

POS 1 – ploča $d_p = 16$ cm

$$g = 0.16 \times 25 + 2.0 = 6.0 \text{ kN/m}^2$$

$$p = 8 \text{ kN/m}^2$$

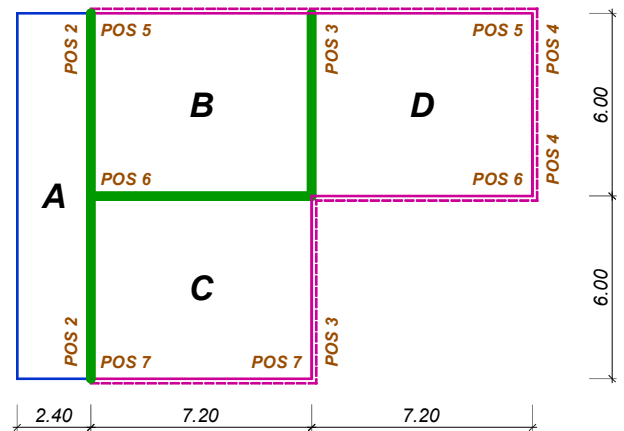
za delove ploče »B«, »C« i »D«:

$$L_y/L_x = 7.2/6.0 = 1.2$$

$$G = 6.0 \times 6.0 \times 7.2 = 259.2 \text{ kN}$$

$$P = 5.0 \times 4.0 \times 3.0 = 345.6 \text{ kN}$$

$$Q_u = 1.6 \times G + 1.8 \times P = 1036.8 \text{ kN}$$

**ploča tipa »A«**Konzolna ploča, raspona $L = 2.4$ m.

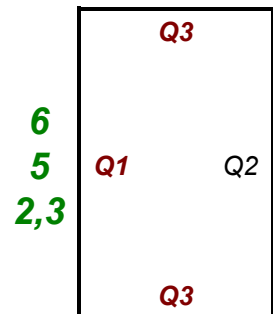
$$q_u = 1.6 \times 6.0 + 1.8 \times 8.0 = 24.0 \text{ kN/m}^2$$

$$M_u = 24.0 \times 2.4^2 / 2 = 69.1 \text{ kNm/m}$$

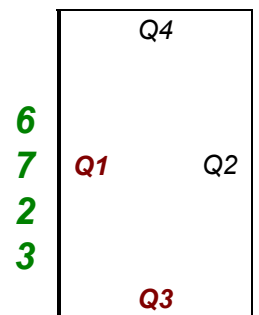
$$R_g = 6.0 \times 2.4 = 14.4 \text{ kN/m} \quad ; \quad R_p = 8.0 \times 2.4 = 19.2 \text{ kN/m}$$

ploča tipa »B«

	$L_y/L_x =$	k		G	P	U	L	g_i	p_i
				kN	kN	kN	m	kN/m	kN/m
duža strana, uklješ.	1.2	0.300	Q_1	77.8	103.7		7.20	10.80	14.40
duža strana, oslonac		0.210	Q_2	54.4	72.6		7.20	7.56	10.08
kraća strana, uklješ.		0.245	Q_3	63.5	84.7		6.00	10.58	14.11
kraći pravac, polje		0.026	M_x			27.0			
duži pravac, polje		0.023	M_y			23.8			
kraći pravac, oslonac		0.062	X			64.3			
duži pravac, oslonac		0.058	Y			60.1			

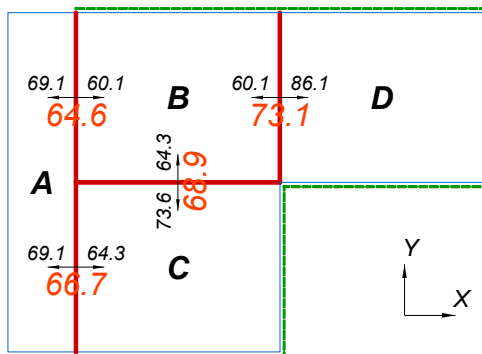
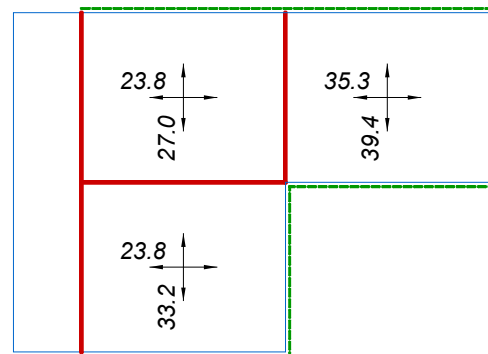
**ploča tipa »C«**

	$L_y/L_x =$	k		G	P	U	L	g_i	p_i
				kN	kN	kN	m	kN/m	kN/m
duža strana, uklješ.	1.2	0.331	Q_1	85.8	114.4		7.20	11.92	15.89
duža strana, oslonac		0.226	Q_2	58.6	78.1		7.20	8.14	10.85
kraća strana, uklješ.		0.257	Q_3	66.6	88.8		6.00	11.10	14.80
kraća strana, oslonac		0.186	Q_4	48.2	64.3		6.00	8.04	10.71
kraći pravac, polje		0.032	M_x			33.2			
duži pravac, polje		0.023	M_y			23.8			
kraći pravac, oslonac		0.071	X			73.6			
duži pravac, oslonac		0.062	Y			64.3			



ploča tipa »D«

$L_y/L_x = 1.2$			G	P	U	L	g_i	p_i	
k			kN	kN	kN	m	kN/m	kN/m	
duža strana, oslonac	0.244	Q_1	63.2	84.3		7.20	8.78	11.71	5,6
kraća strana, uklješ.	0.298	Q_2	77.2	103.0		6.00	12.87	17.16	3
kraća strana, oslonac	0.214	Q_3	55.5	74.0		6.00	9.24	12.33	4
kraći pravac, polje	0.038	M_x			39.4				
duži pravac, polje	0.034	M_y			35.3				
duži pravac, oslonac	0.083	Y			86.1				

 M_U [kNm/m] - GORNJA ZONA M_U [kNm/m] - DONJA ZONADimenzionisanje

Uopšte uzevši, veći momenti savijanja se uglavnom javljaju u Y (kraćem) pravcu pa će u skladu sa tim biti usvojene i statičke visine. Prvi red armature donje zone biće postavljen u Y pravcu, preko njega donja zona X pravca, zatim gornja zona X pravca ($\max.M_U$) i konačno gornja zona Y pravca.

$$MB 30 \Rightarrow f_B = 20.5 \text{ MPa} \quad ; \quad RA 400/500 \Rightarrow \sigma_v = 400 \text{ MPa}$$

$$\max.M_{y_u} = 68.9 \text{ kNm/m} \quad (\text{upravno na POS 6 - oslonac između ploča B i C})$$

$$a_{1y} = 3.0 \text{ cm} \Rightarrow h_y = d - a_{1y} = 16 - 3 = 13 \text{ cm}$$

$$k = \frac{13}{\sqrt{\frac{68.9}{2.05}}} = 2.242 \quad \Rightarrow \quad \varepsilon_b/\varepsilon_a = 3.5/9.104\% \quad ; \quad \bar{\mu} = 22.480\% \quad ; \quad \zeta = 0.884$$

$$A_{aY} = 22.480 \times \frac{100 \times 13}{100} \times \frac{2.05}{40} = 14.98 \text{ cm}^2/\text{m}$$

$$\text{usvojeno: } R\emptyset 14/10 \quad (15.39 \text{ cm}^2/\text{m})$$

$$A_{ap} = 0.2 \times 14.98 = 3.00 \text{ cm}^2/\text{m}$$

$$\text{usvojeno: } R\emptyset 10/20 \quad (3.93 \text{ cm}^2/\text{m}) \text{ – podeona armatura}$$

$$\max.M_{x_u} = 73.1 \text{ kNm/m} \quad (\text{upravno na POS 3 - oslonac između ploča B i D})$$

$$h_x = h_y - (\emptyset_x + \emptyset_y)/2 = 13.0 - 1.4 = 11.6 \text{ cm}$$

$$k = \frac{11.6}{\sqrt{\frac{73.1}{2.05}}} = 1.943 \quad \Rightarrow \quad \varepsilon_b/\varepsilon_a = 3.5/5.454\% \quad ; \quad \bar{\mu} = 31.644\% \quad ; \quad \zeta = 0.837$$

$$A_{ax} = 31.644 \times \frac{100 \times 11.6}{100} \times \frac{2.05}{40} = 18.81 \text{ cm}^2/\text{m}$$

usvojeno: **RØ16/10** (20.10 cm²/m)

$$A_{ap} = 0.2 \times 18.81 = 3.76 \text{ cm}^2/\text{m}$$

usvojeno: **RØ10/20** (3.93 cm²/m) – podeona armatura

Preostala armatura u gornjoj zoni je postavljena upravno na POS 2 – oslonac između konzolne ploče "A" i ploča "B" odnosno "C". Vrednosti momenata savijanja su veoma slične (vidi šemu na prethodnoj strani). Dimenzionisanje može biti sprovedeno tačnim postupkom (pomoću tablica), ili približno – usvajanjem iste vrednosti kraka unutrašnjih sila¹ kao kod određivanja armature upravne na POS 3:

$$A_{ax} \approx \frac{66.7 \times 10^2}{0.837 \times 11.6 \times 40} = 17.17 \text{ cm}^2/\text{m}$$

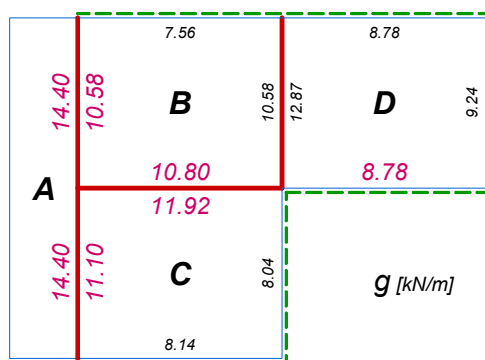
usvojeno: **RØ16/10** (20.10 cm²/m)

Dimenzionisanje u ostalim preseccima (donja zona) je sprovedeno uprošćenim postupkom, usvajajući približnu vrednost kraka unutrašnjih sila. ($z \approx 0.9 \times h$). Potrebna i usvojena površina armature prikazane su tabelarno.

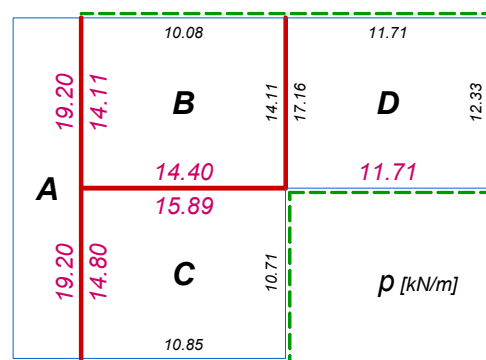
ploča	pravac	h	M _u	A _{a,potr.}	Ø	e _a	A _{a,usv.}
		cm	kNm/m	cm ² /m	mm	cm	cm ² /m
B	Y	13.3	27.0	5.64	12	20	5.65
C	Y	13.3	33.2	6.93	12	15	7.54
D	Y	13.3	39.4	8.23	14	15	10.26
B	X	11.9	23.8	5.56	12	20	5.65
C	X	11.9	23.8	5.56	12	20	5.65
D	X	11.9	35.3	8.24	14	15	10.26

Opterećenje na grede POS 2 – POS 7

STALNO OPTERECENJE



POVREMENO OPTERECENJE



Ovom opterećenju je potrebno dodati sopstvenu težinu greda. Opterećenje koje NIJE neophodno sračunati za potrebe zadatka je ispisano sitnijim fontom.

¹ Treba primetiti da je stvarna vrednost kraka unutrašnjih sila manja od uobičajene približne vrednosti $z \approx 0.9h$, pa približan postupak određivanja potrebne površine armature nije na strani sigurnosti. Uostalom, najopterećeniji presek je i dimenzionisan tačnim postupkom da ne bismo načinili takav propust.

POS 6 – greda $b/d = 30/60$ cm

Greda je sistema kontinualnog nosača preko tri oslonca, raspona 2×7.2 m, opterećena sopstvenom težinom i opterećenjem od POS 1.

Analiza opterećenja

a. prvo polje

$$\text{sopstvena težina:} \quad 0.3 \times 0.6 \times 25 = 4.50 \text{ kN/m}$$

$$\text{od POS 1 (ploča "B")} \quad Q_1^B/L_y = 77.8/7.2 = 10.80 \text{ kN/m}$$

$$\text{od POS 1 (ploča "C")} \quad Q_1^C/L_y = 85.8/7.2 = 11.92 \text{ kN/m}$$

$$\text{ukupno, stalno opterećenje} \quad g_1 = 27.22 \text{ kN/m}$$

$$\text{od POS 1 (ploča "B")} \quad Q_1^B/L_y = 103.7/7.2 = 14.40 \text{ kN/m}$$

$$\text{od POS 1 (ploča "C")} \quad Q_1^C/L_y = 114.4/7.2 = 15.89 \text{ kN/m}$$

$$\text{ukupno, povremeno opterećenje} \quad p_1 = 30.29 \text{ kN/m}$$

$$q_{u1} = 1.6 \times 27.22 + 1.8 \times 30.29 = 98.07 \text{ kN/m}$$

b. drugo polje

$$\text{sopstvena težina:} \quad 0.3 \times 0.6 \times 25 = 4.50 \text{ kN/m}$$

$$\text{od POS 1 (ploča "D")} \quad Q_1^D/L_y = 63.2/7.2 = 8.78 \text{ kN/m}$$

$$\text{ukupno, stalno opterećenje} \quad g_2 = 13.28 \text{ kN/m}$$

$$\text{od POS 1 (ploča "D")} \quad Q_1^D/L_y = 84.3/7.2 = 11.71 \text{ kN/m}$$

$$\text{ukupno, povremeno opterećenje} \quad p_2 = 11.71 \text{ kN/m}$$

$$q_{u2} = 1.6 \times 13.28 + 1.8 \times 11.71 = 42.33 \text{ kN/m}$$

Reakcije oslonaca

$$A_g = \left(\frac{7}{16} \times 27.22 - \frac{1}{16} \times 13.28 \right) \times 7.2 = 79.8 \text{ kN}$$

$$A_p = \left(\frac{7}{16} \times 30.29 - \frac{1}{16} \times 11.71 \right) \times 7.2 = 90.1 \text{ kN}$$

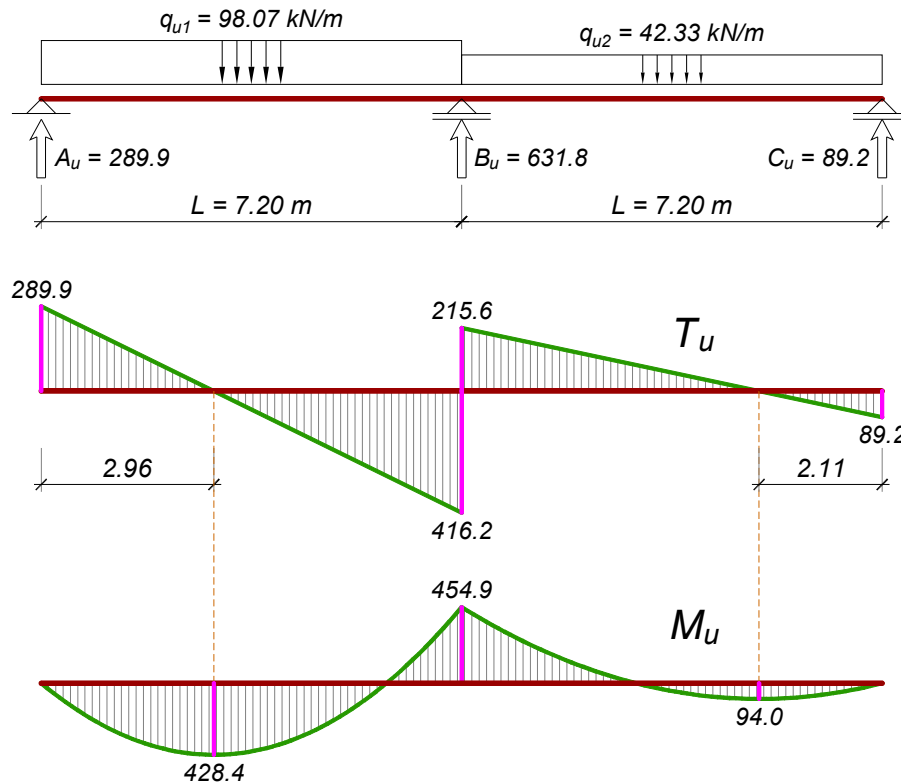
$$C_g = \left(\frac{7}{16} \times 13.28 - \frac{1}{16} \times 27.22 \right) \times 7.2 = 29.6 \text{ kN}$$

$$C_p = \left(\frac{7}{16} \times 11.71 - \frac{1}{16} \times 30.29 \right) \times 7.2 = 23.3 \text{ kN}$$

Nije neophodno sračunati srednje reakcije B (ne traži se dimenzionisanje tog stuba, a nije potrebno ni za proračun T sila ili maksimalnog momenta savijanja u polju. Ipak, za kontrolu:

$$B_g = \frac{5}{8} \times (27.22 + 13.28) \times 7.2 = 182.3 \text{ kN}$$

$$B_p = \frac{5}{8} \times (30.29 + 11.71) \times 7.2 = 189.0 \text{ kN}$$

Dijagrami graničnih momenata savijanja i transverzalnih sila

$$A_u = 1.6 \times 79.8 + 1.8 \times 90.1 = 289.9 \text{ kN} = T_u^A$$

$$T_u^{B,L} = 98.07 \times 7.2 - 289.9 = 416.2 \text{ kN}$$

$$x_{\max} = \frac{A_u}{q_{u1}} = \frac{289.9}{98.07} = 2.96 \text{ m} \Rightarrow M_{u1,\max} = 289.9 \times 2.96 - \frac{98.07 \times 2.96^2}{2} = 428.4 \text{ kNm}$$

$$C_u = 1.6 \times 29.6 + 1.8 \times 23.3 = 89.2 \text{ kN} = T_u^C$$

$$T_u^{B,D} = 42.33 \times 7.2 - 89.2 = 215.6 \text{ kN}$$

$$x_{\max} = \frac{C_u}{q_{u2}} = \frac{89.2}{42.33} = 2.11 \text{ m} \Rightarrow M_{u2,\max} = 89.2 \times 2.11 - \frac{42.33 \times 2.11^2}{2} = 94.0 \text{ kNm}$$

$$M_{u,\text{osl}} = (98.07 + 42.33) \times \frac{7.2^2}{16} = 454.9 \text{ kNm} - \text{moment nad osloncem}$$

Dimenzionisanje POS 6

$$\text{MB 30} \Rightarrow f_B = 20.5 \text{ MPa} \quad ; \quad \text{RA 400/500} \Rightarrow \sigma_v = 400 \text{ MPa}$$

presek nad osloncem

$$\text{pretp. } a_1 = 7 \text{ cm} \Rightarrow h = 60 - 7 = 53 \text{ cm}$$

$$k = \frac{53}{\sqrt{\frac{454.9 \times 10^2}{30 \times 2.05}}} = 1.949 \Rightarrow \frac{\varepsilon_b}{\varepsilon_b} = 3.5 / 5.524\% \\ \mu = 31.398\%$$

$$A_a = 31.398 \times \frac{30 \times 53}{100} \times \frac{2.05}{40} = 25.59 \text{ cm}^2 \Rightarrow \text{usvojeno } 6R\emptyset 25 \text{ (29.45 cm}^2\text{)}$$

prvo polje

$$L_0 = 2 \times 296 = 592 \text{ cm} \Rightarrow B = \min \left\{ \begin{array}{l} 30 + 0.25 \times 592 = 178 \\ 30 + 20 \times 16 = 350 \end{array} \right\} = 178 \text{ cm}$$

$$k = \frac{53}{\sqrt{\frac{428.6 \times 10^2}{178 \times 2.05}}} = 4.890 \Rightarrow \begin{array}{l} \varepsilon_b / \varepsilon_b = 1.082 / 10\text{‰} \\ s = 0.098 \Rightarrow x = 0.098 \times 53 = 5.2 \text{ cm} < 16 \text{ cm} \\ \bar{\mu} = 4.330\% \end{array}$$

$$A_a = 4.330 \times \frac{178 \times 53}{100} \times \frac{2.05}{40} = 20.94 \text{ cm}^2 \Rightarrow \text{usvojeno } \mathbf{6R\text{\O}22} \text{ (22.80 cm}^2\text{)}$$

drugo polje

$$L_0 = 2 \times 211 = 422 \text{ cm} \Rightarrow B = \min \left\{ \begin{array}{l} 30 + \frac{0.25}{3} \times 422 = 65 \\ 30 + 8 \times 16 = 174 \end{array} \right\} = 65 \text{ cm}$$

$$k = \frac{53}{\sqrt{\frac{90.4 \times 10^2}{65 \times 2.05}}} = 6.310 \Rightarrow \begin{array}{l} \varepsilon_b / \varepsilon_b = 0.802 / 10\text{‰} \\ s = 0.074 \Rightarrow x = 0.074 \times 53 = 3.93 \text{ cm} < 16 \text{ cm} \\ \bar{\mu} = 2.578\% \end{array}$$

$$A_a = 2.578 \times \frac{65 \times 53}{100} \times \frac{2.05}{40} = 4.55 \text{ cm}^2 > 0.2 \times \frac{30 \times 60}{100} = 3.6 \text{ cm}^2$$

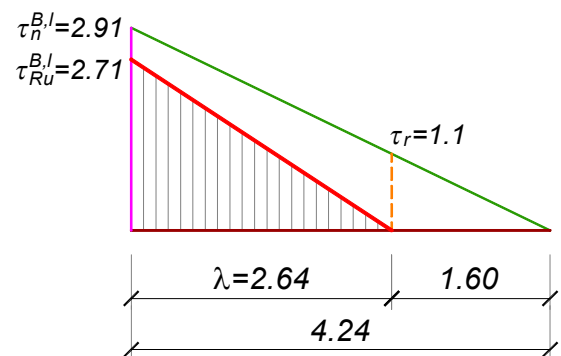
usvojeno **3R\O16** (6.03 cm²)**Osiguranje od glavnih napona zatezanja**usvojeno: $z = 0.9 \times 53 = 47.7 \text{ cm}$ presek levo od srednjeg oslonca

$$\tau_n^{B, \text{levo}} = \frac{416.2}{30 \times 47.7} = 0.291 \frac{\text{kN}}{\text{cm}^2} \left\{ \begin{array}{l} > \tau_r = 1.1 \text{ MPa} \\ < 3\tau_r \end{array} \right.$$

$$\lambda = (7.2 - 2.96) \times \left(1 - \frac{0.11}{0.291} \right) = 2.64 \text{ m}$$

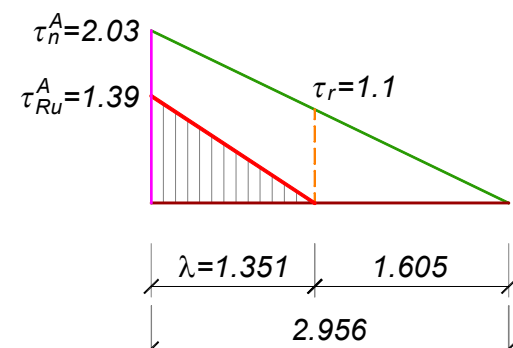
$$\tau_{Ru}^{B, \text{levo}} = \frac{3}{2} \times (0.291 - 0.11) = 0.271 \frac{\text{kN}}{\text{cm}^2}$$

$$e_u = \frac{4 \times 0.785}{30 \times 0.271} \times 40 = 15.4 \text{ cm} \Rightarrow \text{usvojeno } \mathbf{UR\text{\O}10/15} \text{ (m=4)}$$

presek kod levog oslonca

$$\tau_n^A = \frac{289.9}{30 \times 47.7} = 0.203 \frac{\text{kN}}{\text{cm}^2} \left\{ \begin{array}{l} > \tau_r = 1.1 \text{ MPa} \\ < 3\tau_r \end{array} \right.$$

$$\lambda = 2.96 \times \left(1 - \frac{0.11}{0.203} \right) = 1.351 \text{ m}$$



$$\tau_{Ru}^A = \frac{3}{2} \times (0.203 - 0.11) = 0.139 \frac{\text{kN}}{\text{cm}^2}$$

$$e_u = \frac{2 \times 0.785}{30 \times 0.139} \times 40 = 15.08 \text{ cm} \quad \Rightarrow \quad \text{usvojeno UR}\mathbf{\text{\O}}\mathbf{10/15} \text{ (} m=2 \text{)}$$

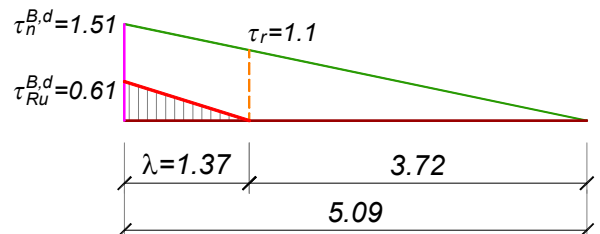
$$\Delta A_a = \frac{289.9}{2 \times 40} \times (\cot 45^\circ - \cot 90^\circ) = 3.62 \text{ cm}^2 \quad \Rightarrow \quad \text{usvojeno 2R}\mathbf{\text{\O}}\mathbf{22} \text{ (} 7.60 \text{ cm}^2 \text{)}$$

presek desno od srednjeg oslonca

$$\tau_n^{B,desno} = \frac{215.6}{30 \times 47.7} = 0.151 \frac{\text{kN}}{\text{cm}^2} \quad \left\{ \begin{array}{l} > \tau_r = 1.1 \text{ MPa} \\ < 3\tau_r \end{array} \right.$$

$$\lambda = (7.2 - 2.11) \times \left(1 - \frac{0.11}{0.151} \right) = 1.37 \text{ m}$$

$$\tau_{Ru}^{B,desno} = \frac{3}{2} \times (0.151 - 0.11) = 0.061 \frac{\text{kN}}{\text{cm}^2}$$



Biće usvojene minimalne vertikalne uzengije ($\mu=0.2\% \Rightarrow \tau_{u,u} = 0.8 \text{ MPa} > \tau_{Ru}$)

$$e_u \leq \frac{2 \times 0.503}{30 \times 0.2 \times 10^{-2}} = 16.7 \text{ cm} \quad \Rightarrow \quad \text{usvojeno UR}\mathbf{\text{\O}}\mathbf{8/15} \text{ (} m=2 \text{)}$$

presek kod desnog oslonca

$$\tau_n^C = \frac{89.1}{30 \times 47.7} = 0.062 \frac{\text{kN}}{\text{cm}^2} < \tau_r$$

Nije potrebno osiguranje armaturom.

Dimenzionisanje stuba POS S

Označeni stub predstavlja krajnji oslonac dimenzionisane grede POS 6, odnosno srednji oslonac grede POS 2. Potrebno je izvršiti analizu opterećenja za POS 2 i sračunati SAMO srednju reakciju.

Analiza opterećenja

a. prvo polje (između POS 6 i POS 7)

sopstvena težina:	$0.3 \times 0.6 \times 25$	=	4.50 kN/m
od POS 1 (ploča "A")	R_g	=	14.40 kN/m
od POS 1 (ploča "C")	$Q_3^C / L_x = 66.6 / 6.0$	=	11.10 kN/m
ukupno, stalno opterećenje	g_1	=	30.00 kN/m

od POS 1 (ploča "A")	R_p	=	19.20 kN/m
od POS 1 (ploča "C")	$Q_3^C / L_x = 88.8 / 6.0$	=	14.80 kN/m
ukupno, povremeno opterećenje	p_1	=	34.00 kN/m

b. drugo polje (između POS 6 i POS 5)

sopstvena težina:	$0.3 \times 0.6 \times 25$	=	4.50 kN/m
od POS 1 (ploča "A")	R_g	=	14.40 kN/m
od POS 1 (ploča "B")	$Q_3^B / L_x = 63.5 / 6.0$	=	10.58 kN/m
ukupno, stalno opterećenje	g_2	=	29.48 kN/m

$$\begin{array}{l} \text{od POS 1 (ploča "A")} \quad R_p = 19.20 \text{ kN/m} \\ \text{od POS 1 (ploča "B")} \quad Q_3^B/L_x = 84.7/6.0 = 14.11 \text{ kN/m} \\ \hline \text{ukupno, povremeno opterećenje} \quad p_2 = 33.31 \text{ kN/m} \end{array}$$

Reakcije oslonaca

$$B_g^{POS2} = \frac{5}{8} \times (30.0 + 29.48) \times 6.0 = 223.1 \text{ kN} \quad ; \quad B_p^{POS2} = \frac{5}{8} \times (34.0 + 33.31) \times 6.0 = 252.4 \text{ kN}$$

$$G = A_g^{POS6} + B_g^{POS2} = 79.8 + 223.1 = 302.9 \text{ kN}$$

$$P = A_p^{POS6} + B_p^{POS2} = 90.1 + 252.4 = 342.5 \text{ kN}$$

$$i = \sqrt{\frac{I_b}{A_b}} = \frac{b}{\sqrt{12}} = \frac{30}{\sqrt{12}} = 8.66 \text{ cm} \quad \Rightarrow \quad \lambda = \frac{L_i}{i} = \frac{600}{8.66} = 69.3 > 25$$

$$e_0 = L_i/300 = 600/300 = 2.0 \text{ cm}$$

$$I_b = \frac{b \times d^3}{12} = \frac{30 \times 30^3}{12} = 67500 \text{ cm}^4 \quad ; \quad E_b = 31.5 \text{ GPa} = 31.5 \times 10^6 \text{ kN/m}^2$$

$$N_E = 31.5 \times 10^6 \times 67500 \times 10^{-8} \times \frac{\pi^2}{6.0^2} = 5829 \text{ kN}$$

$$\alpha_E = \frac{N_g}{N_E} = \frac{302.9}{5829} = 0.052 \quad ; \quad e_g = \frac{M_g}{N} = 0 \quad ; \quad \varphi_\infty = 2.5$$

$$e_\varphi = (e_0 + e_g) \times \left(e^{\frac{\alpha_E}{1-\alpha_E} \times \varphi_\infty} - 1 \right) = (2 + 0) \times \left(e^{\frac{0.0052}{1-0.052} \times 2.5} - 1 \right) = 0.29 \text{ cm}$$

$$e_1/d = 0 \Rightarrow e_d = 30 \times \frac{69.3 - 25}{100} \times \sqrt{0.1 + 0} = 4.2 \text{ cm}$$

$$e_2 = e_1 + e_0 + e_\varphi + e_d = 0 + 2.0 + 0.29 + 4.2 = 6.49 \text{ cm}$$

$$N_u = 1.9 \times 302.9 + 2.1 \times 342.5 = 1294.8 \text{ kN} \quad \Rightarrow \quad n_u = \frac{1294.8}{30 \times 30 \times 2.05} = 0.702$$

$$M_u = N_u \times e_2 = 1294.8 \times 6.49 = 8410 \text{ kNcm} \quad \Rightarrow \quad m_u = \frac{8410}{30 \times 30^2 \times 2.05} = 0.152$$

$$\frac{a}{d} = \frac{4.5}{30} = 0.15 \Rightarrow \bar{\mu}_1 \approx 0.1 \quad , \quad \varepsilon_{a1} \approx 0.35\text{‰} \Rightarrow \gamma_{uG} = 1.865 \quad , \quad \gamma_{uP} = 2.065$$

Nakon korekcije koeficijenata sigurnosti, sledi:

$$N_u = 1.865 \times 302.9 + 2.065 \times 342.5 = 1272.2 \text{ kN} \quad \Rightarrow \quad n_u = \frac{1272.2}{30 \times 30 \times 2.05} = 0.690$$

$$M_u = N_u \times e_2 = 1272.2 \times 6.49 = 8260 \text{ kNcm} \quad \Rightarrow \quad m_u = \frac{8260}{30 \times 30^2 \times 2.05} = 0.149$$

$$\frac{a}{d} = \frac{4.5}{30} = 0.15 \Rightarrow \bar{\mu}_1 \approx 0.087 \quad , \quad \varepsilon_{a1} \approx 0.4\text{‰} \Rightarrow \gamma_{uG} = 1.86 \quad , \quad \gamma_{uP} = 2.06$$

$$A_{a1} = A_{a2} = 0.087 \times 30 \times 30 \times \frac{2.05}{40} = 4.03 \text{ cm}^2 \quad \Rightarrow \quad \text{usvojeno } \pm 2R\emptyset 16 (\pm 4.02 \text{ cm}^2)$$