

