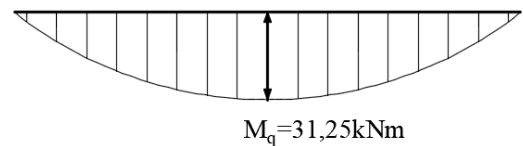
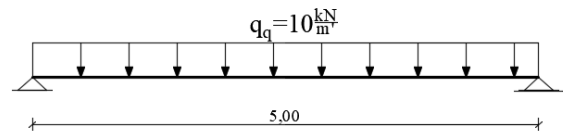
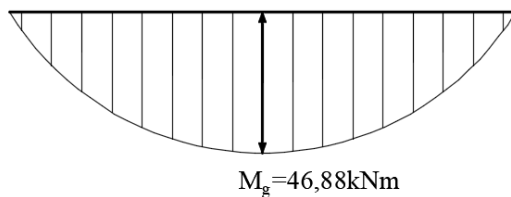
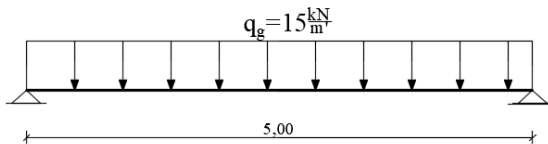
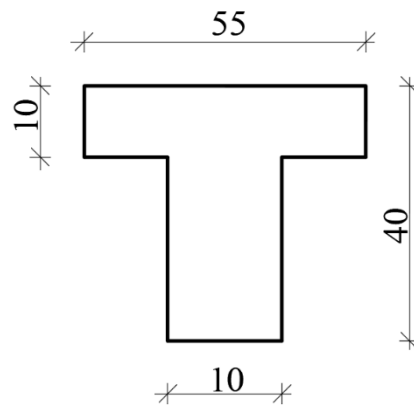


## Betonske konstrukcije

### I kolokvijum (primer)

Dimenzionisati poprečni presek nosača sa slike za vrednosti maksimalnog momenta (u 'opasnom' preseku), usvojiti i rasporediti profile armature i nacrtati plan armiranja u pogodnoj razmeri.

Dimenzije poprečnog preseka



$$b = 55 \text{ cm} \quad b_w = 10 \text{ cm} \quad h = 40 \text{ cm} \quad h_f = 10 \text{ cm}$$

C30/37      B500B (armatura)

$$\text{C30/37} \rightarrow f_{ck} = 30 \text{ Mpa}$$

$$f_{cd} = \alpha_{cc} \cdot \frac{f_{ck}}{\gamma_c} \rightarrow f_{cd} = 1 \cdot \frac{30}{1,5} = 20 \text{ Mpa}$$

$$\text{B500B} \rightarrow f_{yk} = 500 \text{ Mpa}$$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} \rightarrow f_{yd} = \frac{500}{1,15} = 434,78 \text{ Mpa}$$

$$d=0,9h$$

$$d=0,9*40$$

$$d=36\text{cm}$$

$$M_g=46,88\text{kNm}$$

$$M_q=31,25\text{kNm}$$

$$M_{Ed}=1,35M_g+1,5M_q$$

$$M_{Ed}=1,35*46,88+1,5*31,25$$

$$M_{Ed}=110,16\text{kNm}$$

$$\mu_{Ed} = \frac{M_{Ed}}{b*d^2*f_{cd}}$$

(b-pritisnuta ivica preseka)

$$\mu_{Ed} = \frac{110,16 * 10^2}{55 * 36^2 * 20 * 10^{-1}}$$

$$\mu_{Ed} = \frac{110,16 * 10^2}{55 * 36^2 * 20 * 10^{-1}}$$

$$\mu_{Ed} = 0,077$$

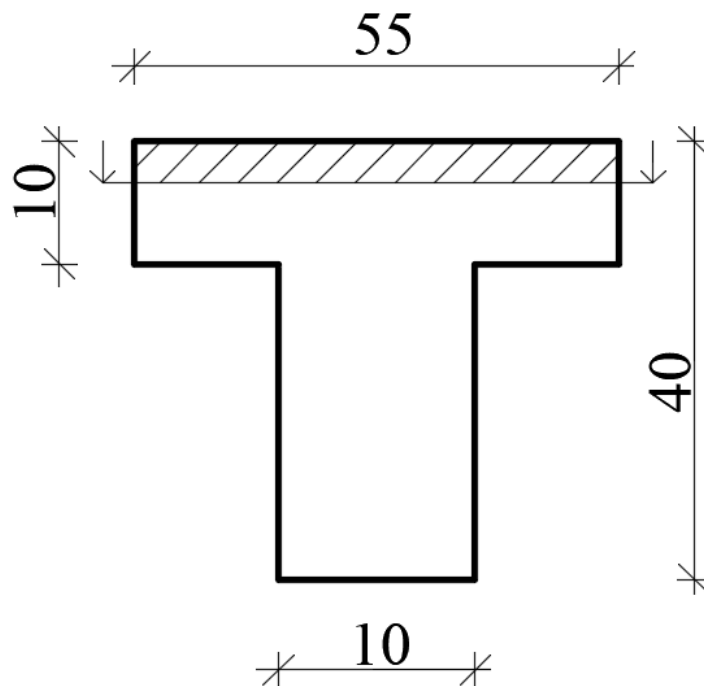
Očitano za  $\mu=0,070$ :

$$\omega=0,073; \quad \zeta=0,96; \quad \xi=0,103;$$

$$x=\xi*d$$

$$x=0,103*36$$

$$x=3,708\text{cm} < h_f=10\text{cm}$$



Presek se dimenzioniše kao pravougaoni presek  $b/h/d=55/40/36$

$$A_s = \omega \cdot b \cdot d \cdot \frac{f_{cd}}{f_{yd}} \pm \frac{N_{Ed}}{f_{yd}}$$

$$A_s = 0,073 \cdot 55 \cdot 36 \cdot \frac{20}{434,78} \pm 0$$

$$A_s = 6,64 \text{ cm}^2$$

Usvojeno 4RØ16(8,04cm<sup>2</sup>)

Minimalna površina armature:

$$A_{s,\min} \geq \max \begin{cases} 0,26 \cdot \frac{f_{ctm}}{f_{yk}} \cdot b \cdot d \\ 0,0013 \cdot b \cdot d \end{cases}$$

C30/37 →  $f_{ctm}=2,9\text{MPa}$  - srednja vrednost čvrstoće betona pri zatezanju (Tabela 3.1.- EC2)

$$A_{s,\min} \geq \begin{cases} 0,26 \cdot \frac{2,9}{500} \cdot 55 \cdot 36 = 2,98\text{cm}^2 \\ 0,0013 \cdot 55 \cdot 36 = 2,57\text{cm}^2 \end{cases} \rightarrow A_{s,\min}=2,98\text{cm}^2 < A_s$$

Maksimalna površina armature:

$$A_{s,\max} = 0,04 \cdot b \cdot h$$
$$A_{s,\max} = 0,04 \cdot 55 \cdot 40 = 88,0\text{cm}^2$$
$$A_s < A_{s,\max}$$

# Plan armiranja

