



Univerzitet u Beogradu – Građevinski fakultet
www.grf.bg.ac.rs

Studijski program: **GRAĐEVINARSTVO**

Modul: **PŽA, HVE, MTI**

Godina/Semestar: **III godina / V semestar**

Naziv predmeta (šifra): **Betonske konstrukcije 1**

(B2S3BK, B2H3BK, B2M3BK, B1S3BK)

Nastavnik: **Jelena Dragaš**

Naslov predavanja: **Krstasto armirane ploče – plan armature.**

Datum : **23.12.2022.**

Beograd, 2021.

Sva autorska prava autora prezentacije i/ili video snimaka su zaštićena. Snimak ili prezentacija se mogu koristiti samo za nastavu na daljinu studenta Građevinskog fakulteta Univerziteta u Beogradu u školskoj 2021/2022. i ne mogu se koristiti za druge svrhe bez pismene saglasnosti autora materijala.

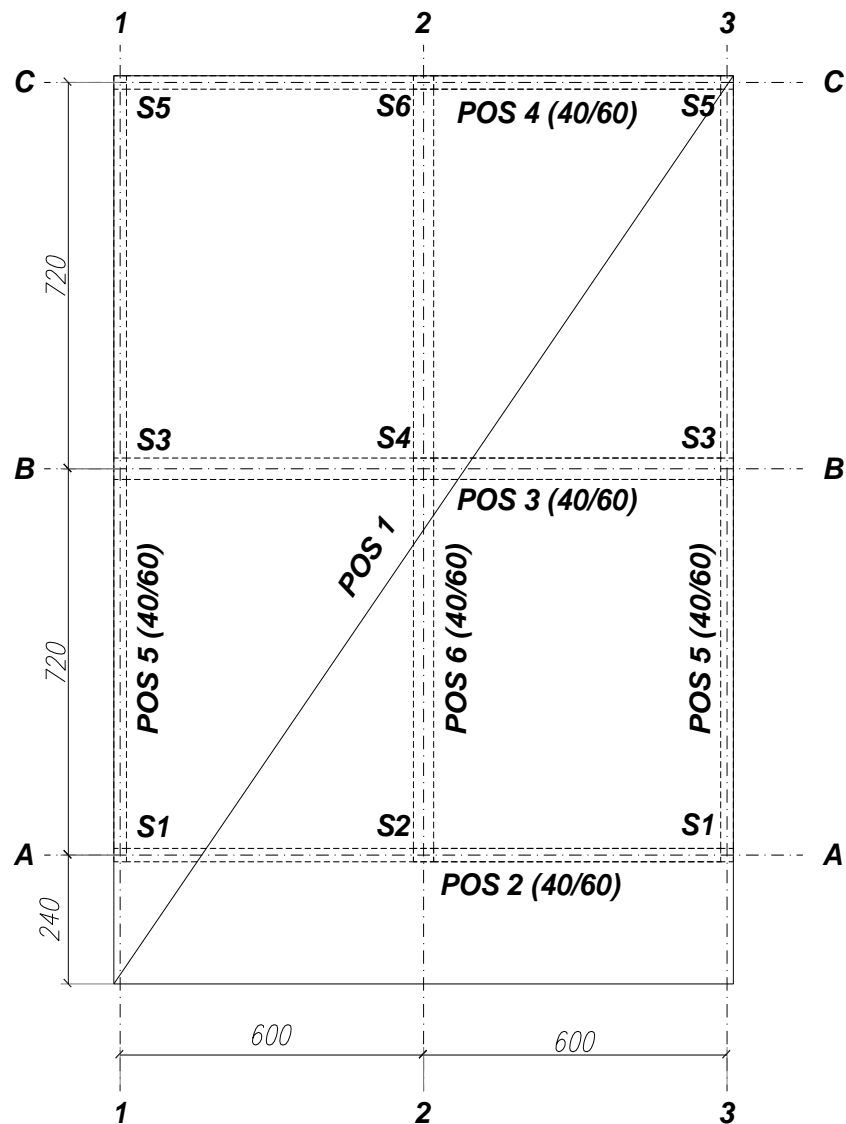
Primer 1

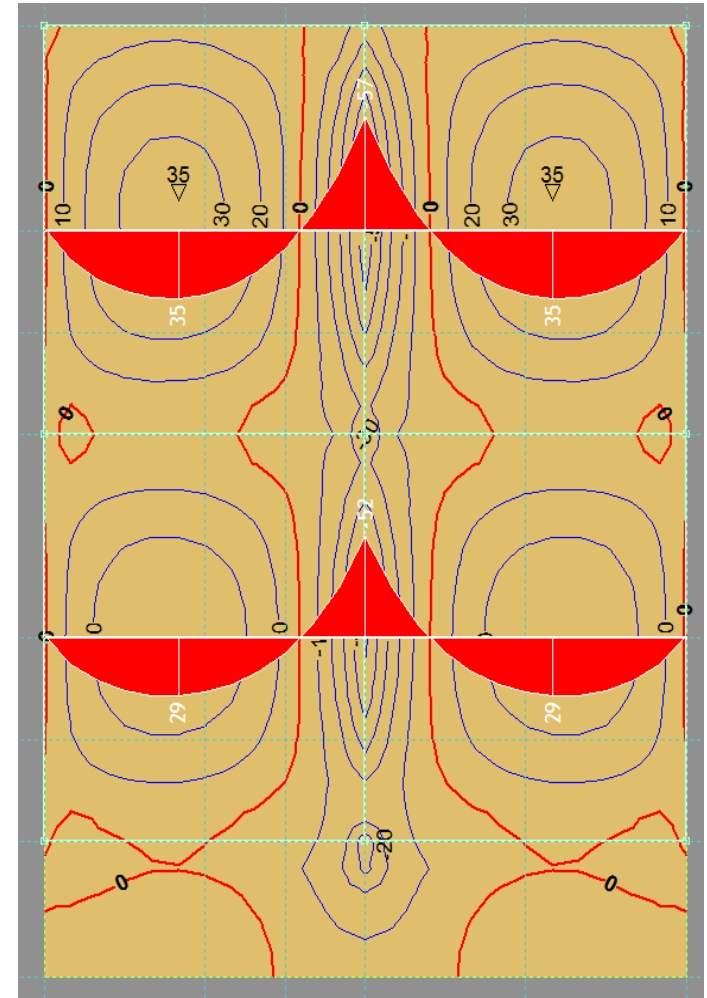
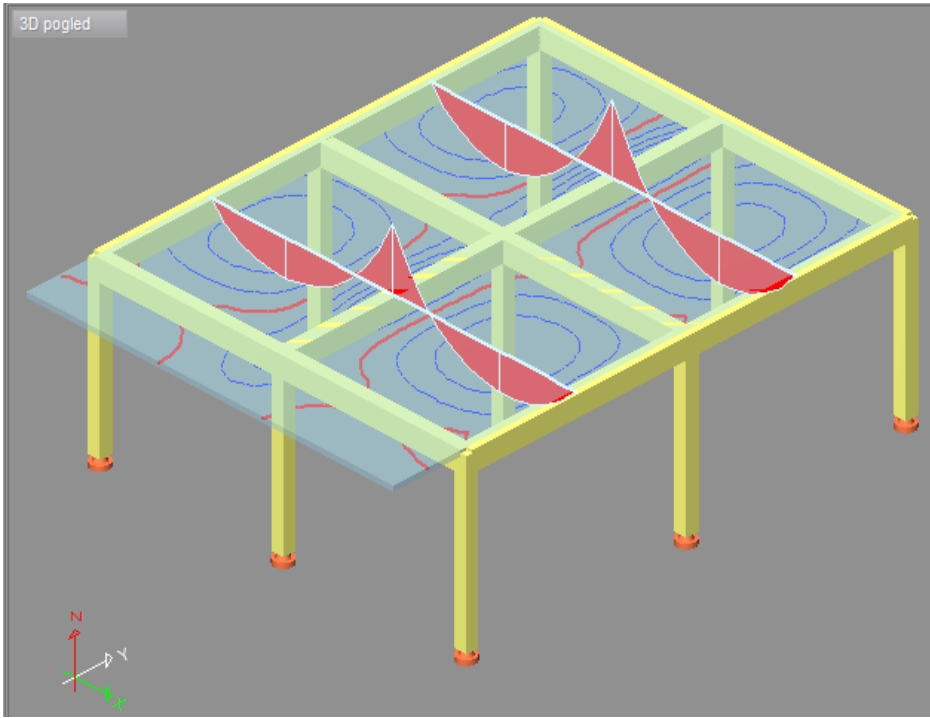
Ploča POS1, debljine $h_p=16$ cm oslonjena je na grede POS 2-6 (b/h=40/60 cm).

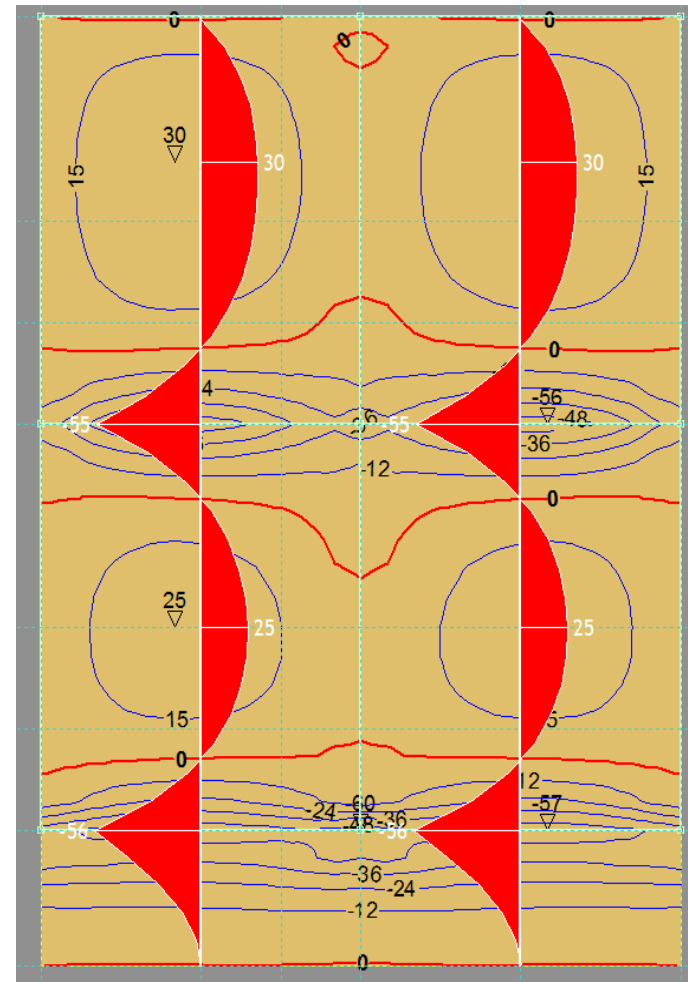
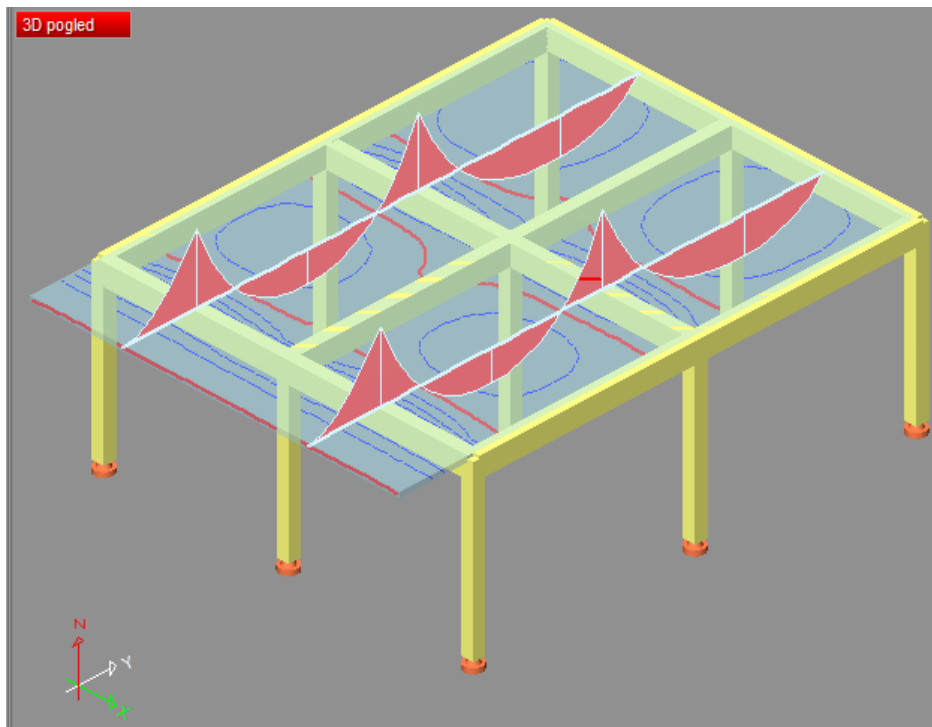
Pored sopstvene težine na ploču deluje dodatno stalno opterećenje $\Delta g=2.0$ kN/m² i promenljivo opterećenje $q=10.0$ kN/m².

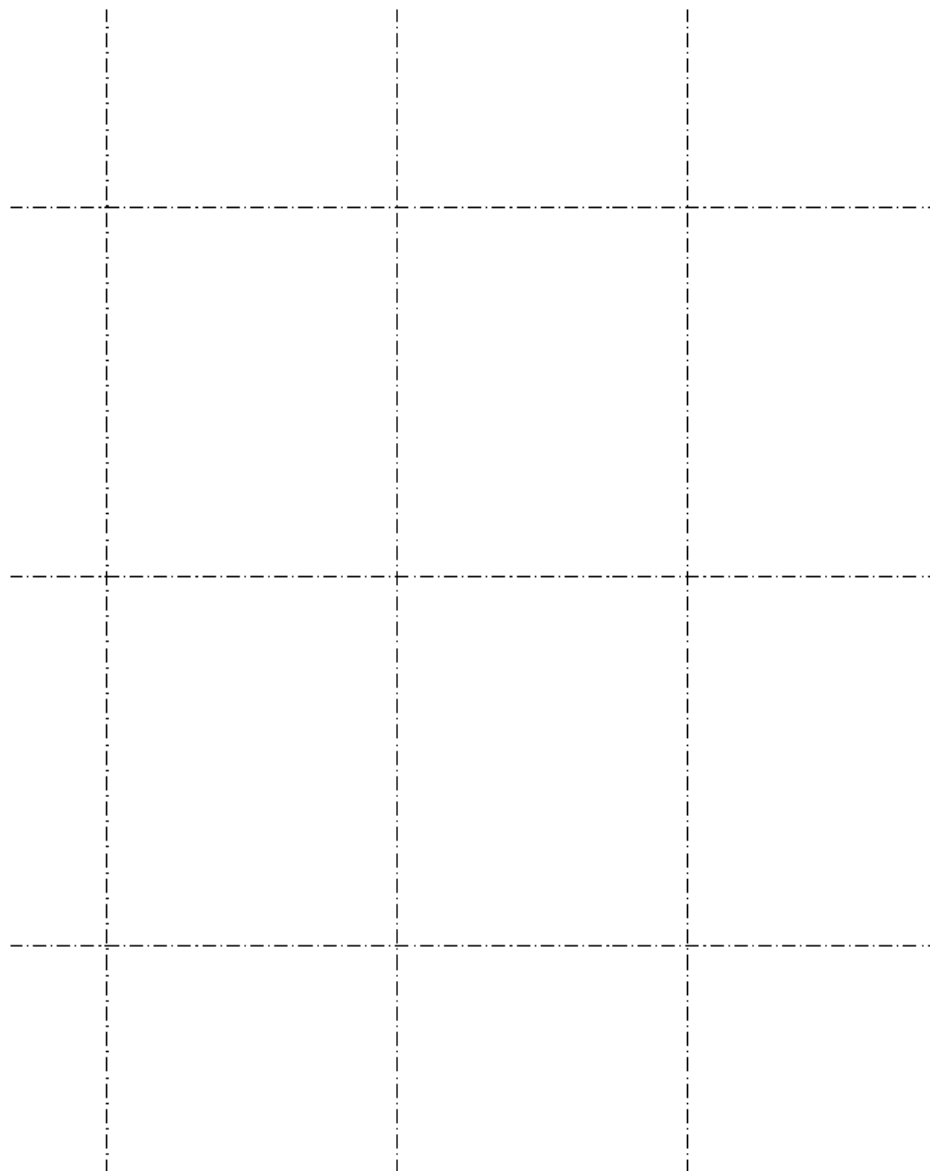
Nacrtati plan oplatae i armature gornje i donje zone ploče.

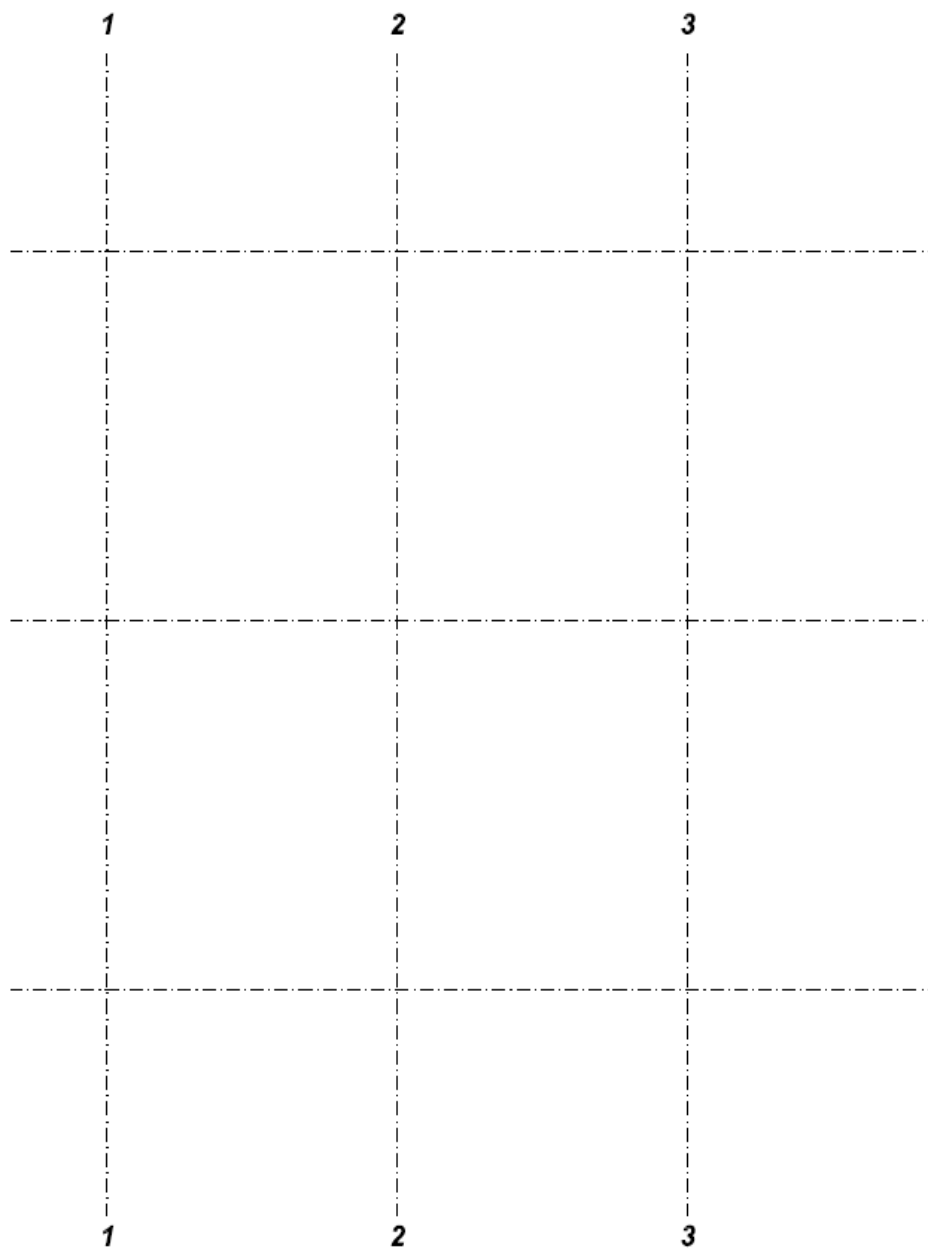
C30/37
B500B
XC3

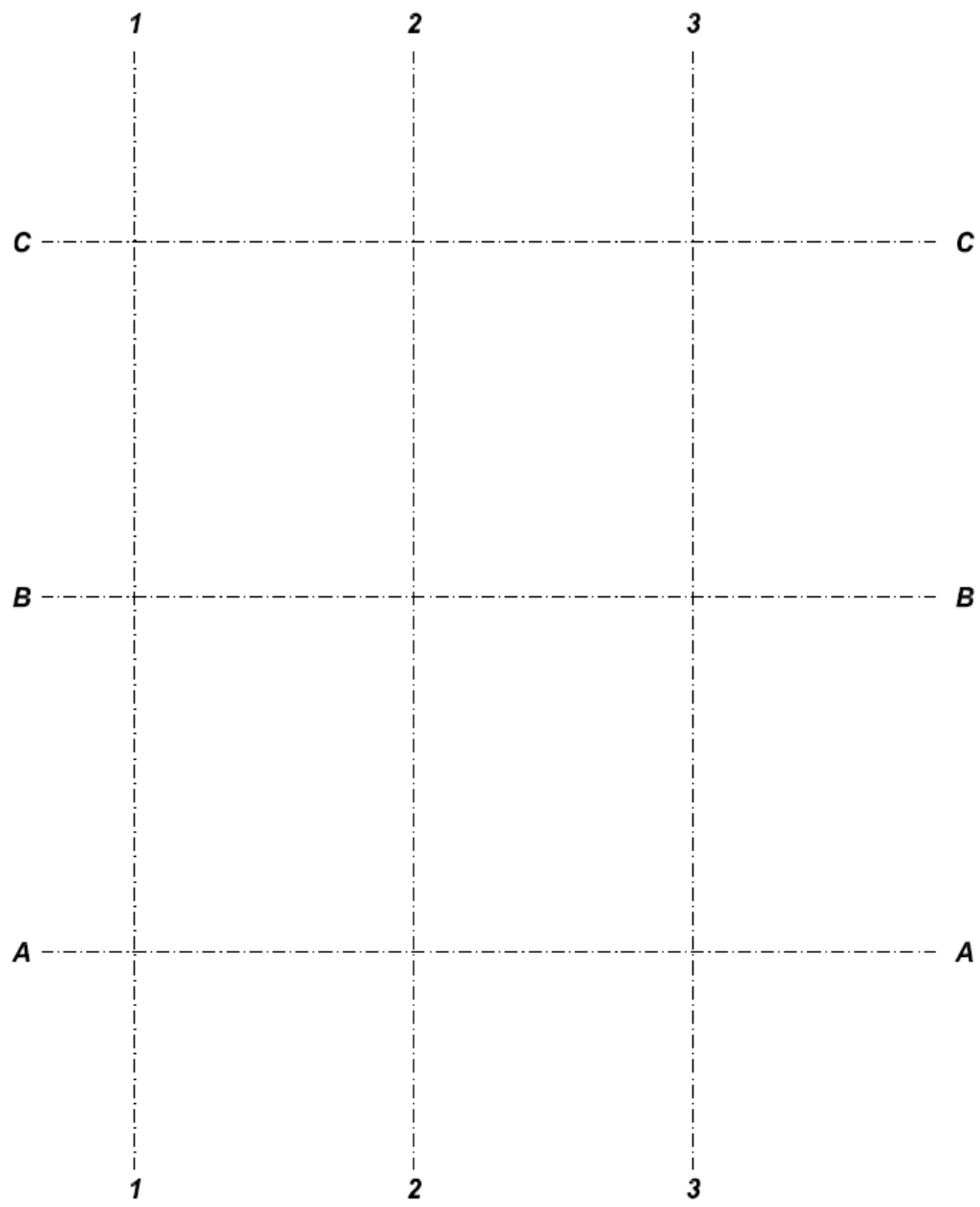


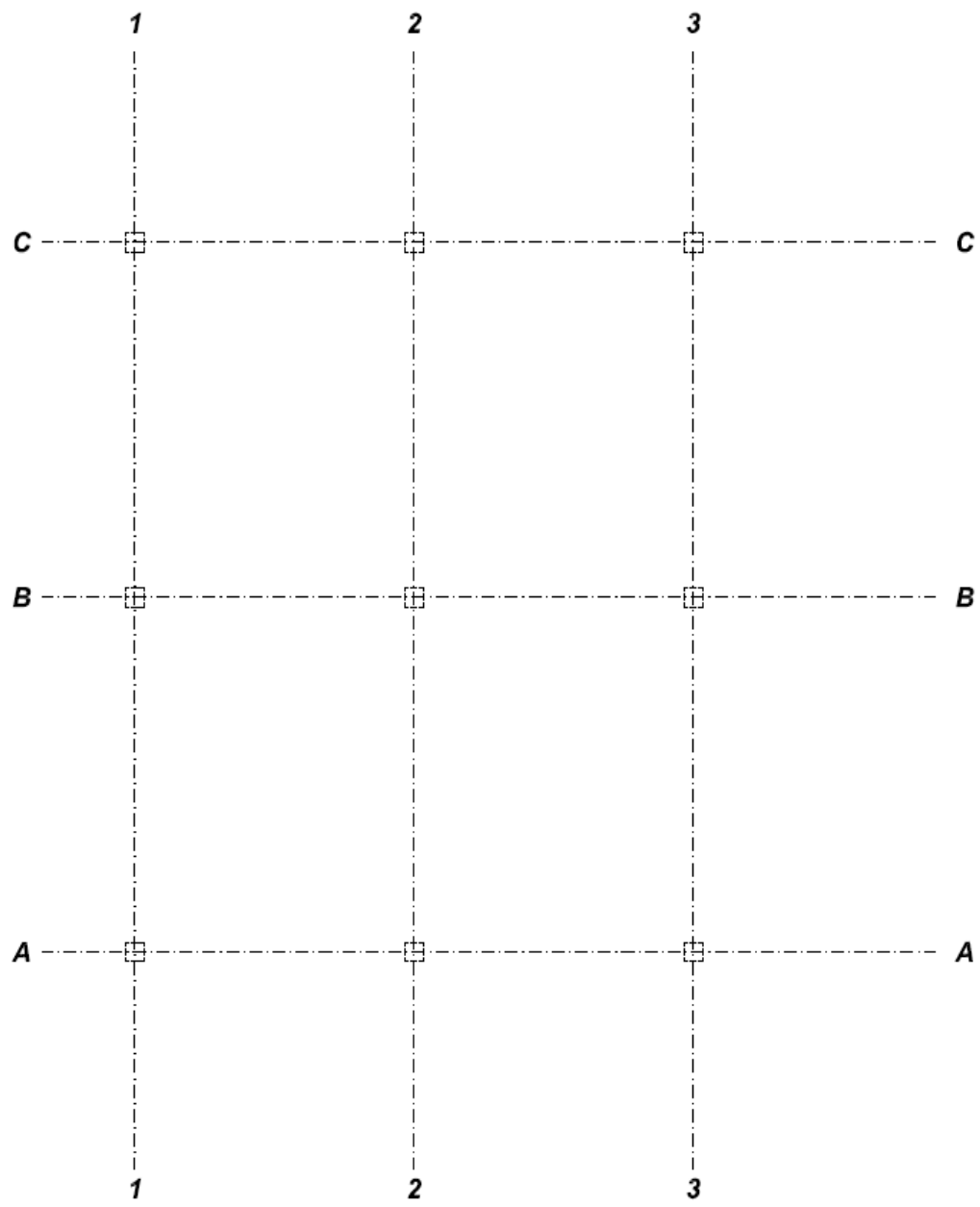


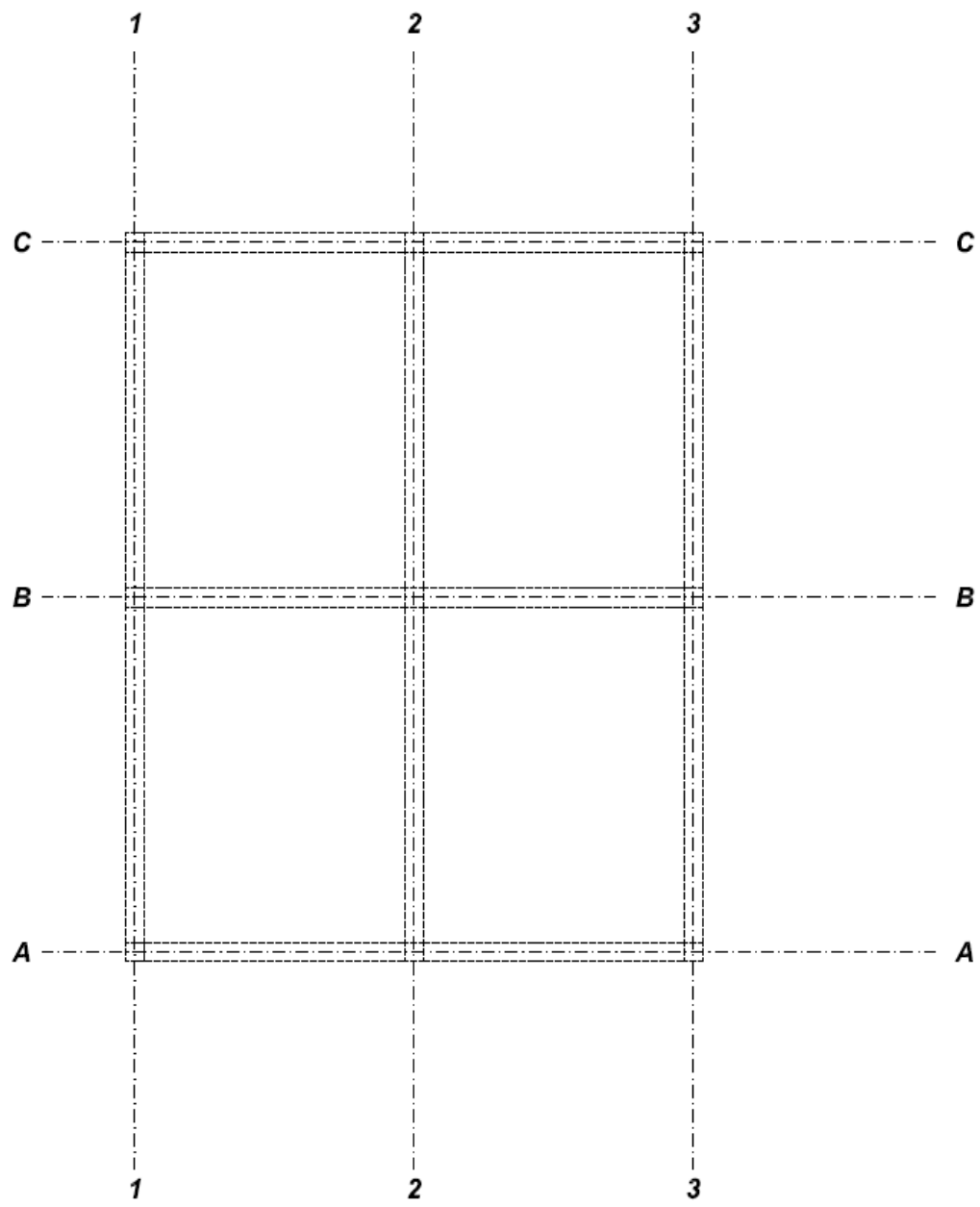


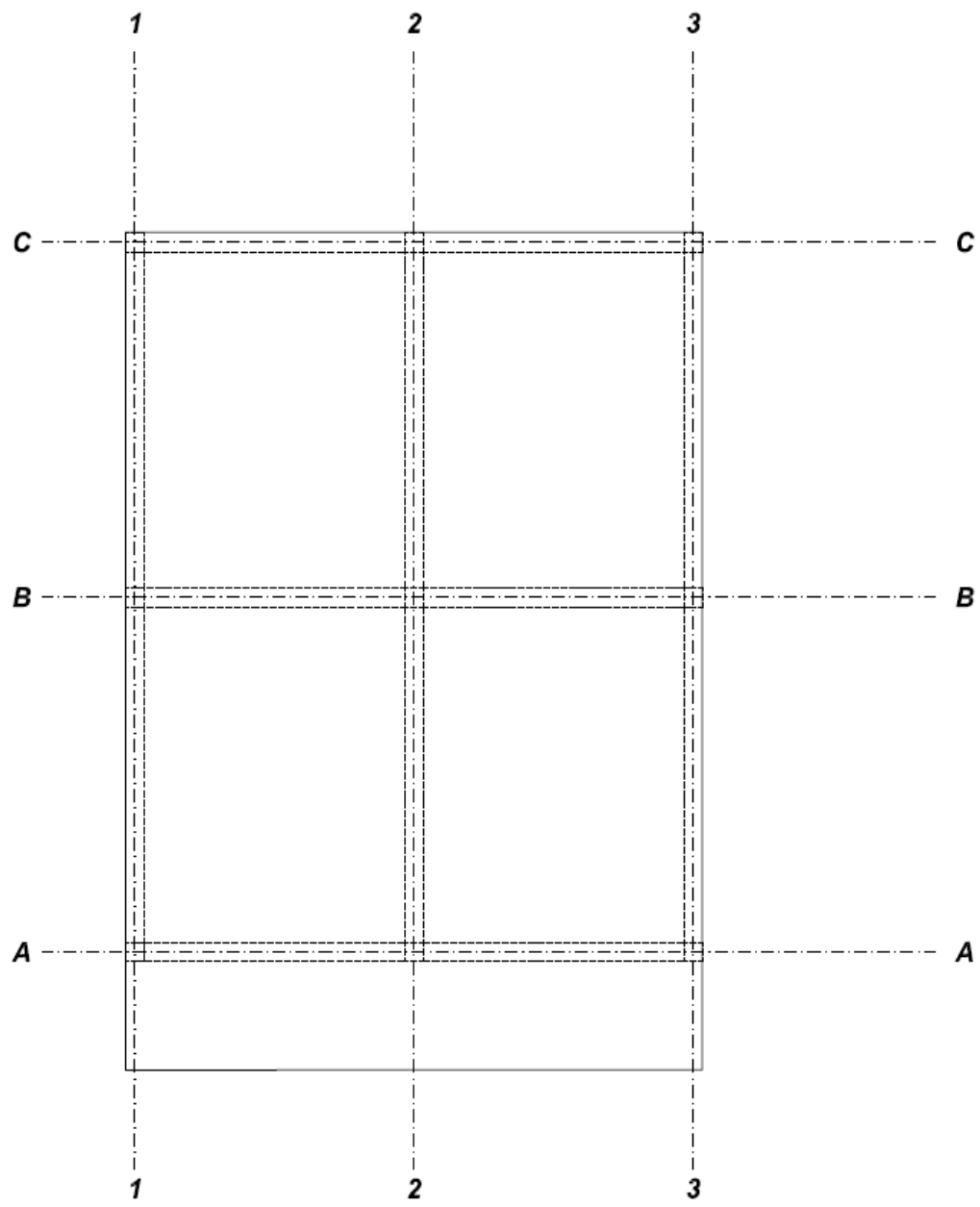


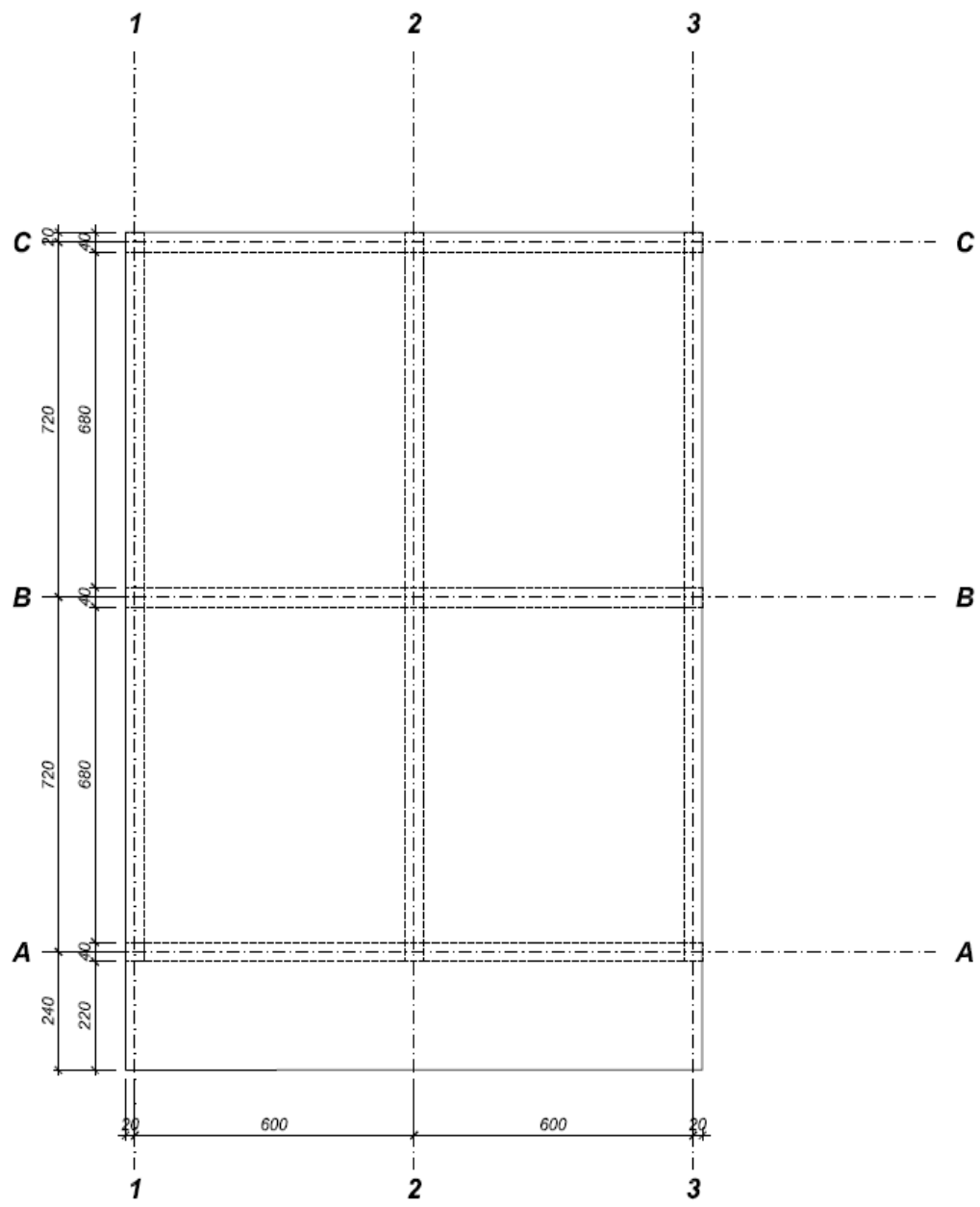




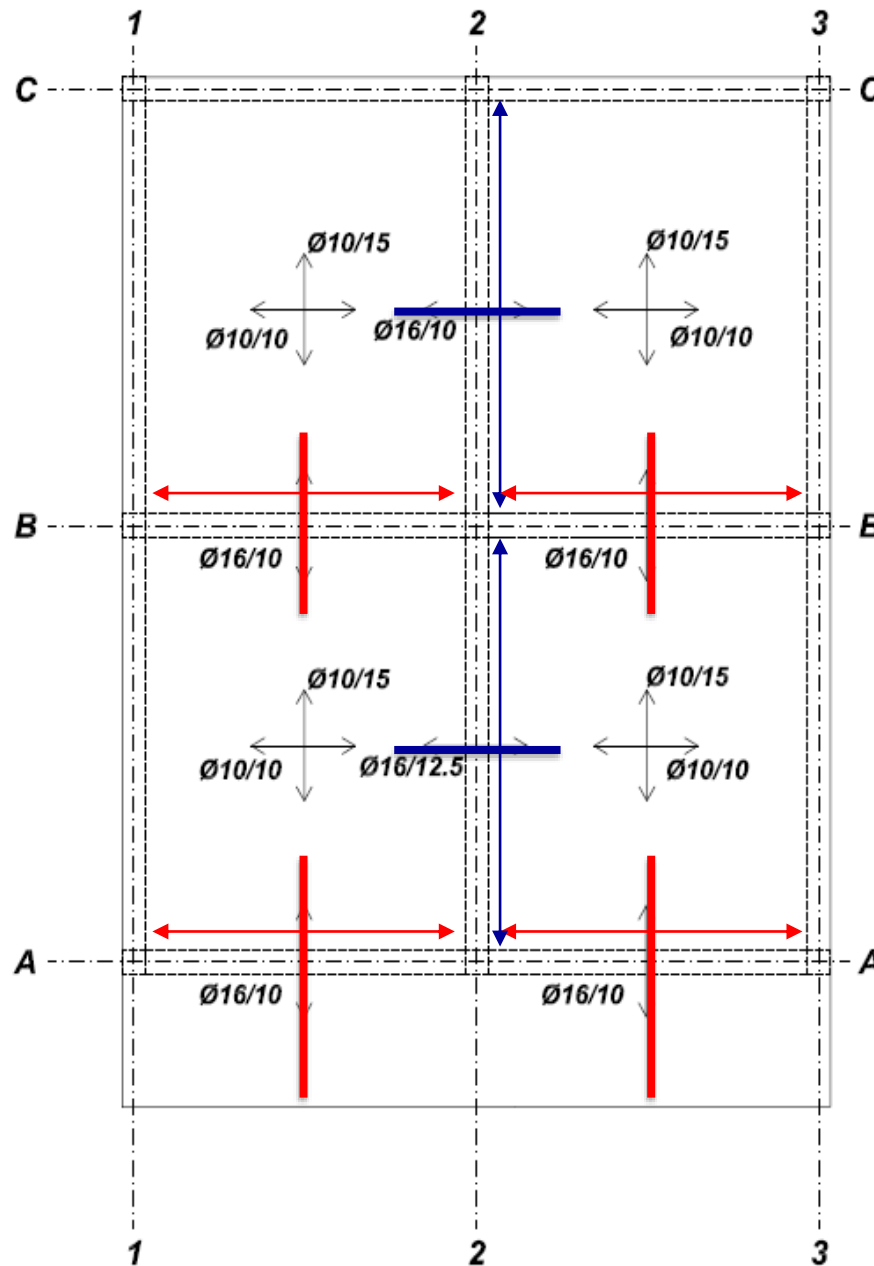




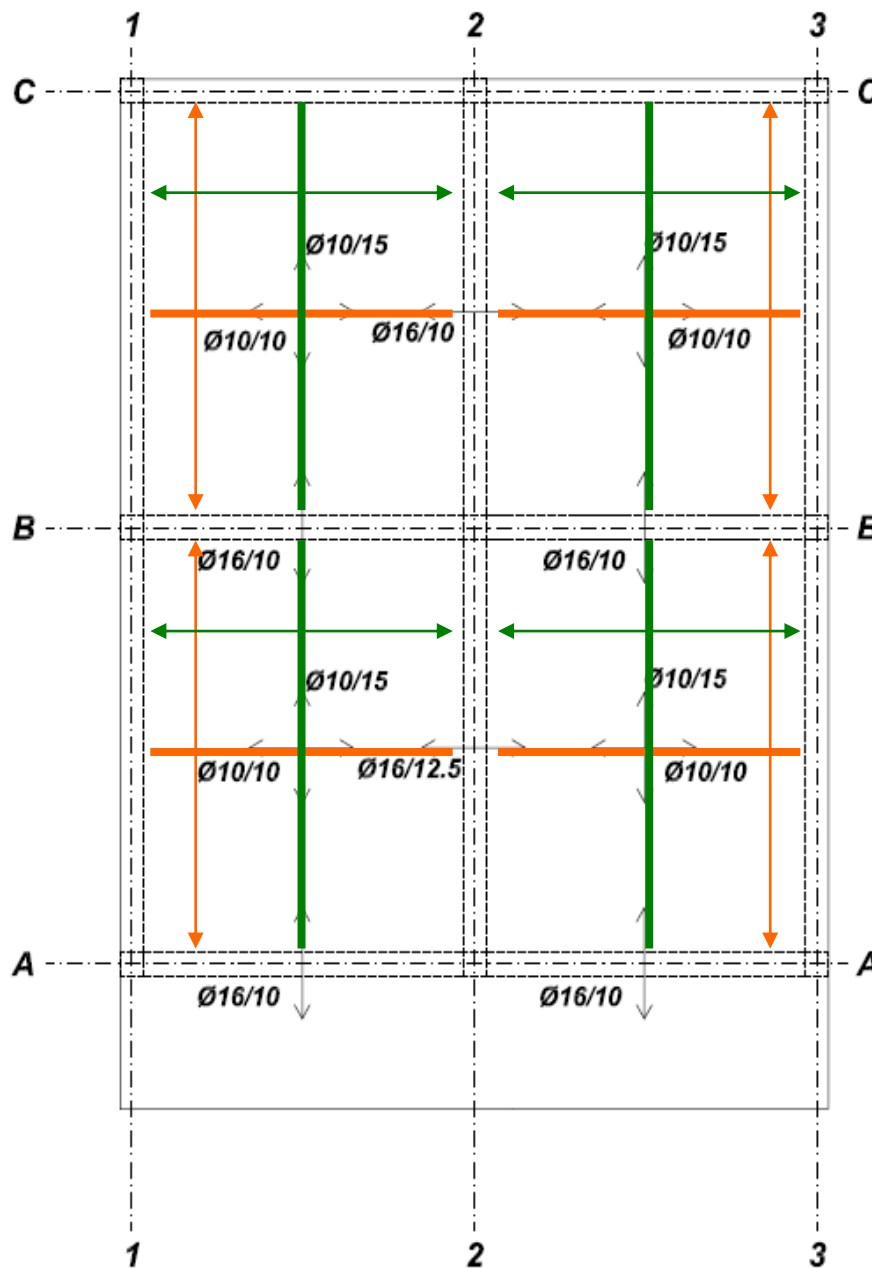




Gornja zona



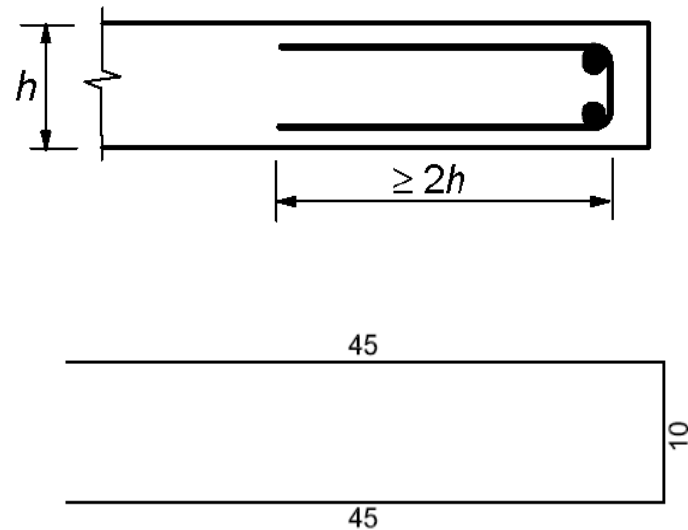
Donja zona



Dužina šipke

$$l_{\text{šipke}}^{\text{gornja zona}} / 2 = 0.3 \cdot L_{\text{min}} = 0.3 \cdot \min(600; 720) = 0.3 \cdot 600 = 180 \text{ cm}$$

Slobodna ivica



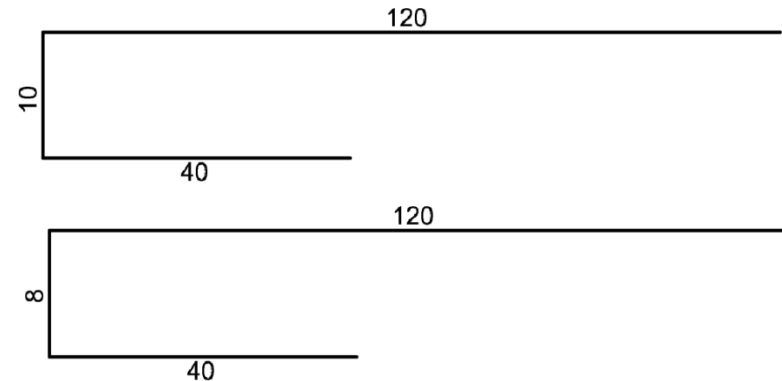
Elastično uklještenje

$$l_{\text{šipke}}^{\text{gore}} = 0.2 \cdot L = 0.2 \cdot 600 = 120 \text{ cm}$$

$$l_{\text{šipke}}^{\text{vert}} (x - \text{pravac}) = 16 - 2 \cdot 3 (c_{\text{nom}} = 3 \text{ cm}) = 10 \text{ cm}$$

$$l_{\text{šipke}}^{\text{vert}} (y - \text{pravac}) = 10 - 2 \cdot 1 (\text{Ø}10) = 8 \text{ cm}$$

$$l_{\text{šipke}}^{\text{dole}} = \underline{40 \text{ cm}}$$



Čvrstoća prijanjanja, f_{bd} [Mpa], i osnovna dužina ankerovanja, $l_{b,rqd}$ (umnožak prečnika ankerovane šipke, Ø)

Klasa betona

		C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60	C55/67	≥C60/75
f_{bd} [Mpa]	"dobri" uslovi prijanjanja	2.25	2.70	3.00	3.30	3.75	4.05	4.35	4.50	4.65
	"loši" uslovi prijanjanja	1.58	1.89	2.10	2.31	2.63	2.84	3.05	3.15	3.26
$l_{b,rqd}$	"dobri" uslovi prijanjanja	48	40	36	33	29	27	25	24	23
	"loši" uslovi prijanjanja	69	58	52	47	41	38	36	35	33

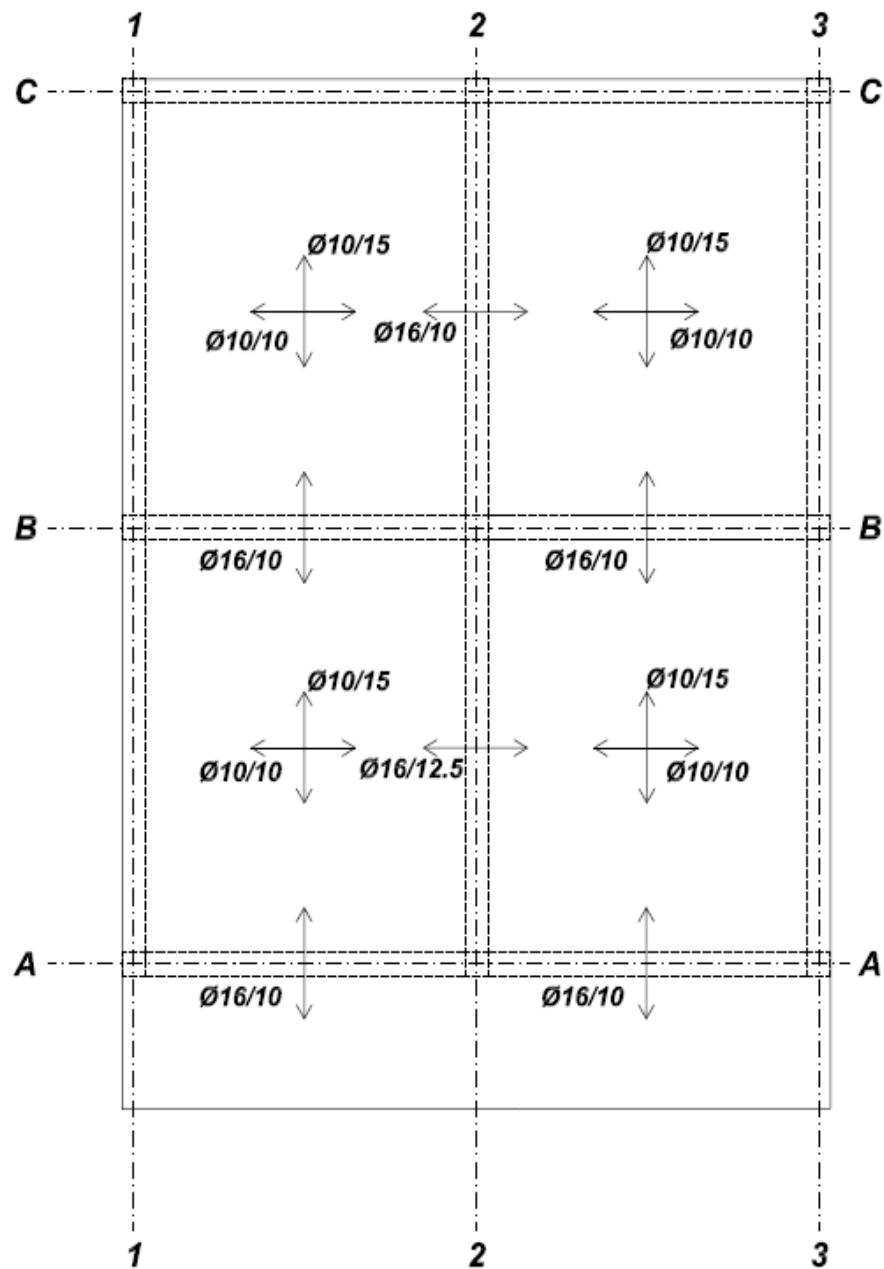
*Za napon u šipki usvojena je vrednost f_{yk}/γ_s , tj. 500/1.15 Mpa

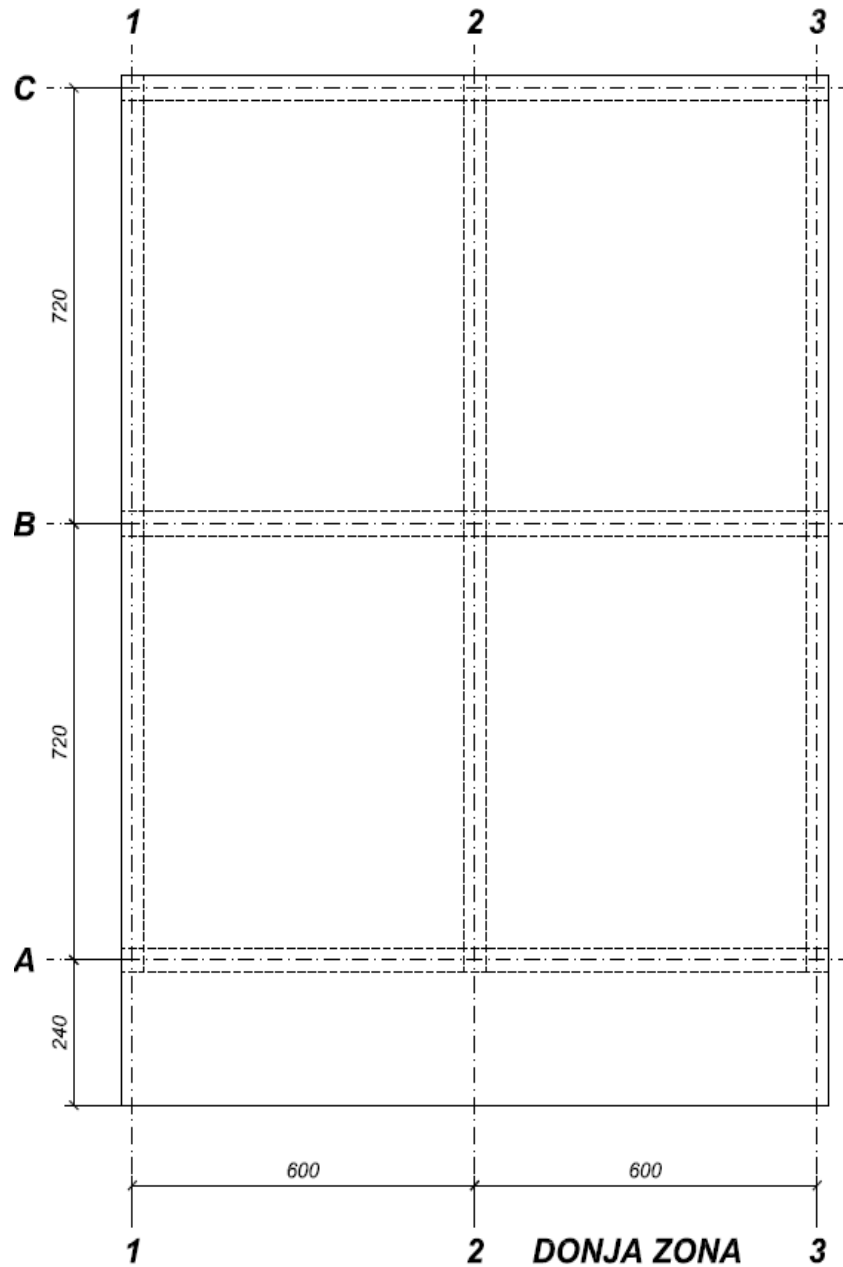
**Vrednosti u tabeli važe za $\phi \leq 32$ mm. Za veće prečnike šipki vrednosti iz tabele treba pomnožiti sa $(132-\phi)/100$

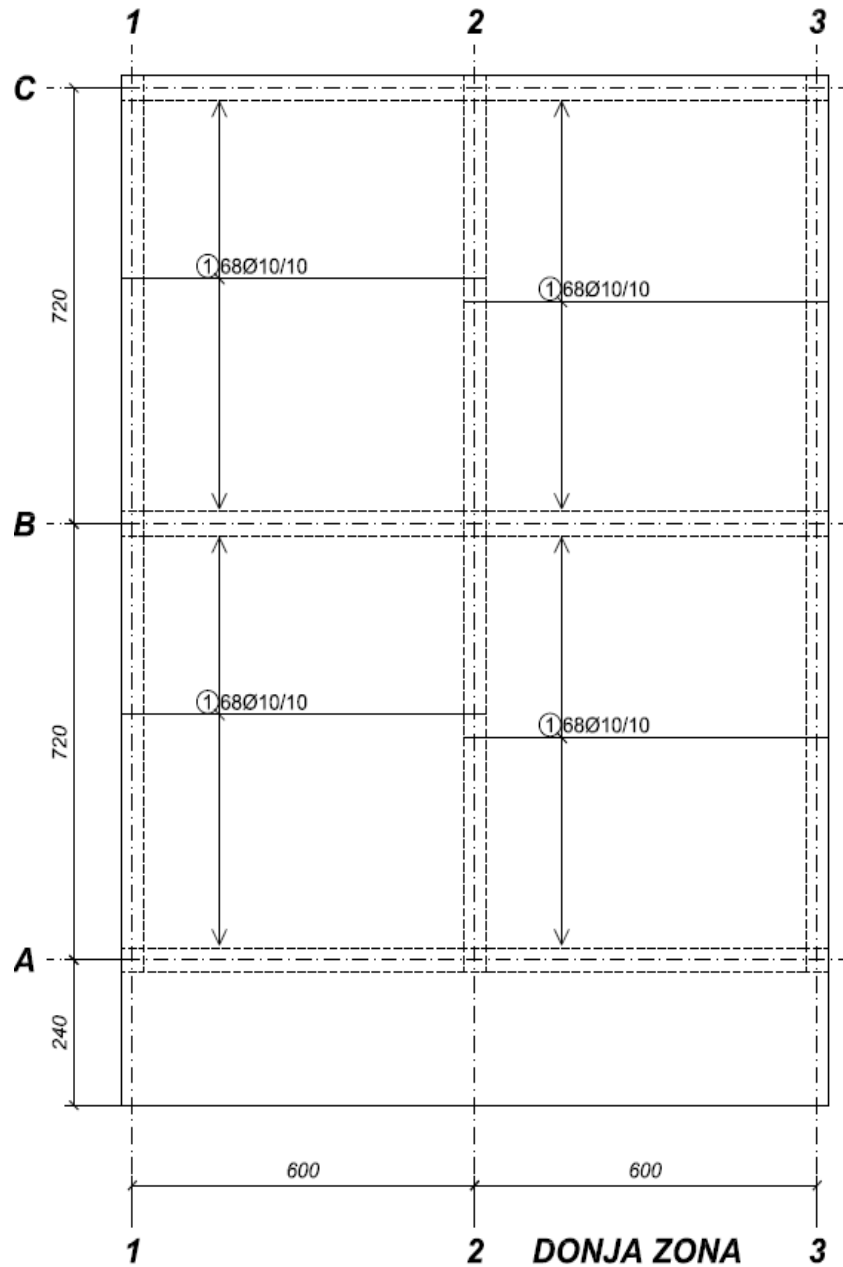
$$l_{\text{dole}}^{\text{šipke}} = l_{b,rqd} \cdot \alpha_2 \cdot \alpha_6 = 36 \cdot 1.0 \cdot (1 - 0.15 \cdot (3 - 1) / 1) \cdot 1.4 = 40 \text{ cm}$$

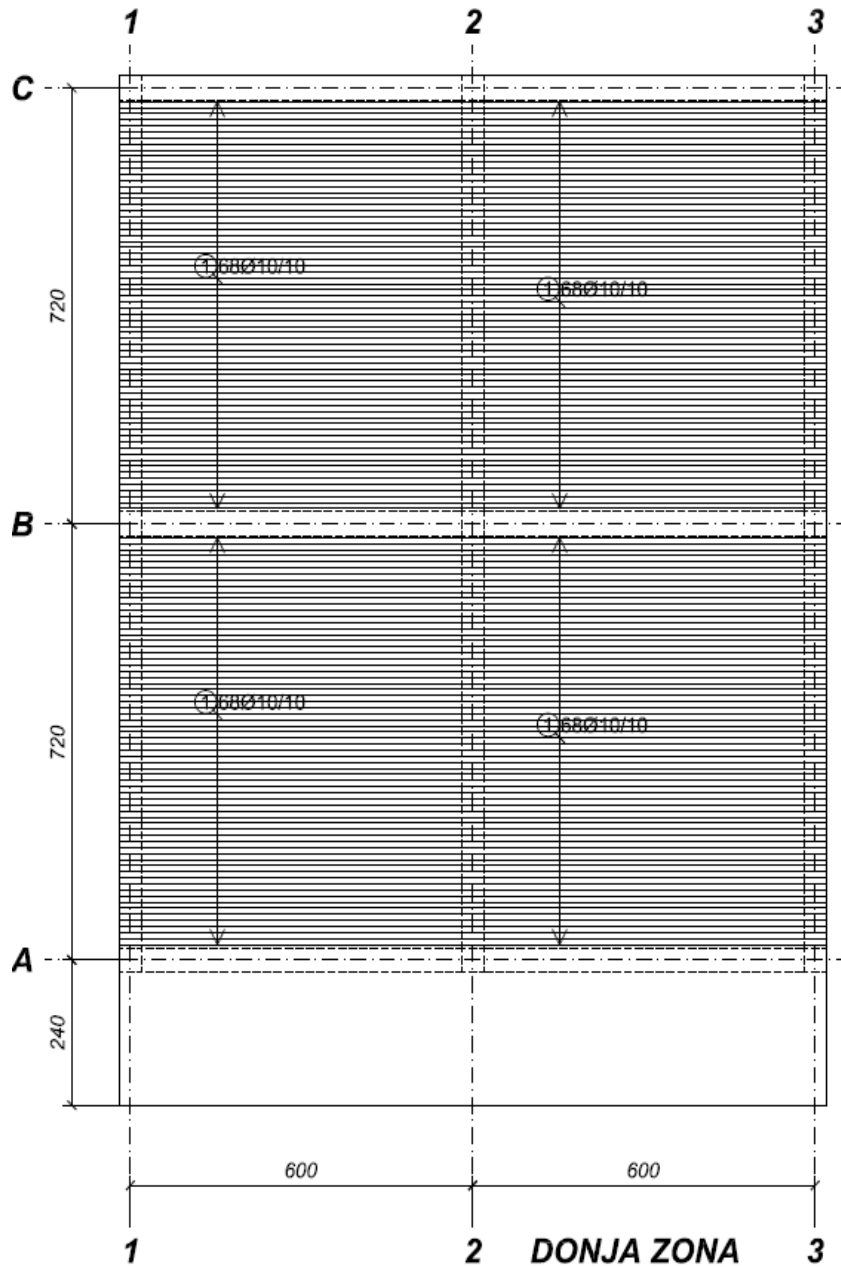
Табела 8.3 – Вредности коефицијента α_6

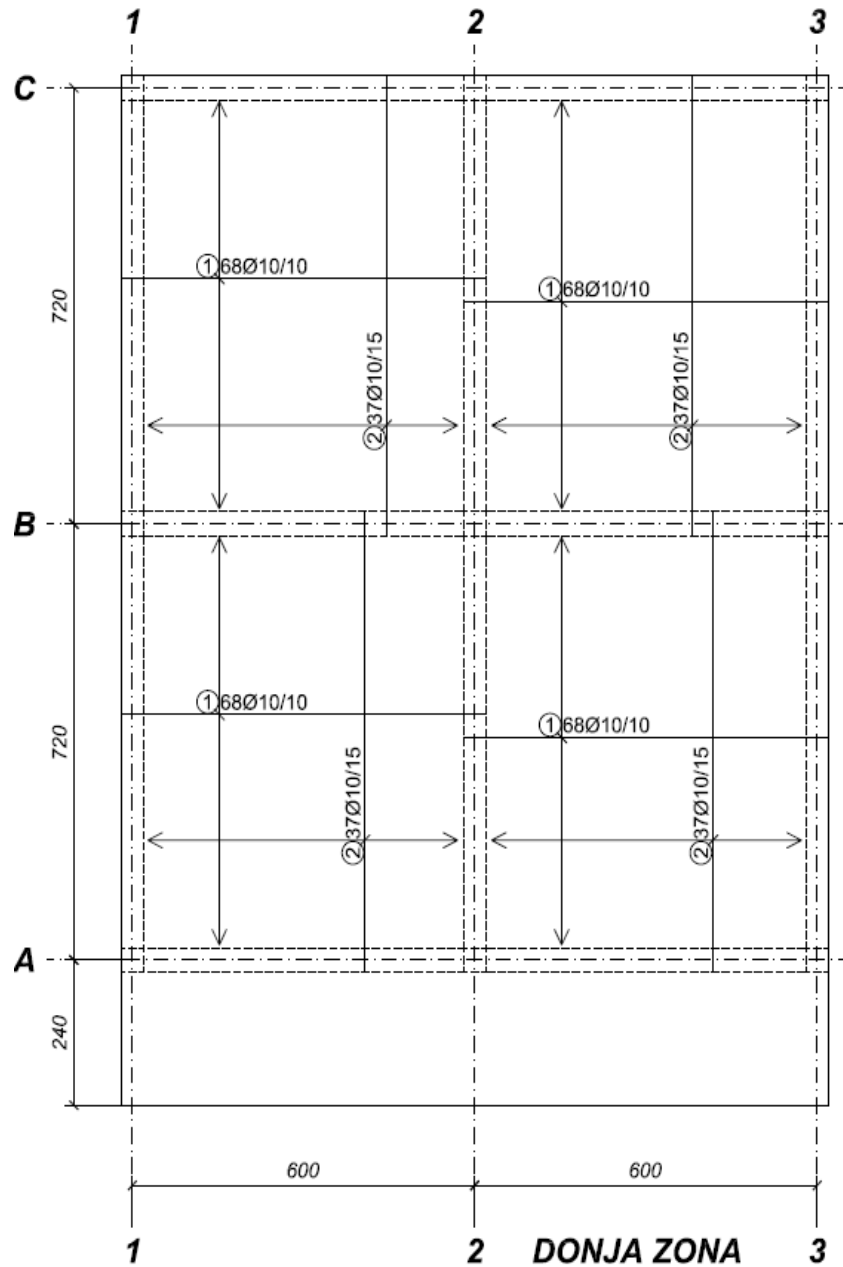
Процент шипки настављених преклапањем у односу на укупну површину попречног пресека	< 25 %	33 %	50 %	> 50 %
α_6	1	1,15	1,4	1,5
НАПОМЕНА Међувредности могу да се одреде интерполацијом.				





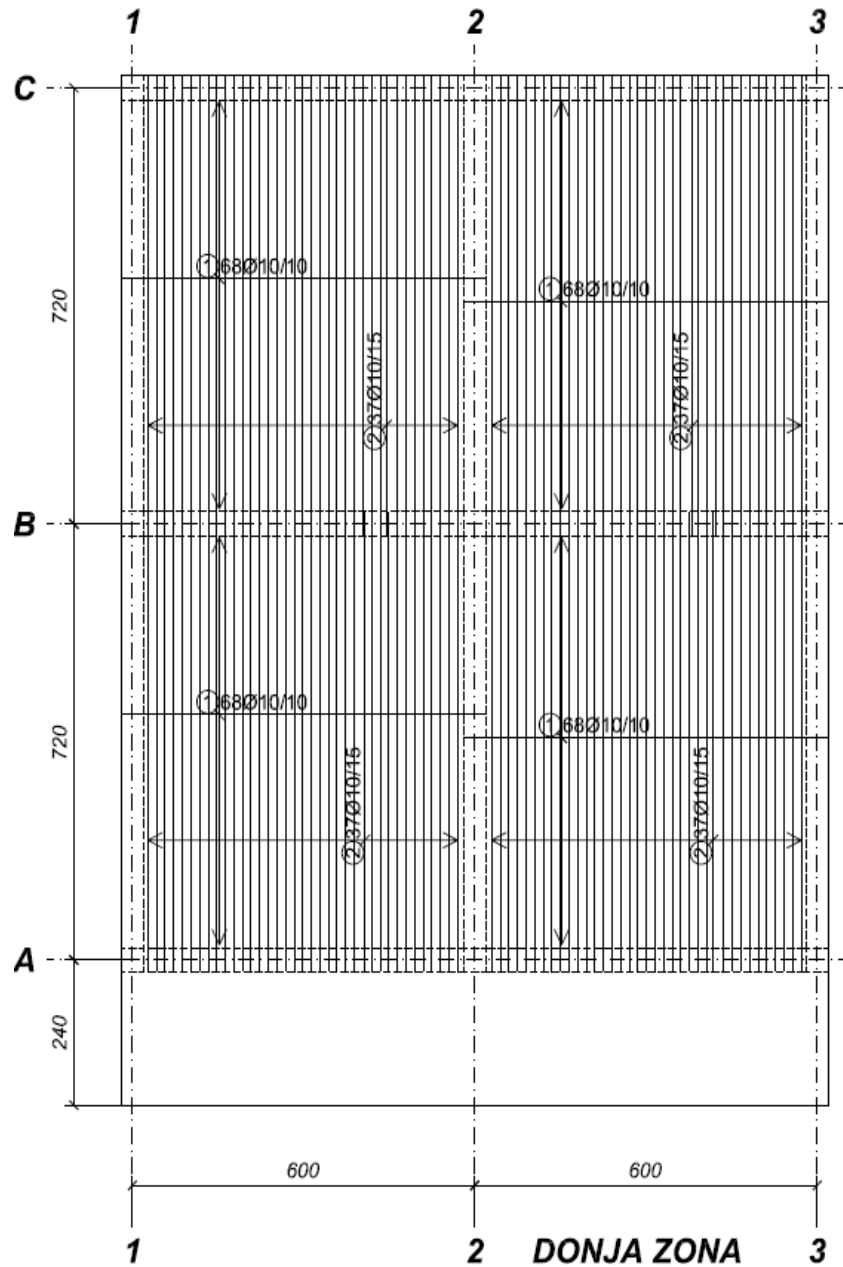






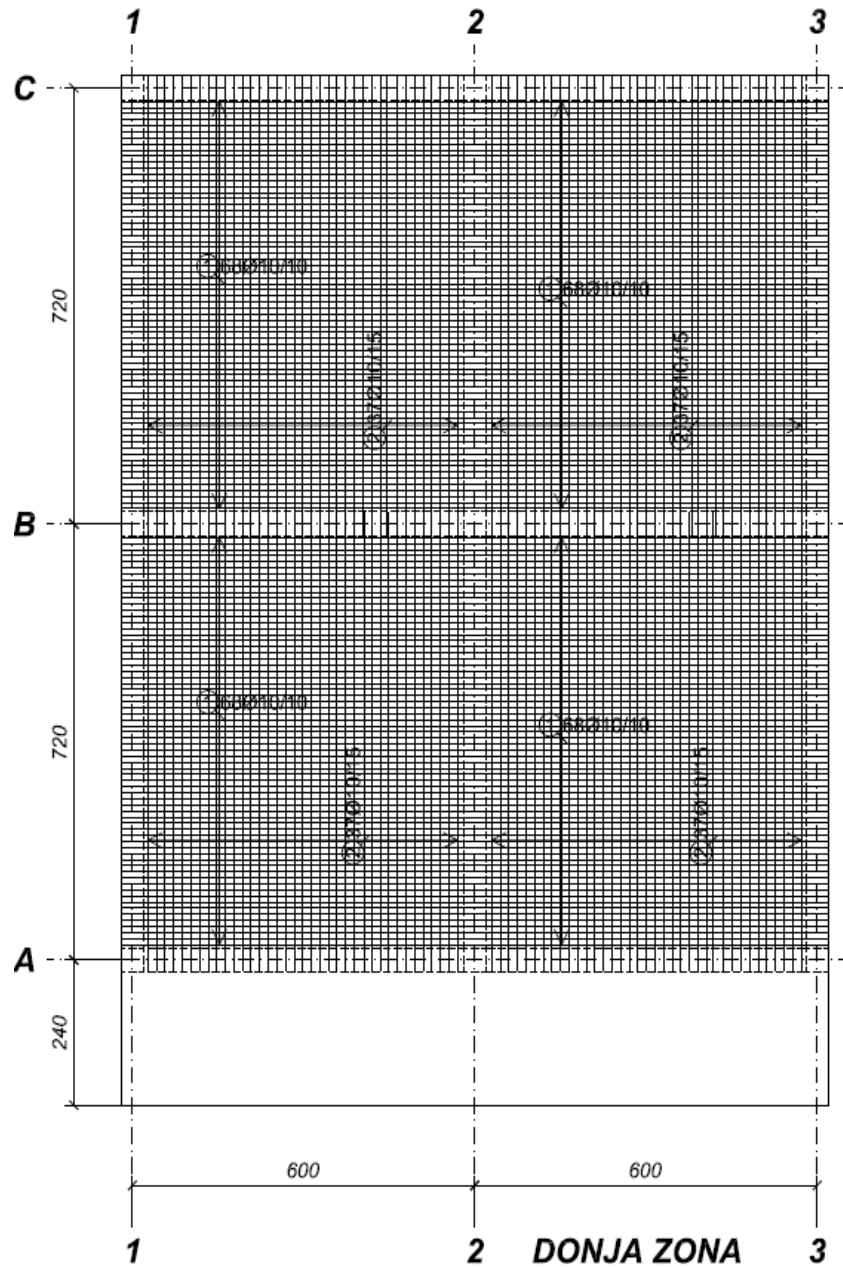
DONJA ZONA

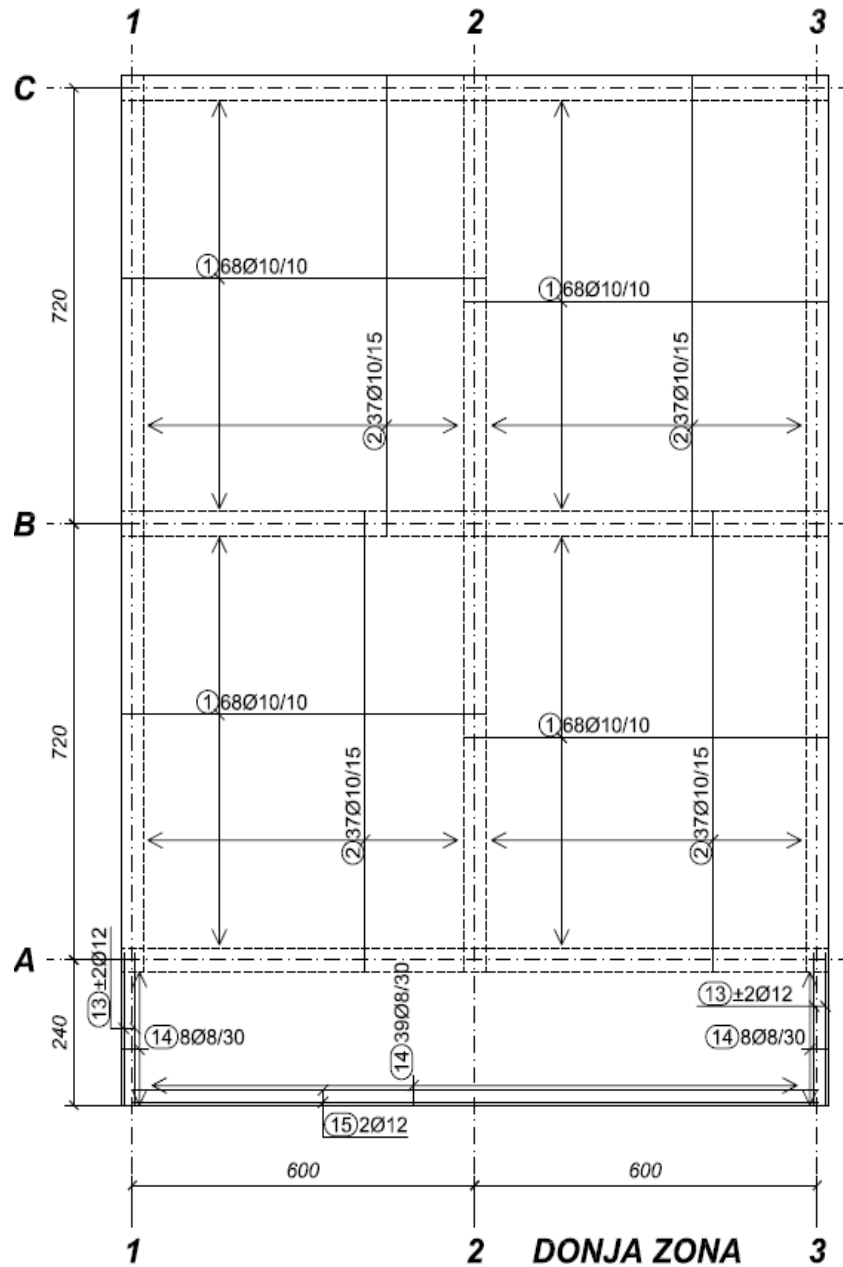




DONJA ZONA

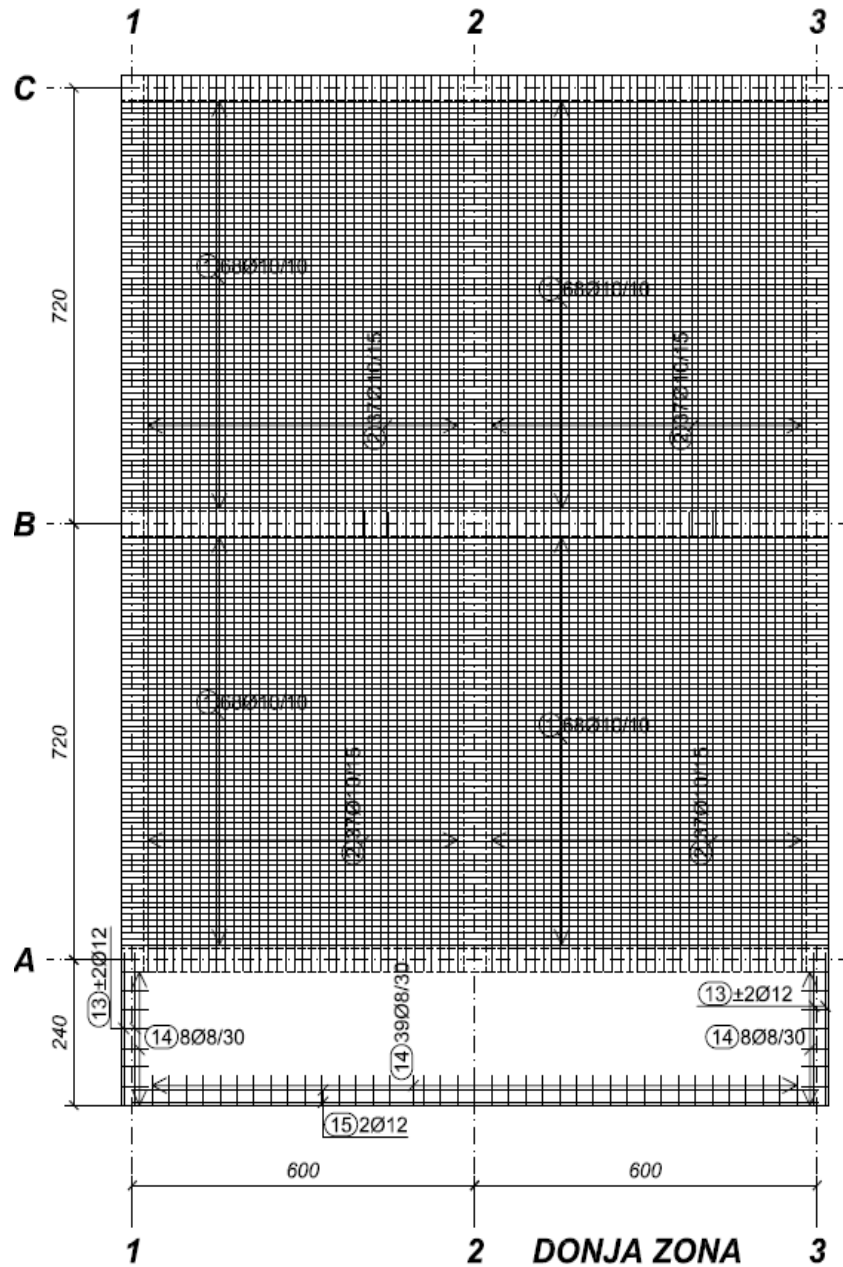


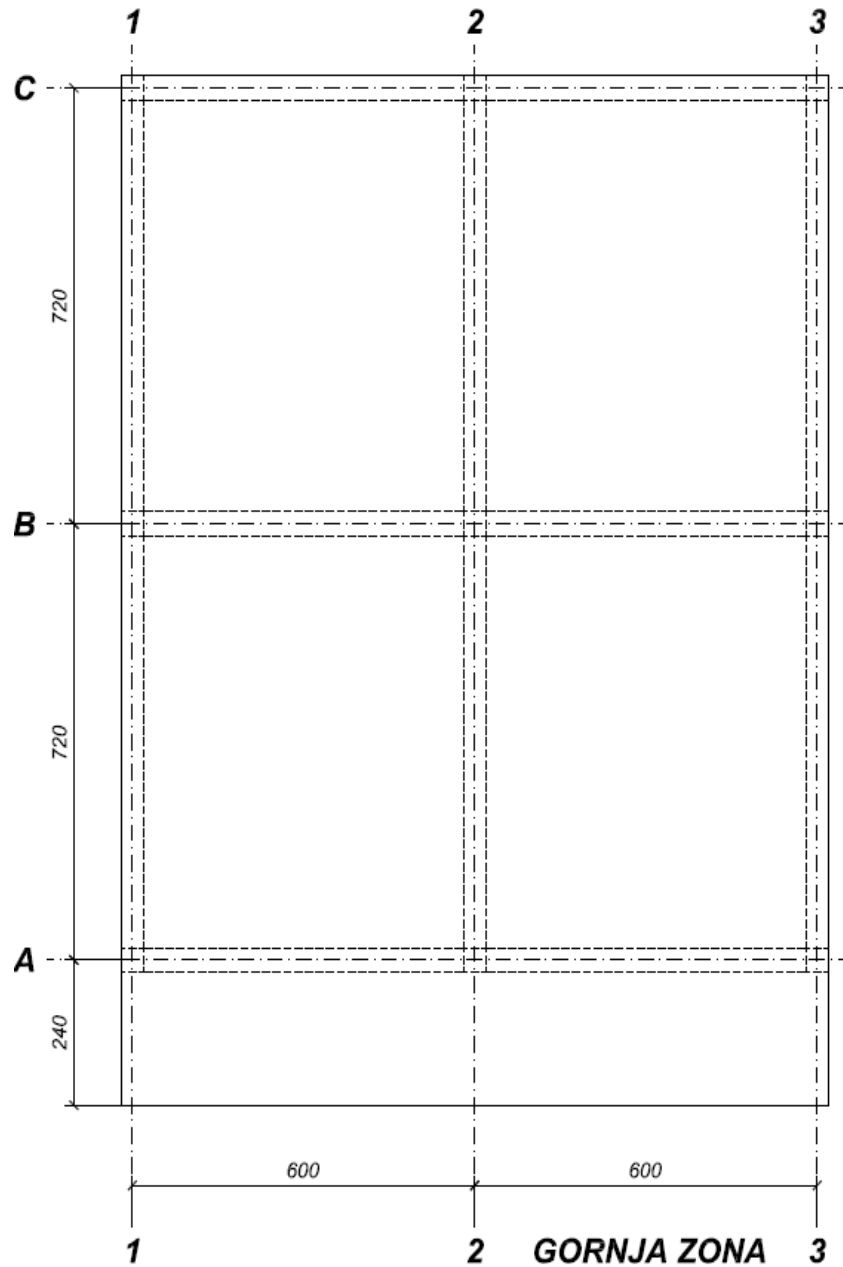


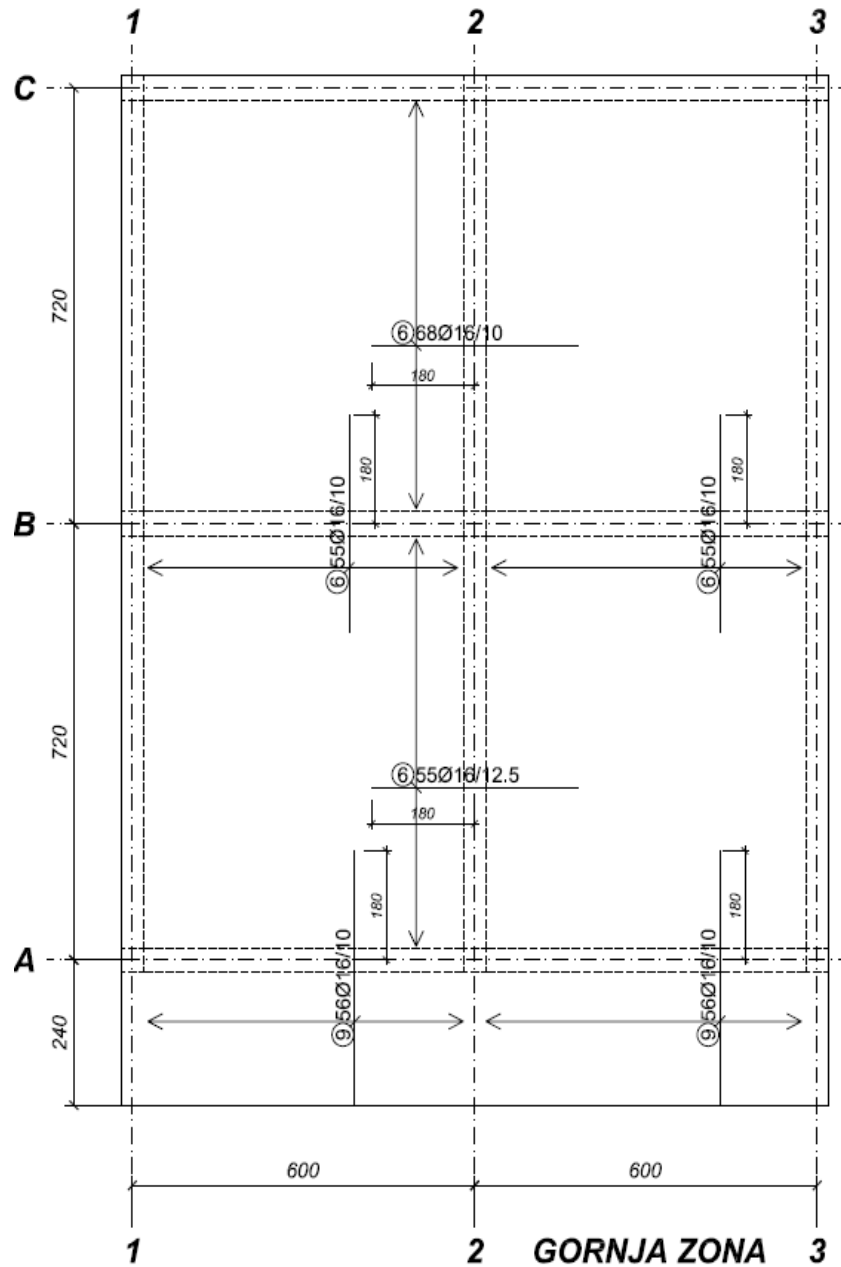


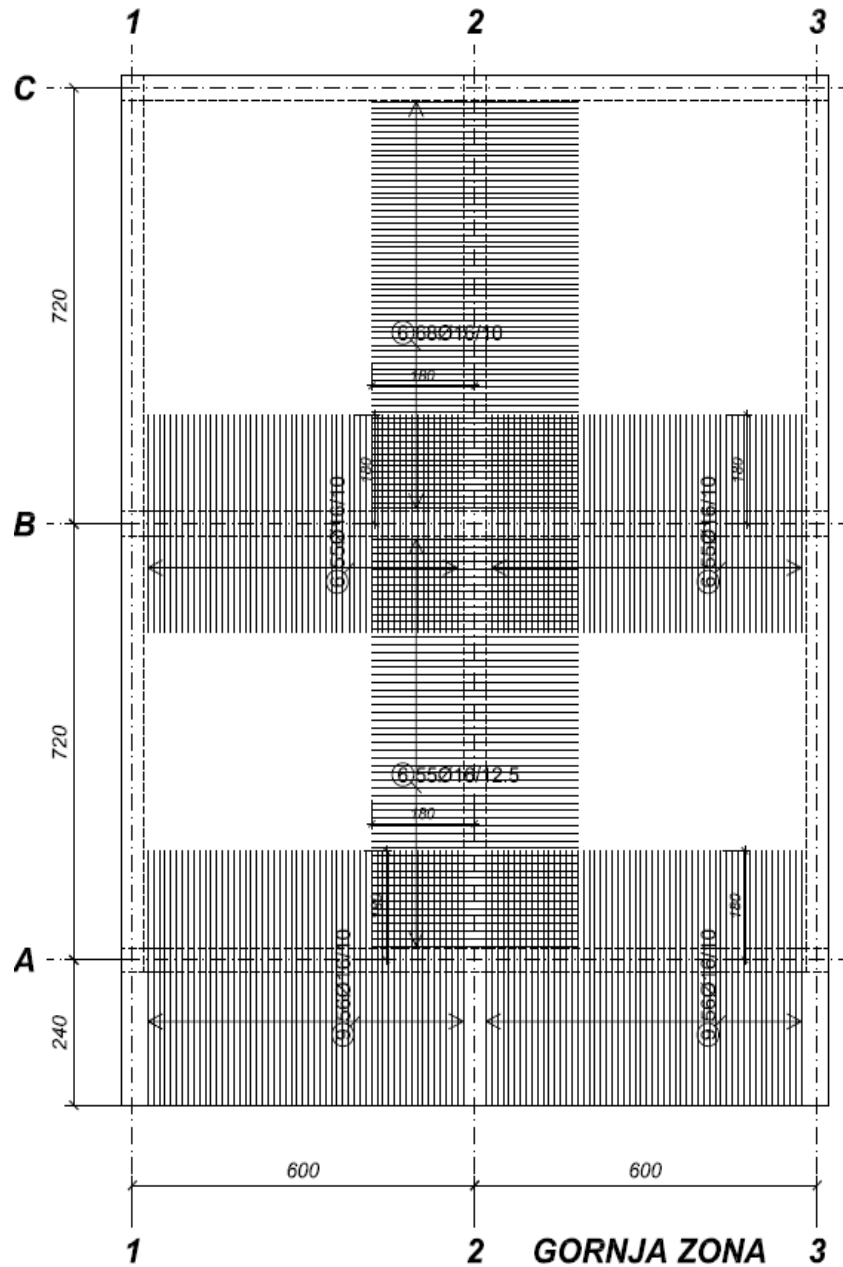
DONJA ZONA





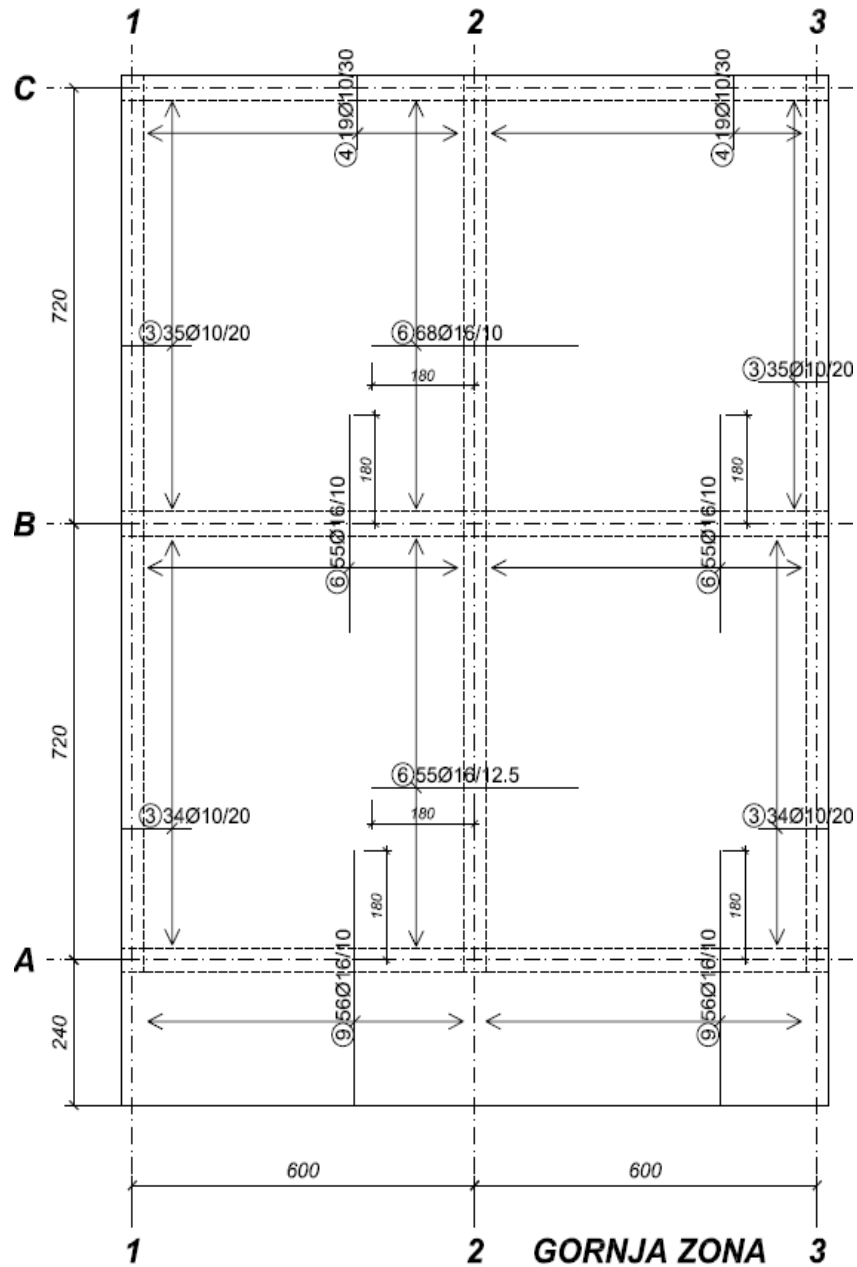




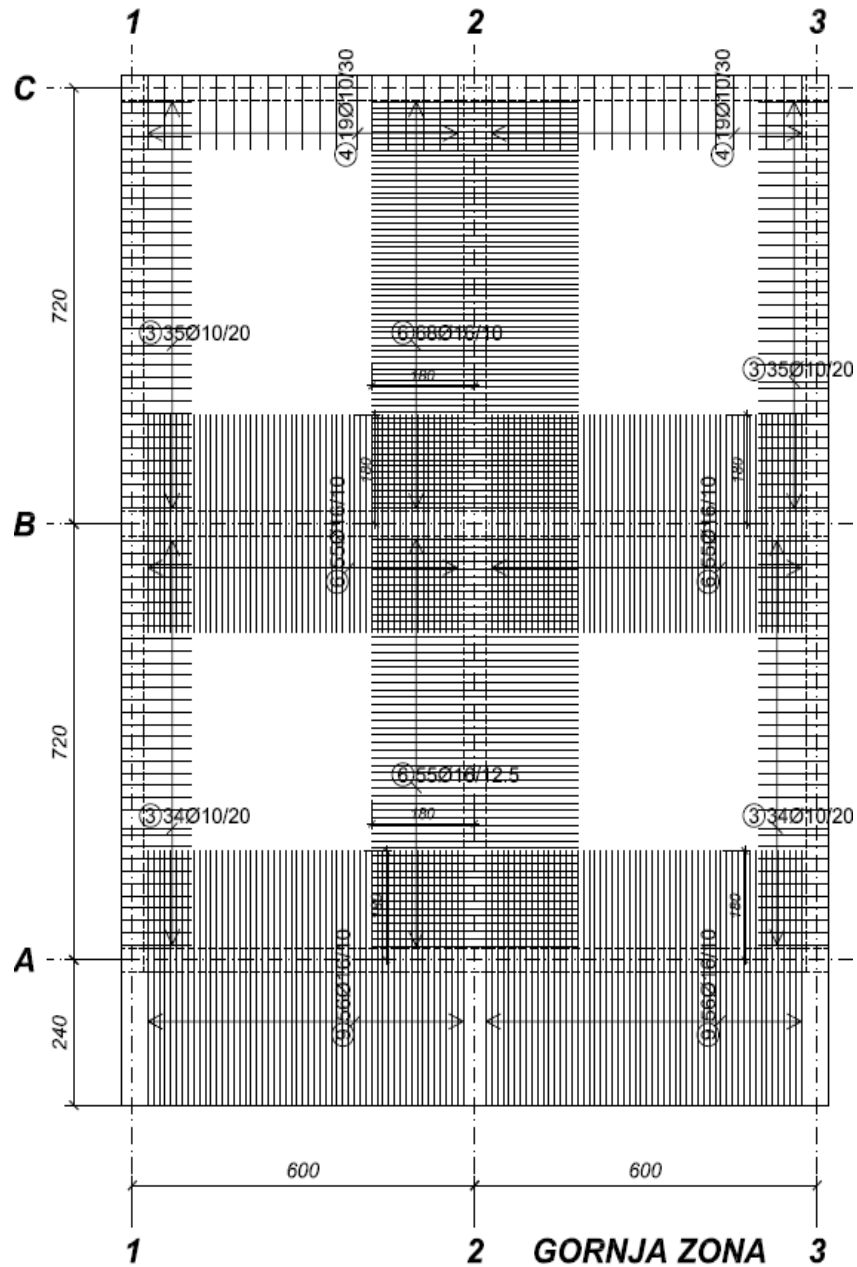


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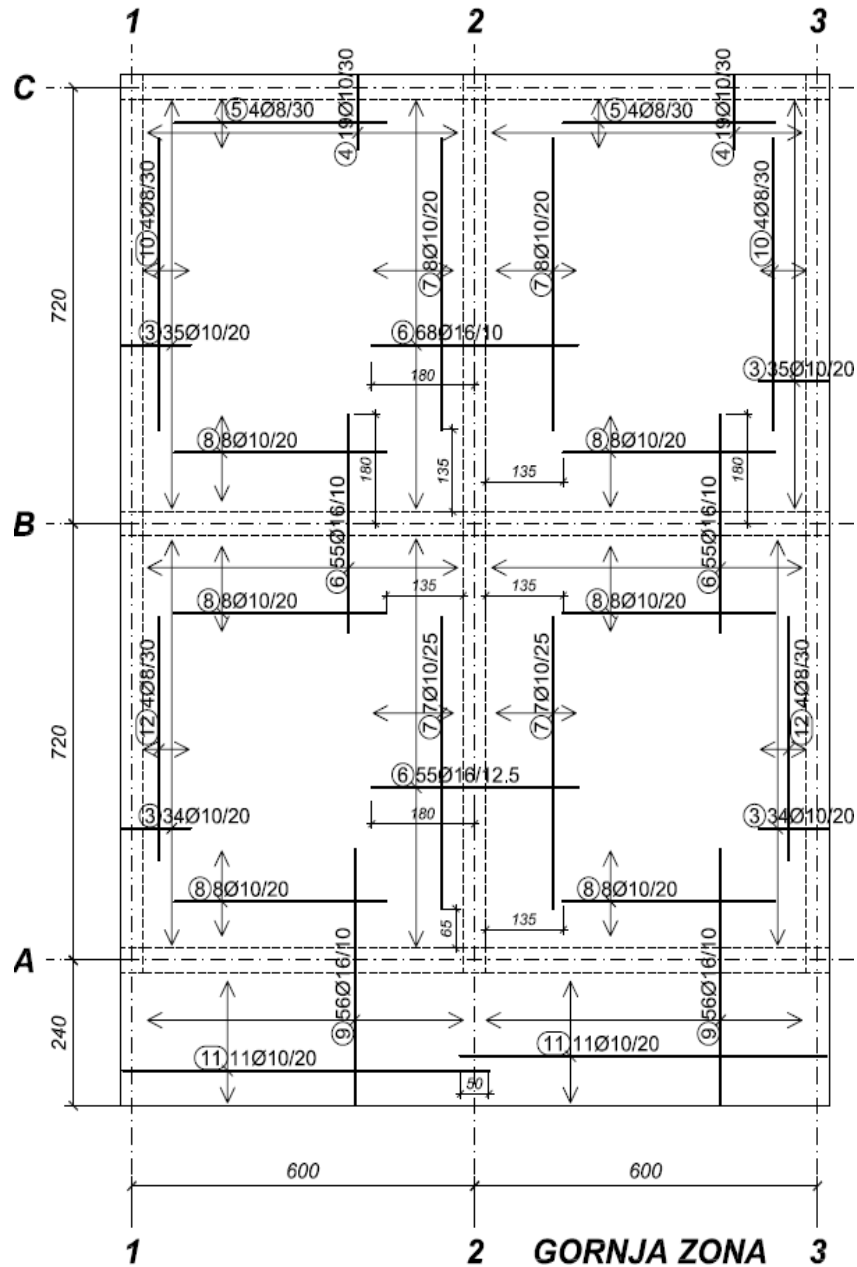


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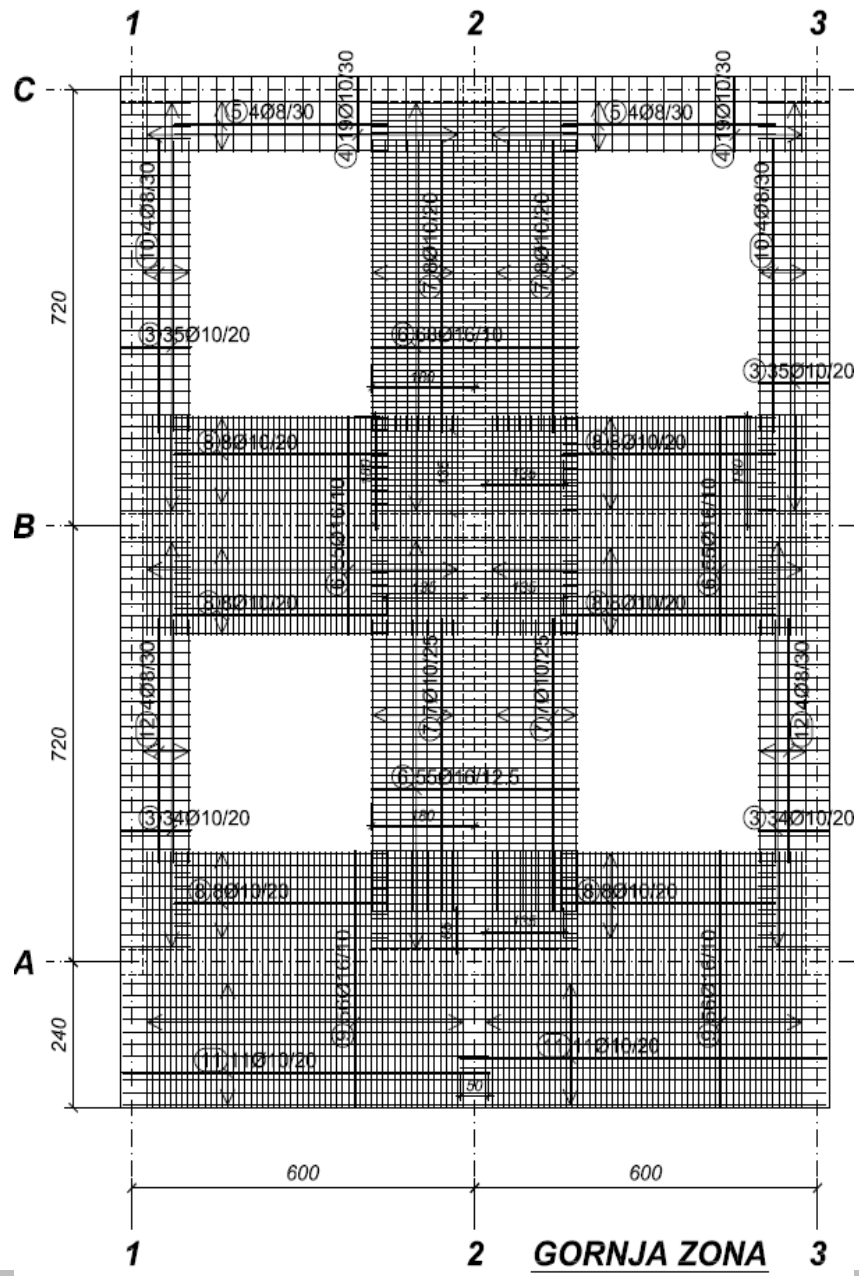
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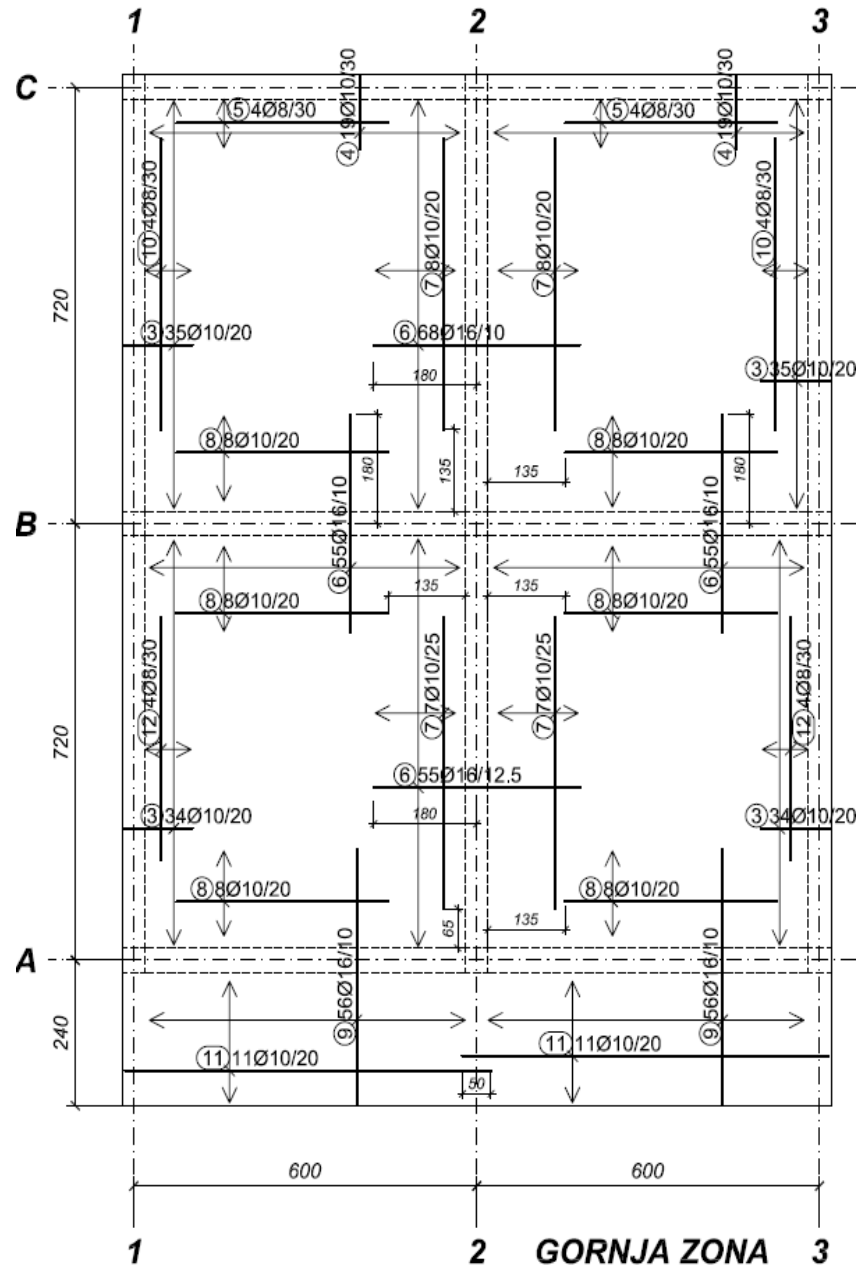
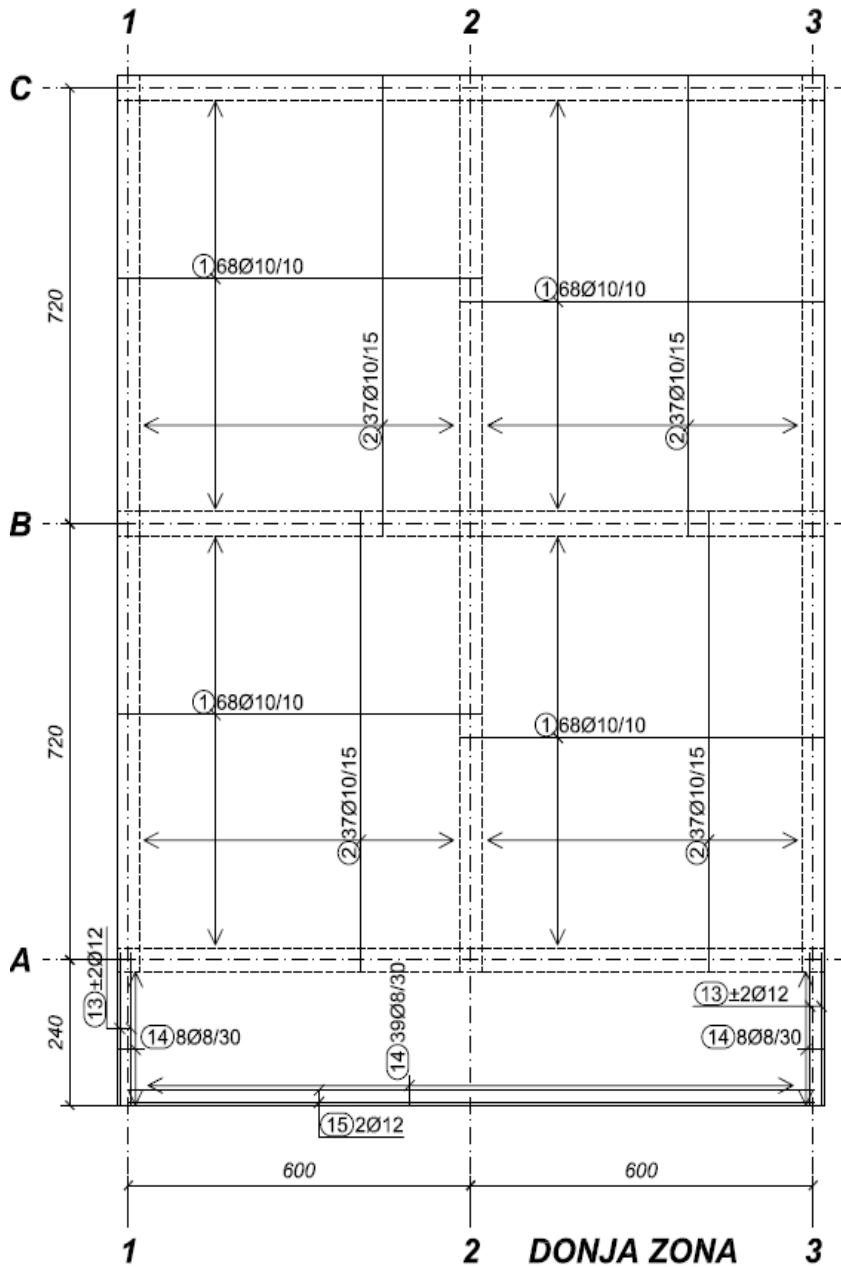
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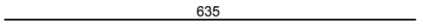
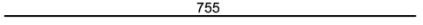
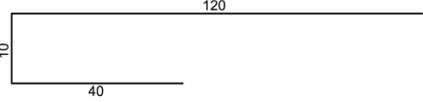
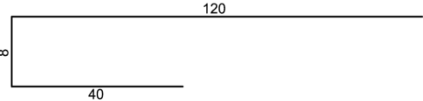
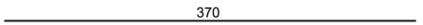
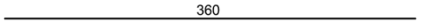
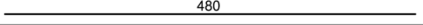
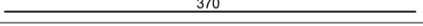
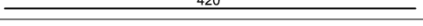
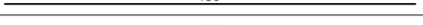
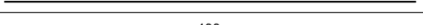
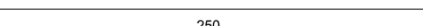
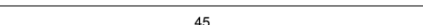
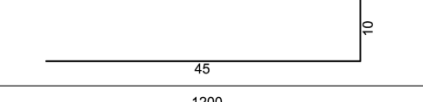
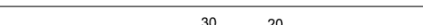
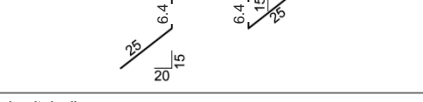




GORNJA ZONA





Šipke - specifikacija						
ozn.	oblik i mere [cm]	ozn.	Ø	lg [m]	n [kom]	lgn [m]
POS 1 (1 kom)						
1		B500B	10	6.35	272	1727.20
2		B500B	10	7.55	148	1117.40
3		B500B	10	1.70	138	234.6
4		B500B	10	1.68	38	63.84
5		B500B	8	3.70	8	29.60
6		B500B	16	3.60	233	838.80
7		B500B	10	4.80	30	144.00
8		B500B	10	3.70	48	177.60
9		B500B	16	4.20	112	470.40
10		B500B	8	4.80	8	38.40
11		B500B	10	6.40	22	140.80
12		B500B	8	4.00	8	32.00
13		B500B	12	2.50	4	10.00
14		B500B	8	1.00	55	55.00
15		B500B	12	12.00	4	48.00
16		B500B	10	1.08	635	685.80
Šipke - rekapitulacija						
Ø [mm]	lgn [m]	Jedinična težina [kg/m ³]	Težina [kg]			
B500B						
8	155.00	0.40	61.23			
10	4291.24	0.62	2660.57			
12	58.00	0.89	51.62			
16	1309.20	1.58	2065.92			
Ukupno						4837.32

