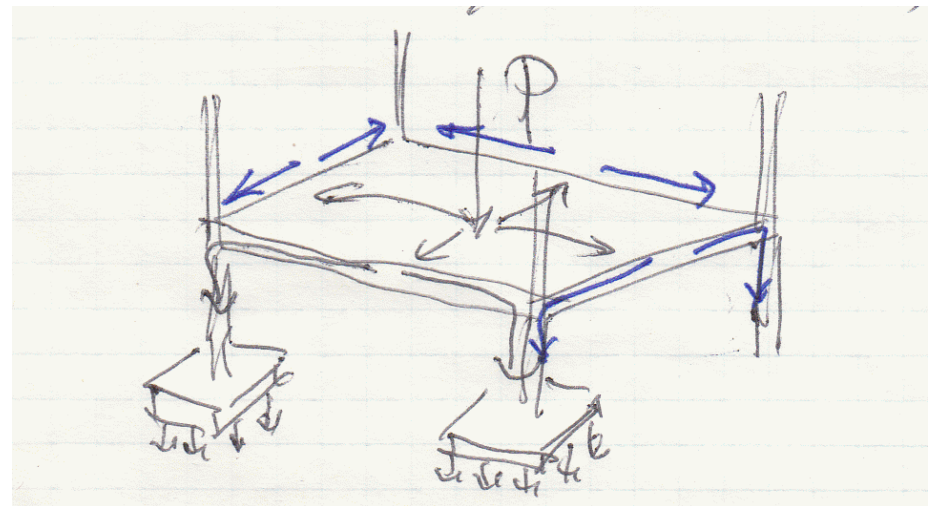


Elementi konstrukcija zgrada od armiranog betona

Gotovo svaka konstrukcija od armiranog betona sastoji se od sledećih grupa pojedinačnih elemenata:

- Temelja (razmatraju se u fundiranju)
- Vertikalnih elemenata konstrukcije – stubovi, zidovi, jezgra
- Međuspratnih konstrukcija, kao i krovne konstrukcije (koja može biti istog ili različitog konstruktivnog sistema)
- Stepenišne konstrukcije.

Razmatraćemo elemente počevši od međuspratnih konstrukcija, zato što se opterećenje, najvećim delom, prenosi sa međuspratnih konstrukcija na vertikalne elemente do temelja, i zatim, do tla.



Međuspratne konstrukcije

Podela međuspratnih konstrukcija se može izvršiti, na pr., prema načinu izvođenja, na:

- Monolitne
- Polumontažne
- Montažne

Monolitne su one međuspratne konstrukcije koje se izvode na licu mesta, tako što prvo mora da se postavi skela i oplata, zatim se postavlja armatura i na kraju se vrši betoniranje. Po očvršćavanju betona se uklanjaju oplata i skela, odnosno podupirači.

















Polumontažne





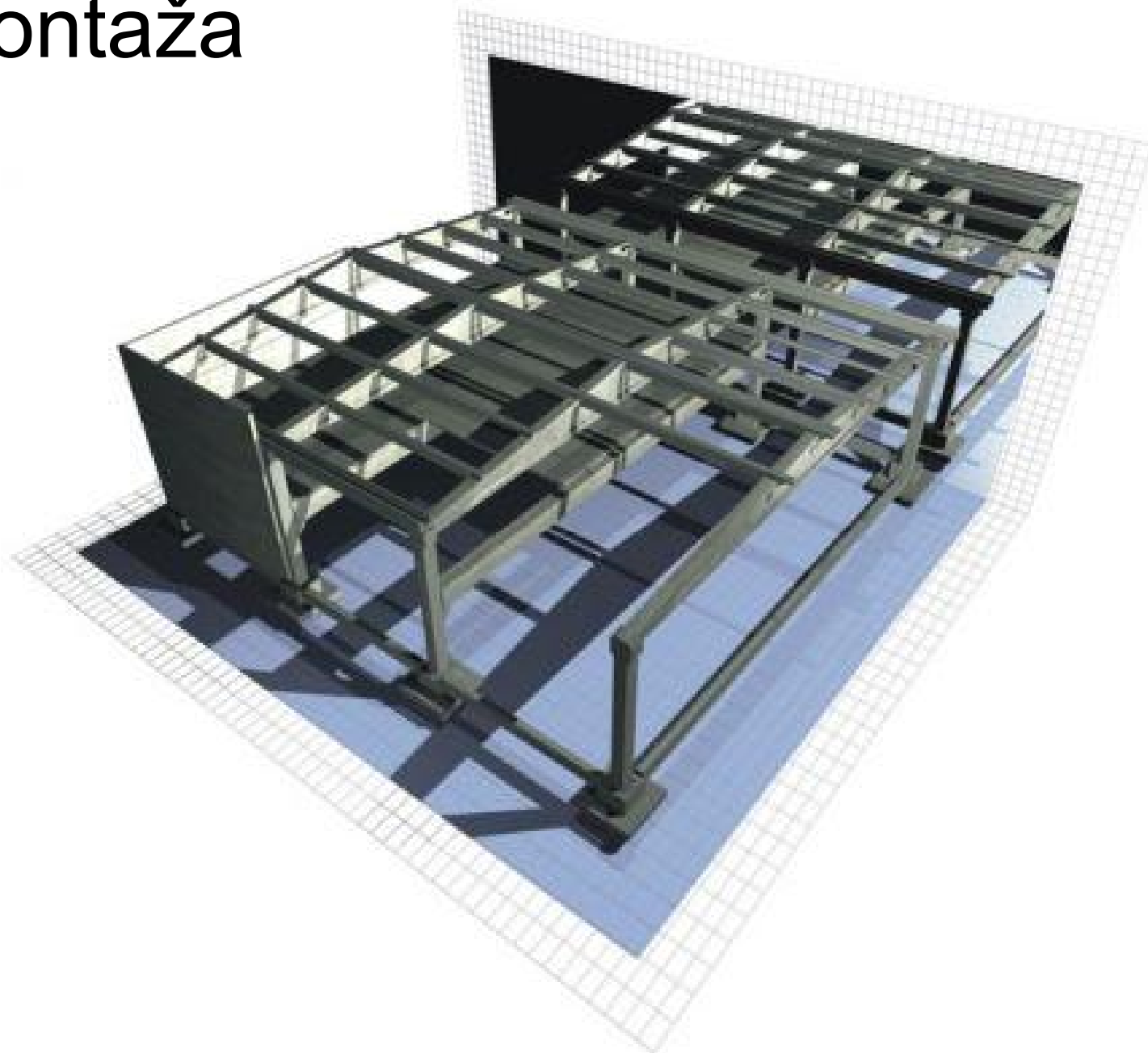




Polumontažne fert gredice



Montaža



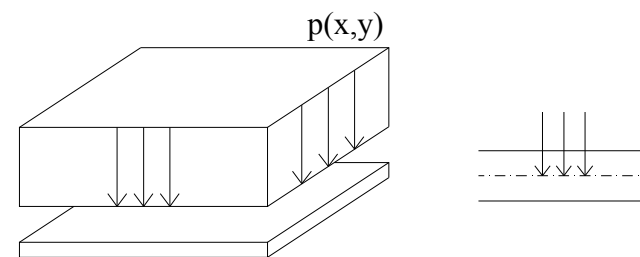
Opterećenje

Prema načinu delovanja mogu biti:

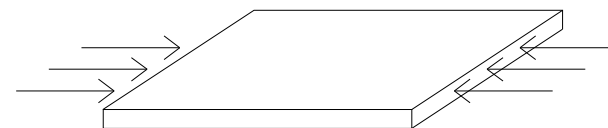
- površinska (stalna, korisna - / kN/m^2 /),
- linijska (na pr. od pregradnih ili fasadnih zidova, / kN/m^1 /)
- koncentrisana (na pr. dejstvo točka vozila, / kN /)

Mogu da deluju:

- upravno na ploču (upravno na srednju ravan)

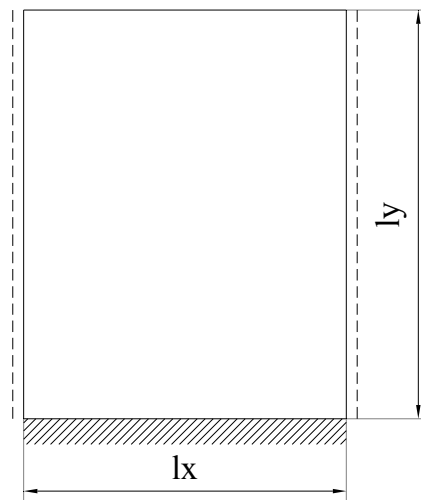
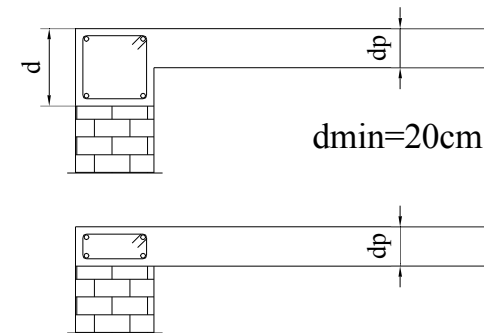
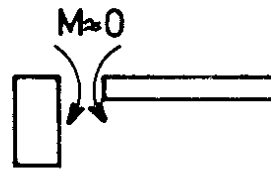
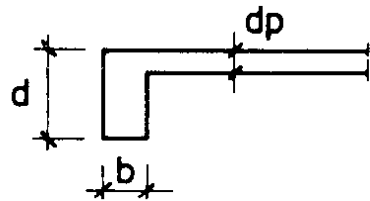


- u ravni ploče (ravan problem, AB zidovi)



Oslanjanje ploča

Načini oslanjanja



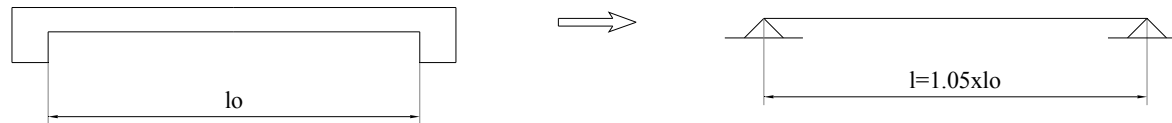
Slobodna ivica

Slobodno oslonjena ivica

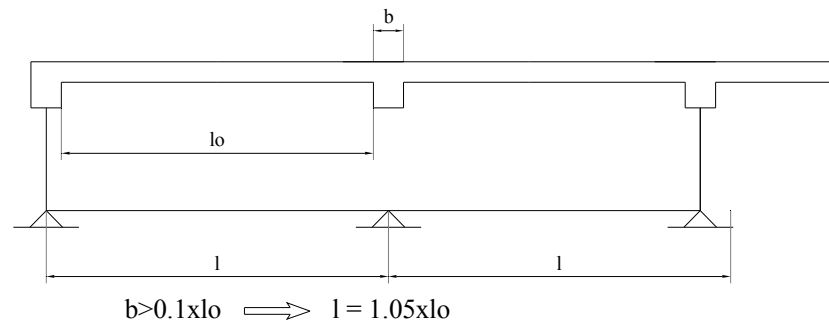
Ukljestena ivica



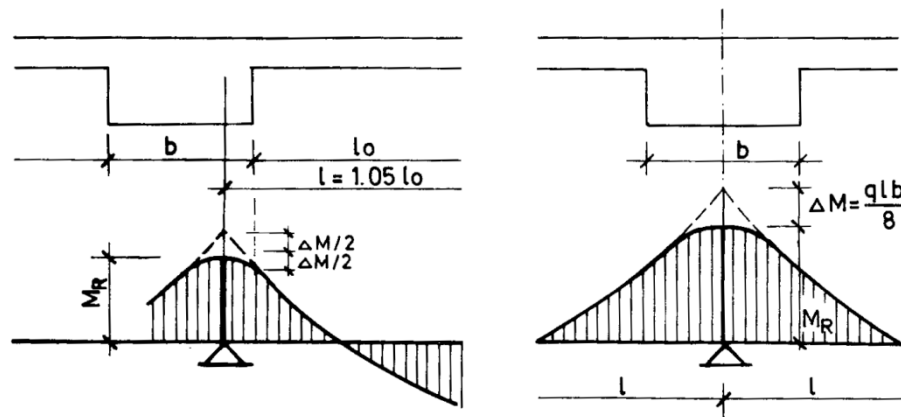
Rasponi ploča



Kontinualne ploče

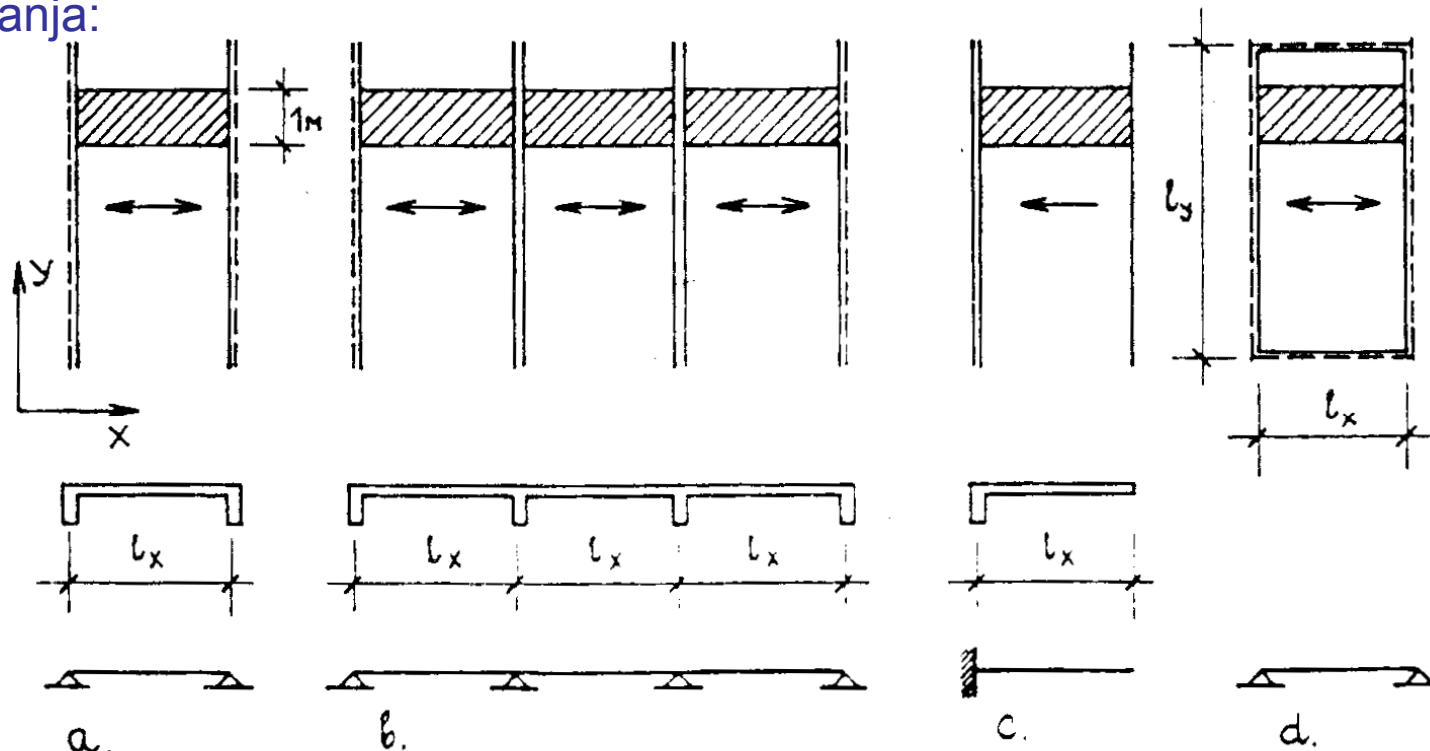


Redukcija momenta



Ploče u jednom pravcu

Ploče koje prenose opterećenje u jednom pravcu se proračunavaju, za jednako podeljeno opterećenje kao linijski nosači u sledećim slučajevima oslanjanja:



Kod ploče oslonjene na sve 4 strane (slučaj d.) mora biti $I_x < 2 I_y$

Proračun za traku jedinične širine važi za bilo koji metar širine ploče.

Deformisan oblik – cilindrična površ.

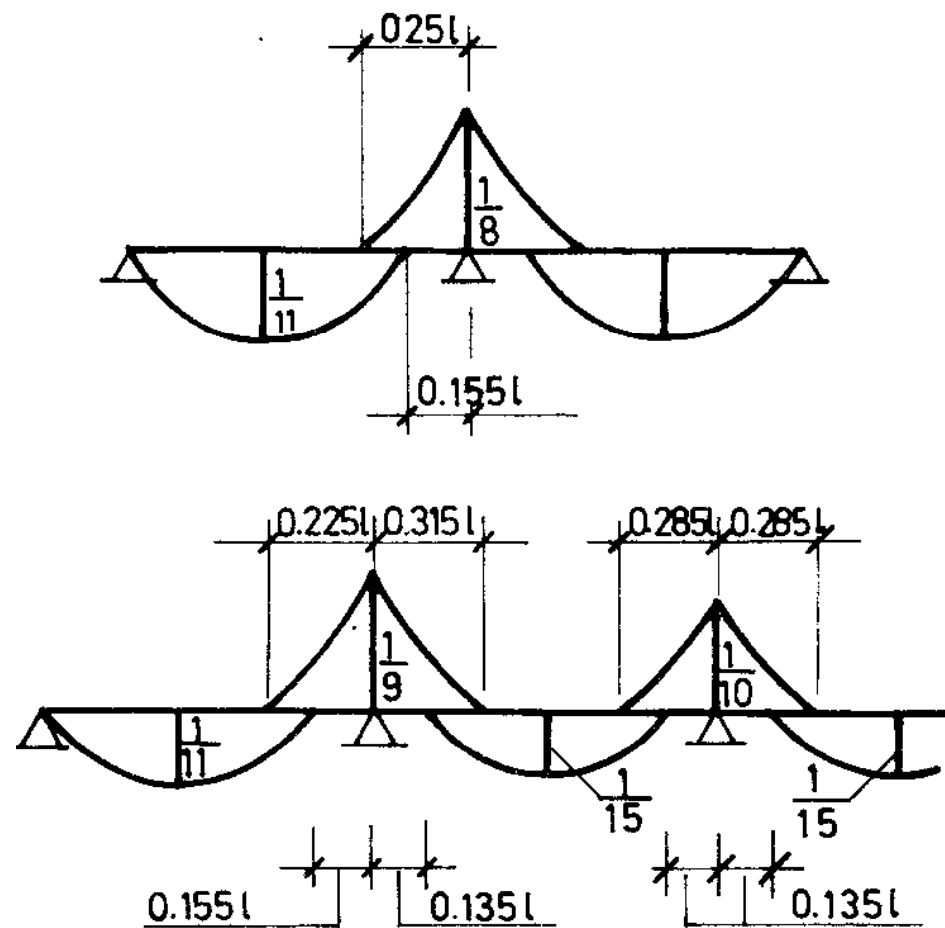
Zbog sprečenih bočnih deformacija usled monolitne veze javlja se momentu u drugom pravcu $M_y = \nu M_x$, gde je ν Poasonov koeficijent 0.16-0.20

$$\epsilon_y = (\sigma_x + \nu \sigma_y), \quad \epsilon_y = 0, \quad \sigma_x = \nu \sigma_y, \quad M_y = \nu M_x, \quad M_y = 0.2 M_x$$

Statički uticaji - kontinualne ploče

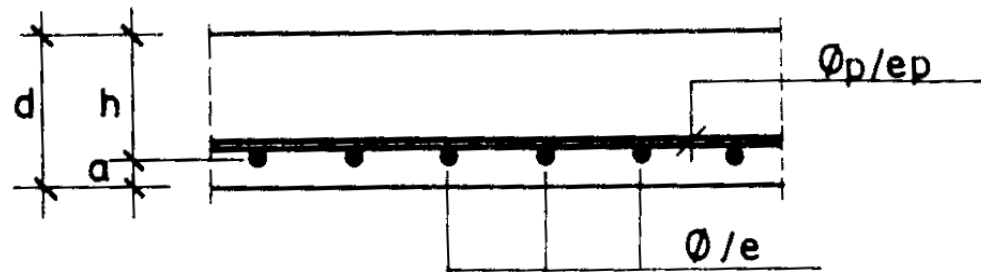
Ukoliko se rasponi ne razlikuju više od 15%, a **g** je veće od **p**

$$M = k (g + p) l^2$$



Dimenzionisanje ploča u jednom pravcu

Kao linijski element u kraćem pravcu, poprečnog preska dimenzija $b/d = 100/d_p$.



Armiranje ploča u jednom pravcu

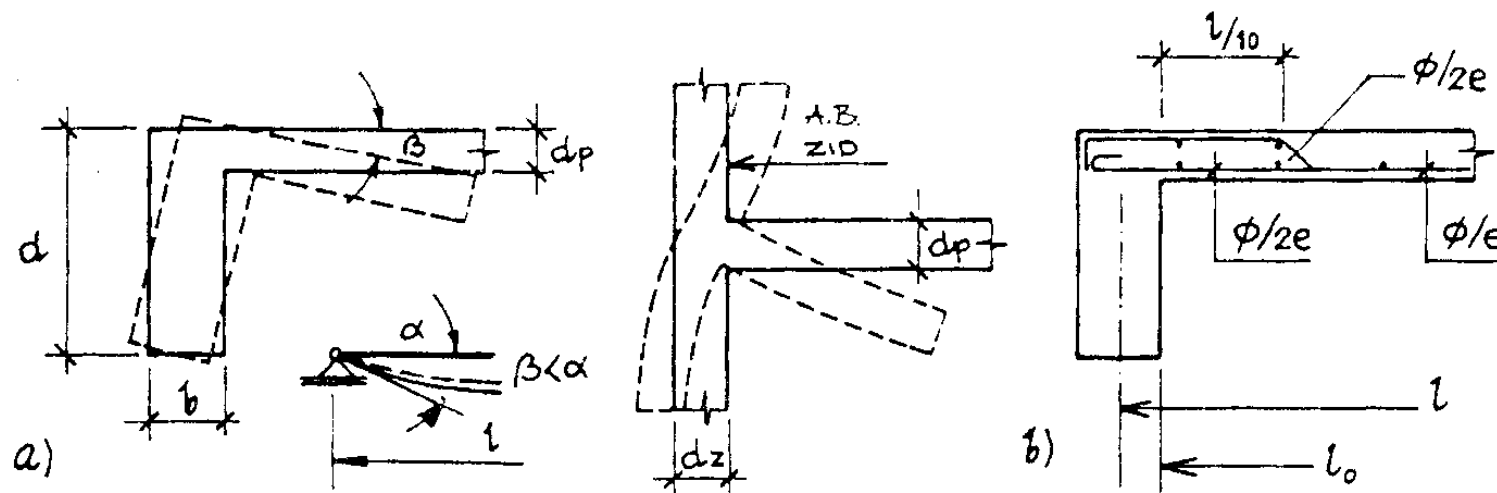
Pored glavne armature koja se postavlja u pravcu kraćeg raspona, postavlja se i podeona armatura u pravcu dužeg raspona

$$A_{ap} = 0.2 A_a$$

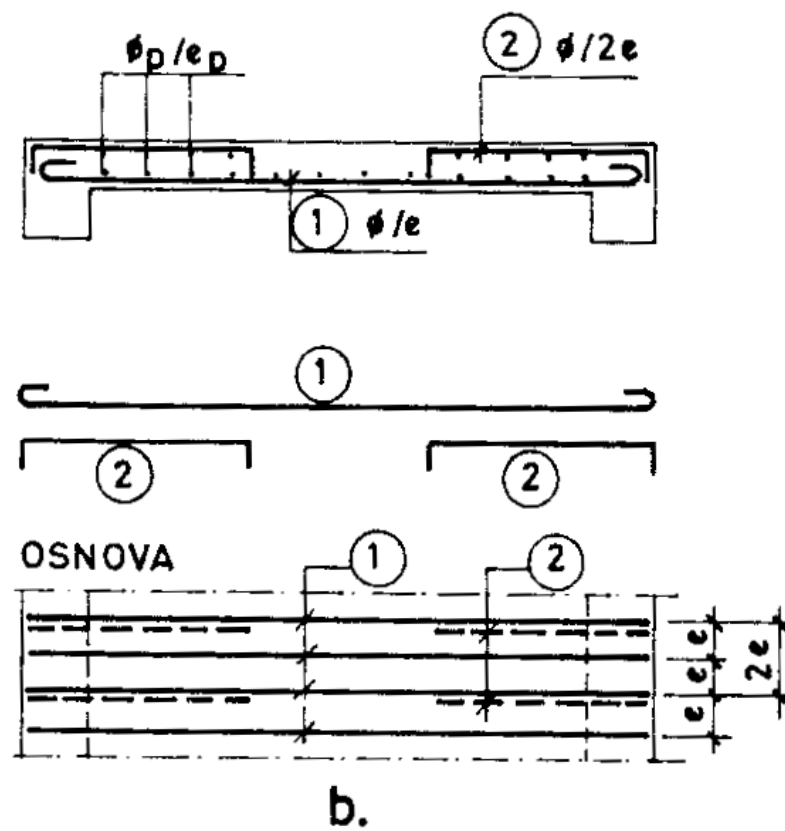
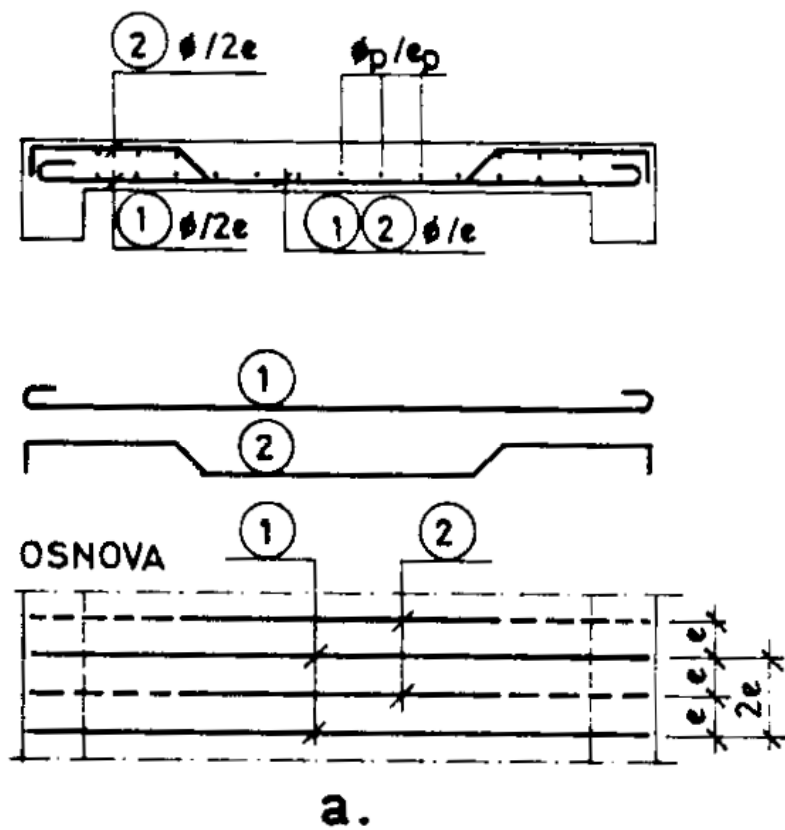
$$(M_y = 0.2 M_x)$$

Armiranje oslonačke zone ploče

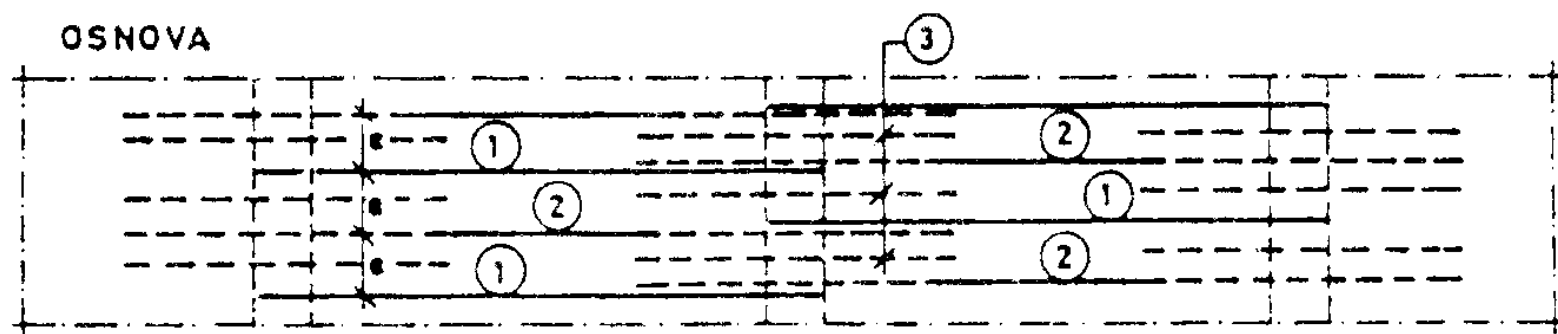
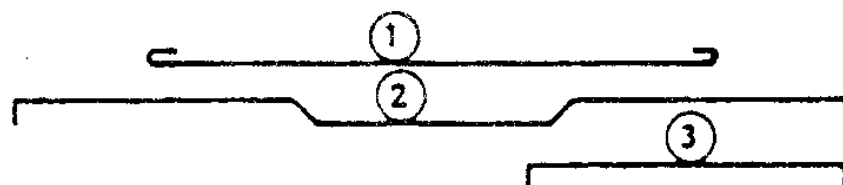
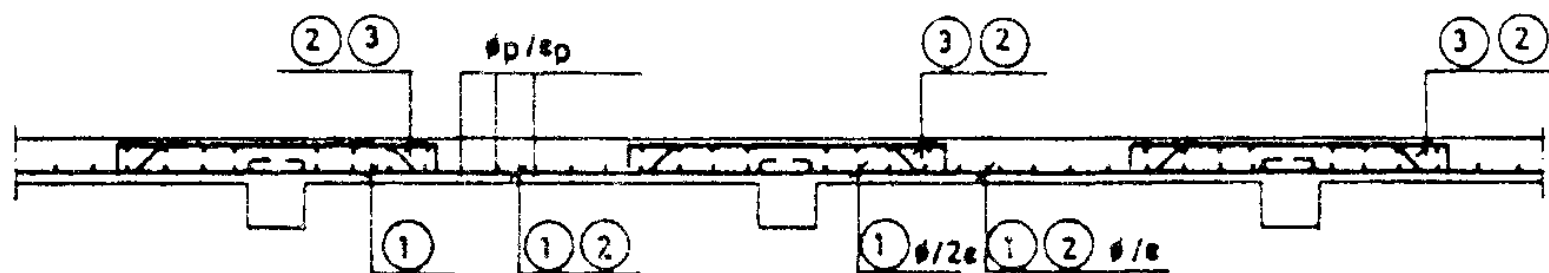
Elastično uklještenje



Shema armiranja ploča

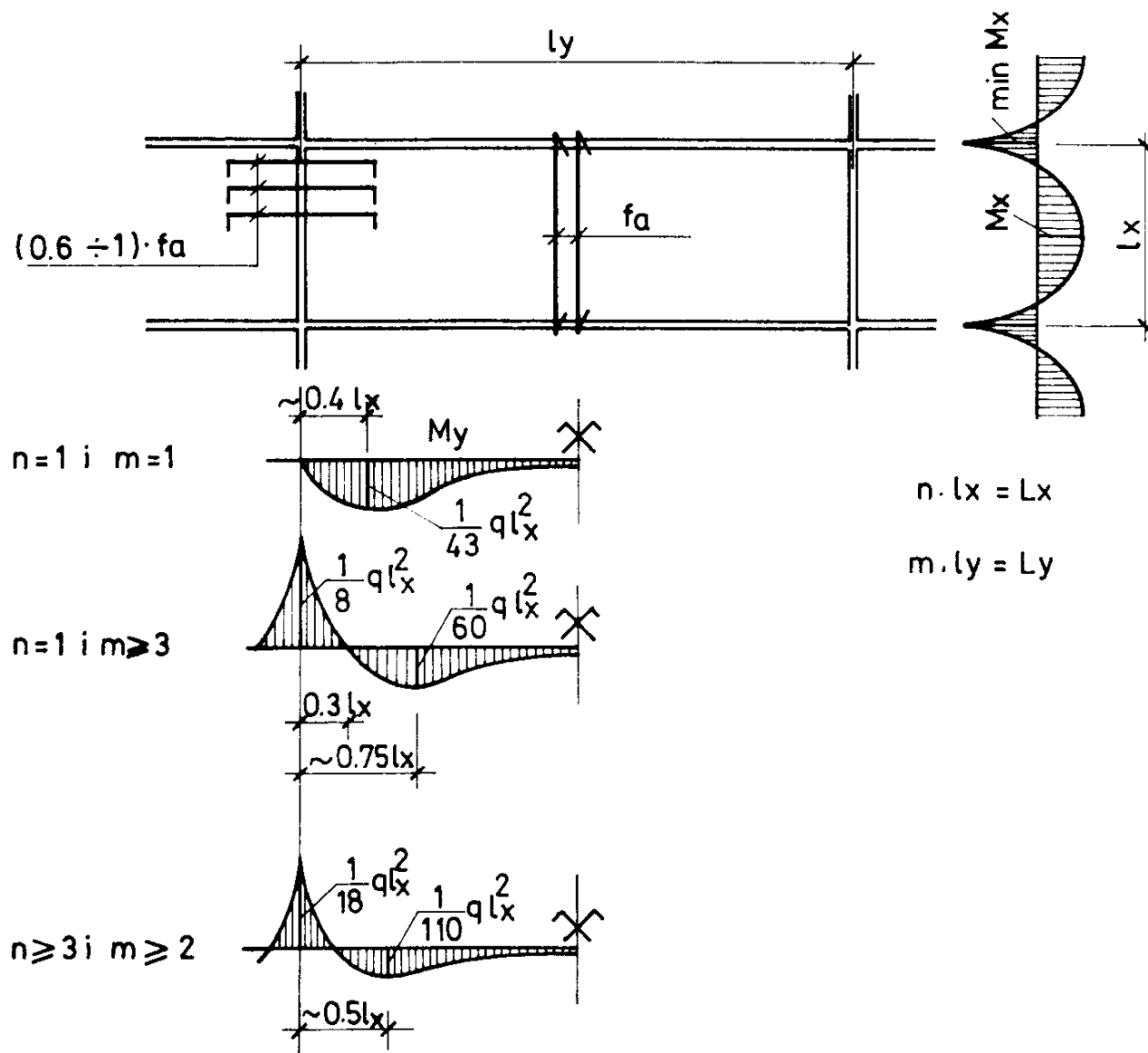


----- armatura u gornjoj zoni
 ————— armatura u donjoj zoni

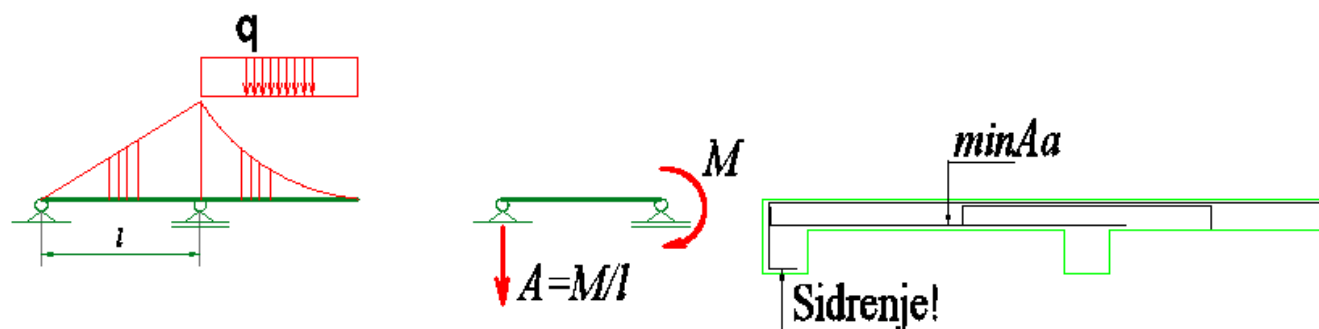
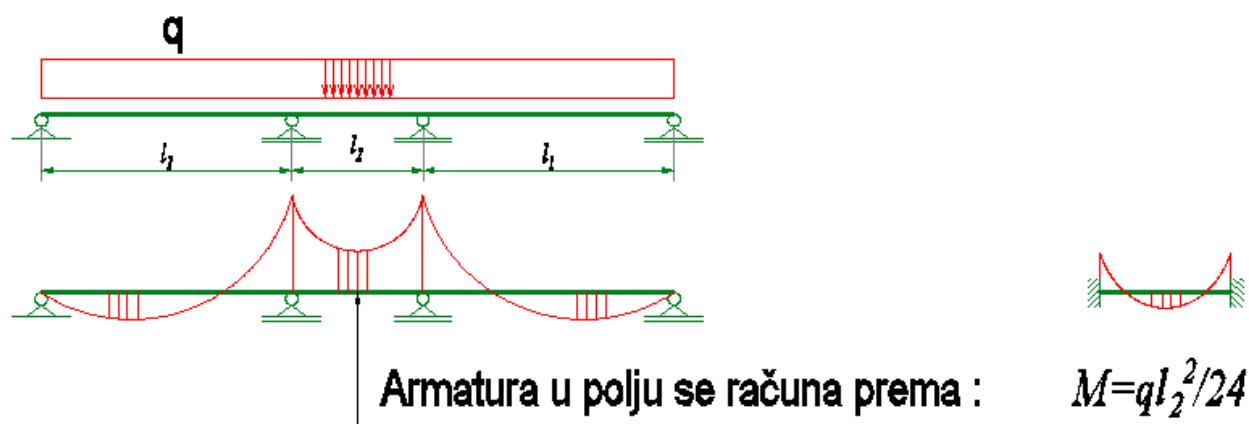


----- armatura u gornjoj zoni
 ————— armatura u donjoj zoni

Uticaji u drugom pravcu

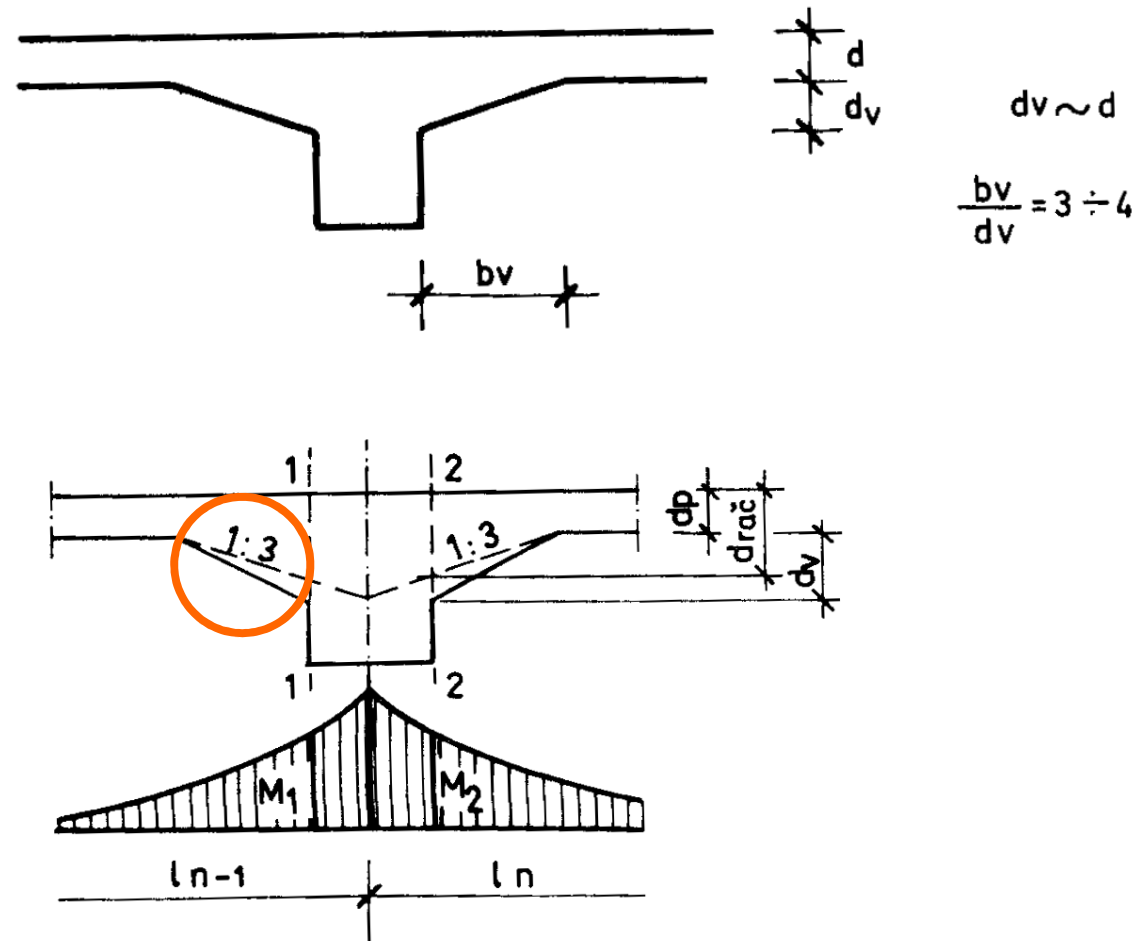


Ploče sa nejednakim rasponima



Vute na ploči

Rade se kada su veći rasponi i opterećenja

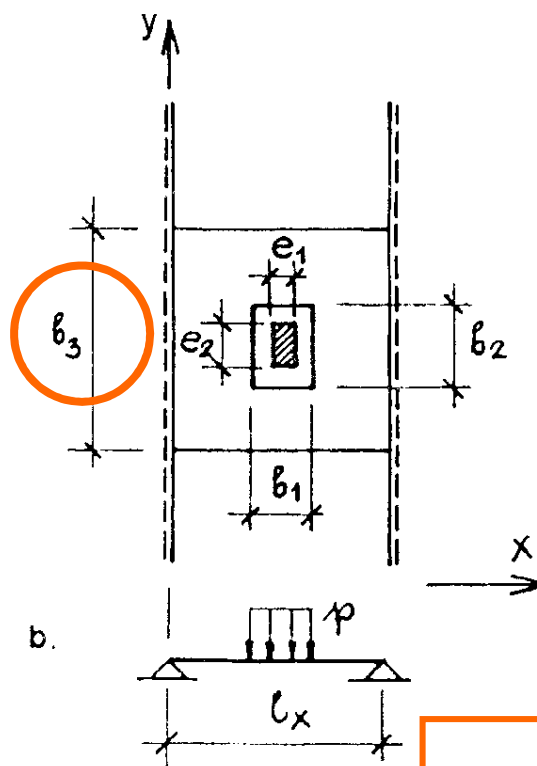
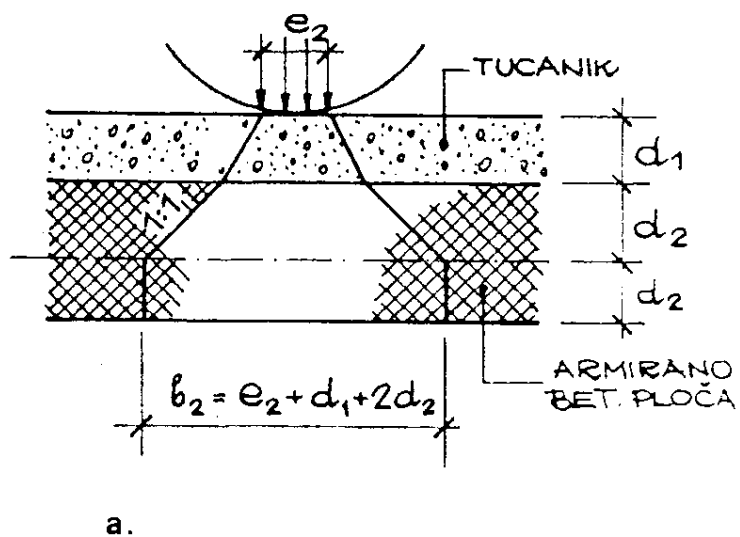


Koncentrisana opterećenja na ploči

Za proračun statičkih uticaja se uzima širina rasprostiranja u nivou srednje ravni ploče, koja u glavnom pravcu (l_x) iznosi:

$$\underline{b_1 = e_1 + d_1 + 2d_2}$$

a u podelenom, tj. pravcu dužeg raspona l_y :



$$\max A_{ap} = 0.65 A_a$$

BAB 87

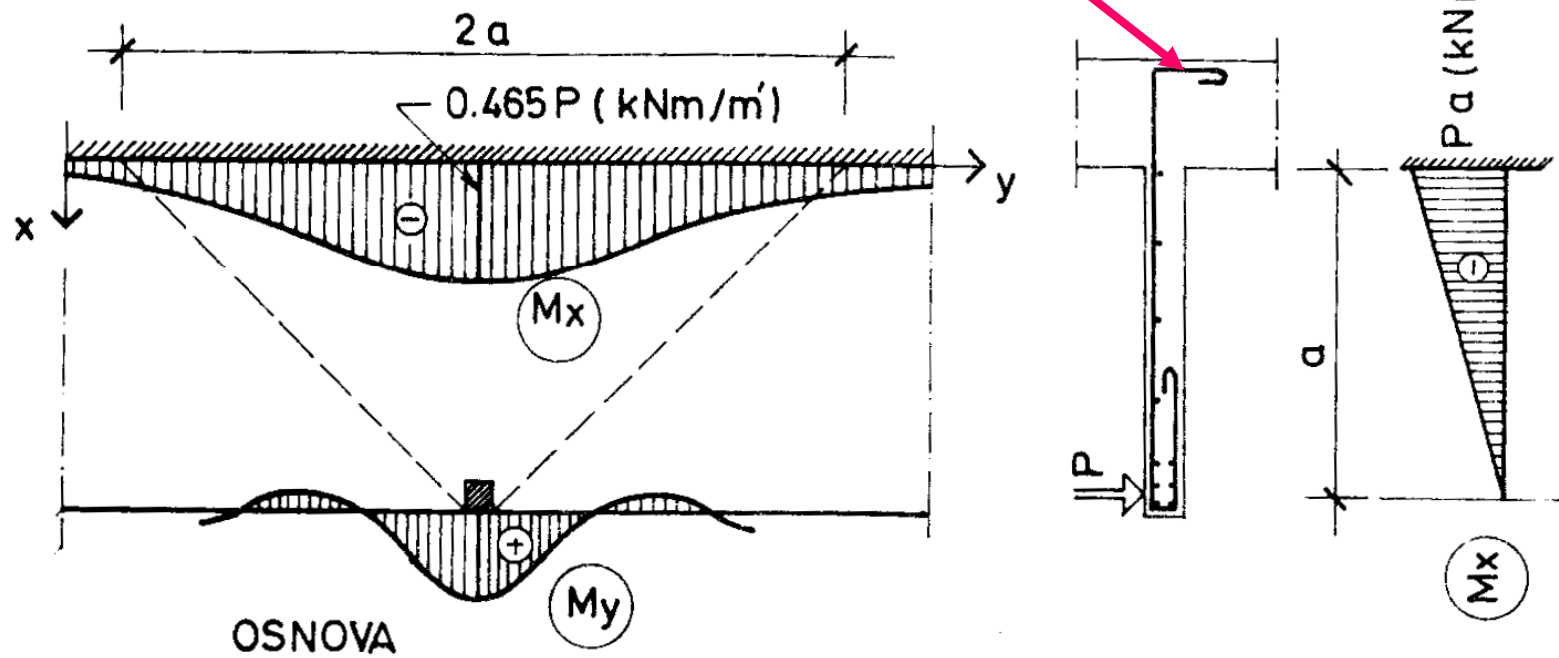
$$b_3 = b_2 + \frac{A_{ap}}{A_a} l_x \leq b_2 + 0.65 l_x$$

$$M_x = M_{x,g} + \frac{M_{x,p}}{b_3}$$

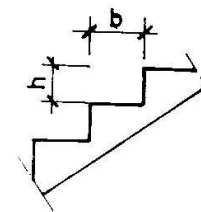
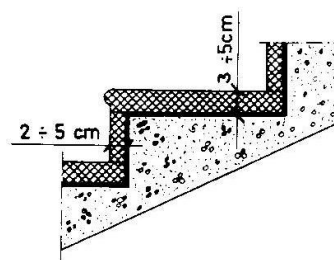
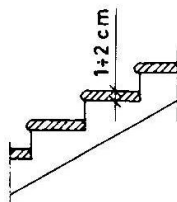
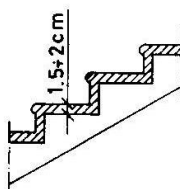
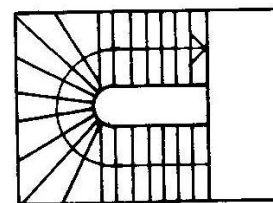
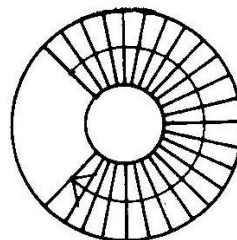
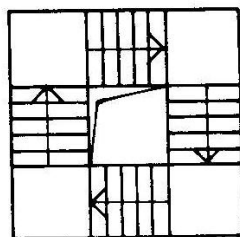
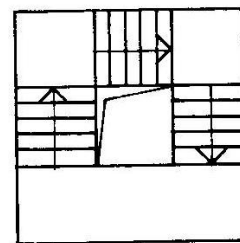
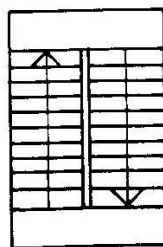
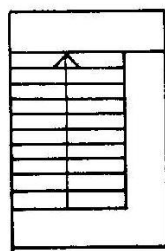
[kNm/m]

Koncentrisano opterećenje na konzolnoj ploči

Sidrenje armature!

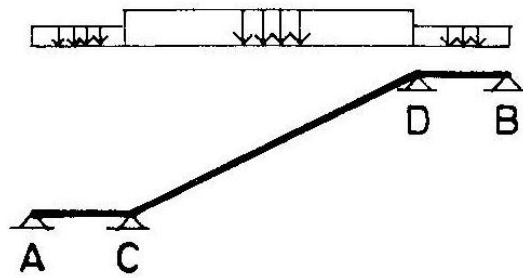
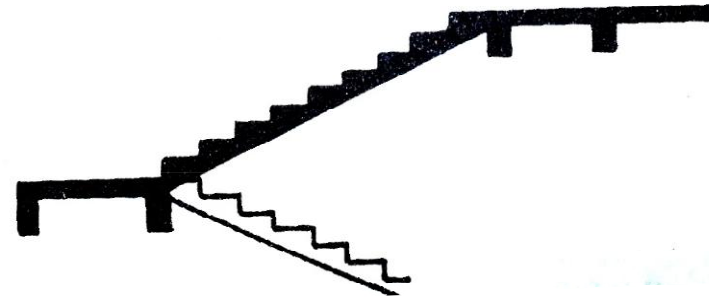
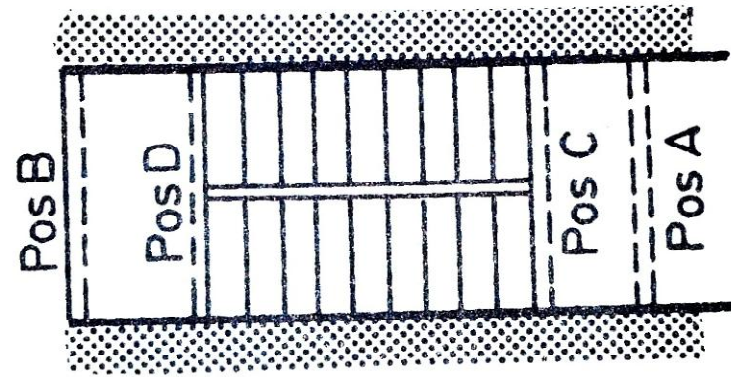


Stepeništa

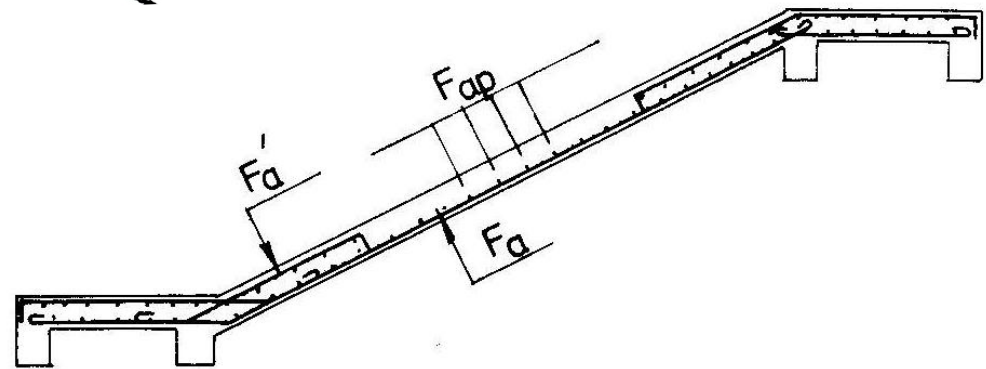


$$b + 2h = 63 \text{ cm}$$

$$b + h = 46 \text{ cm}$$



a)

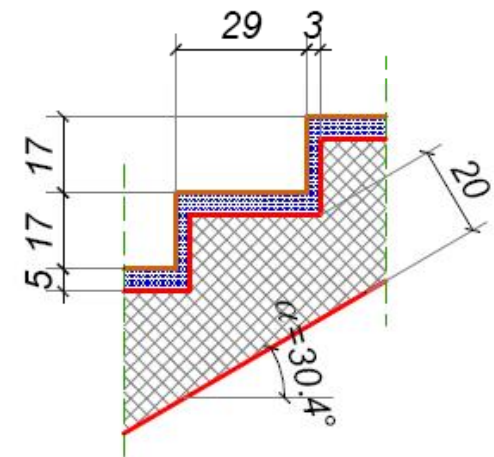
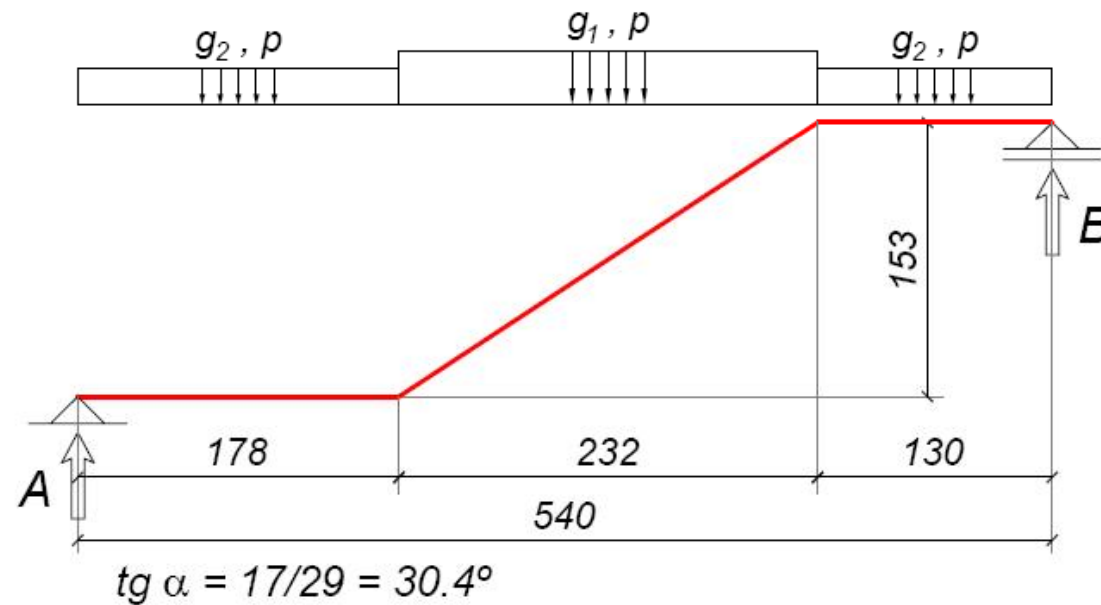


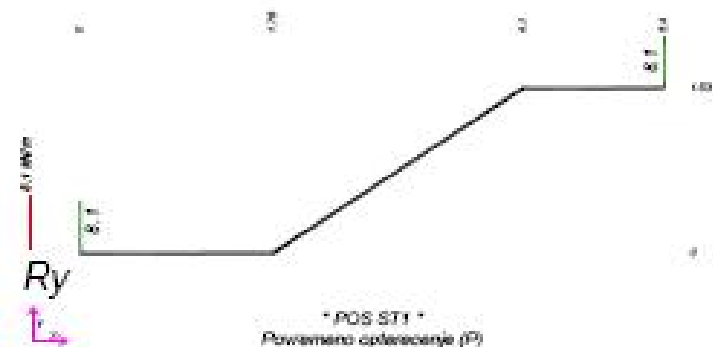
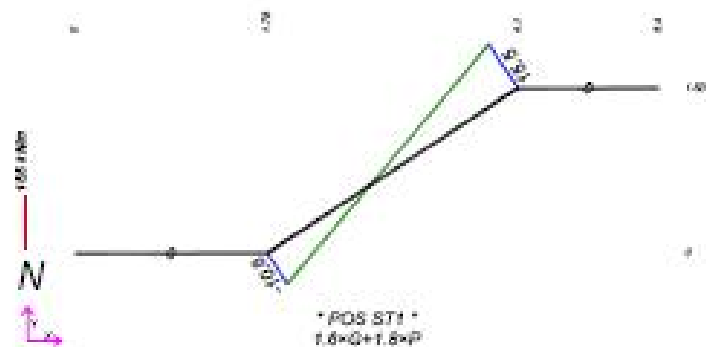
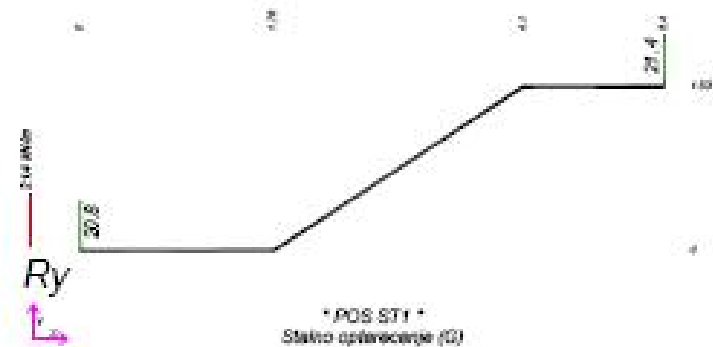
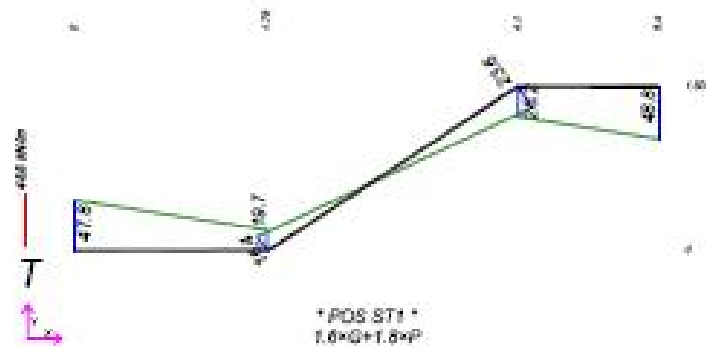
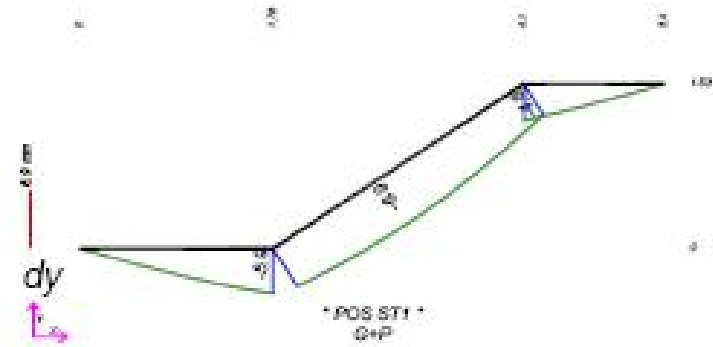
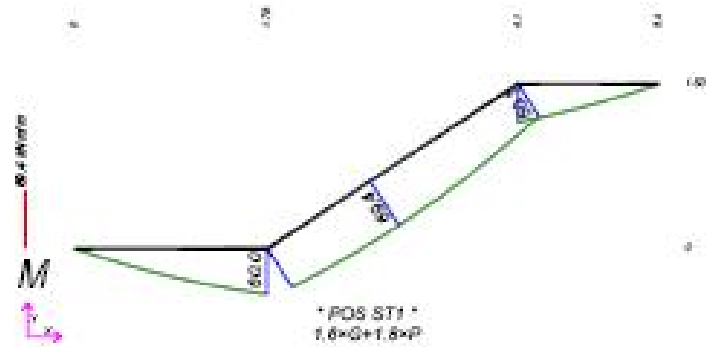
b)

PRORAČUN STEPENIŠTA

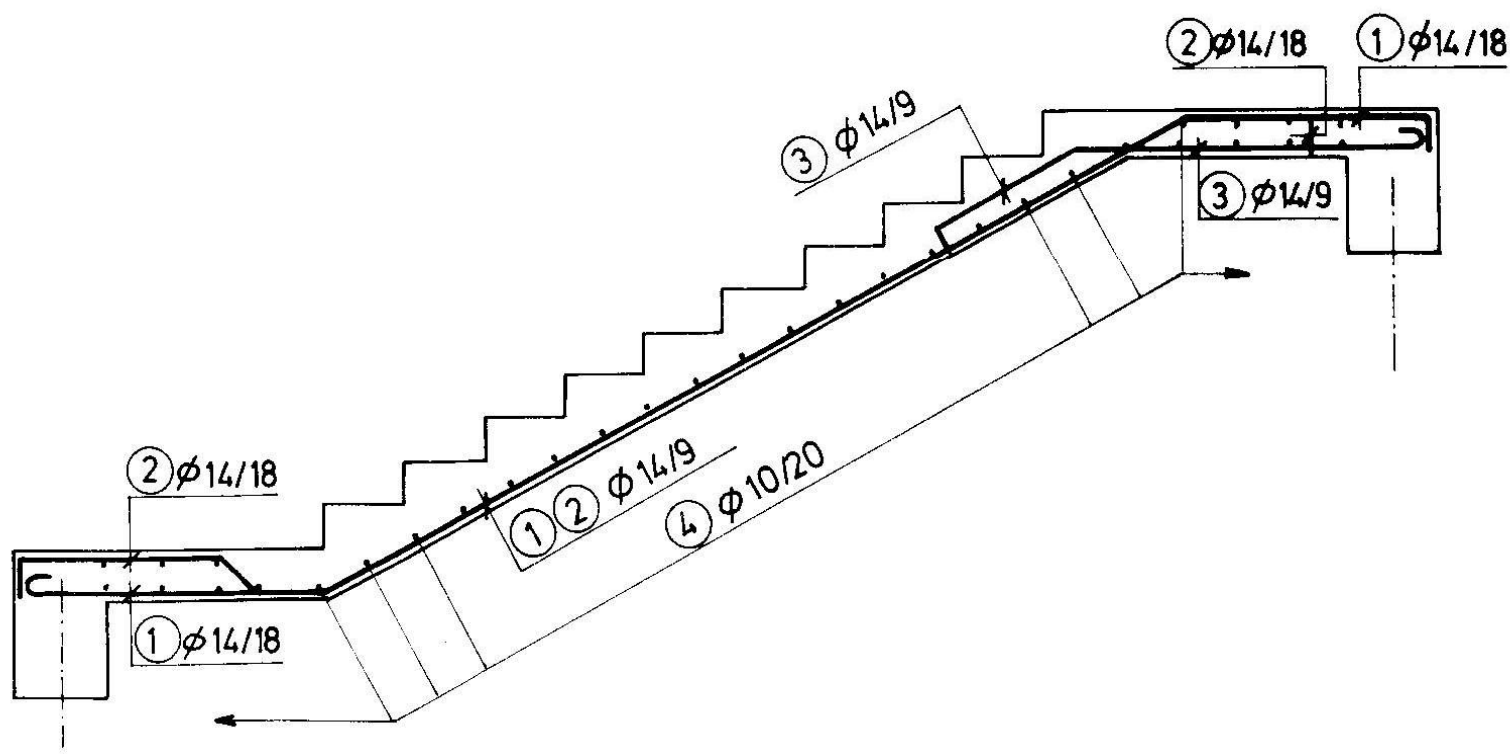
POS ST1

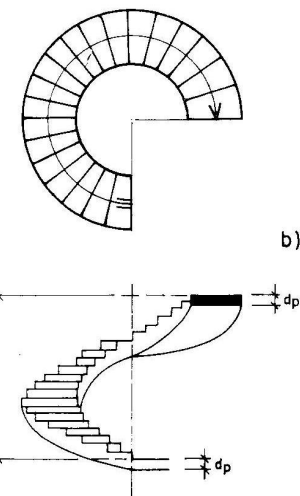
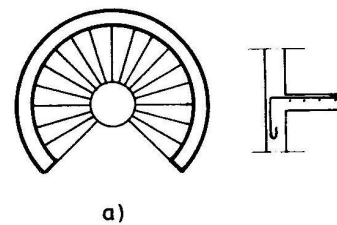
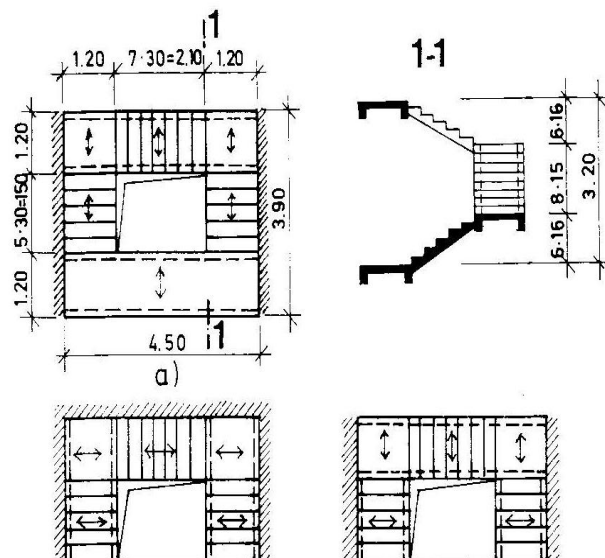
Stepenište je statičkog sistema kolenaste ploče, debljine $d_p = 20$ cm. Savladava visinsku razliku od 306 cm između prizemlja i sprata (18 visina po 17 cm). Stepenci su dimenzija 17/29 cm. Debljina vertikalne obloge stepenika je 3 cm, a horizontalne 5 cm.



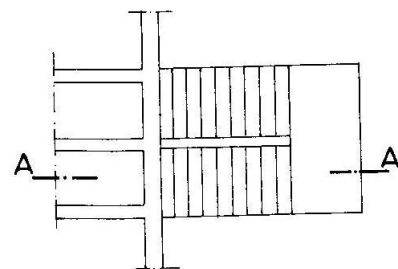


Armiranje stepenišnog kraka

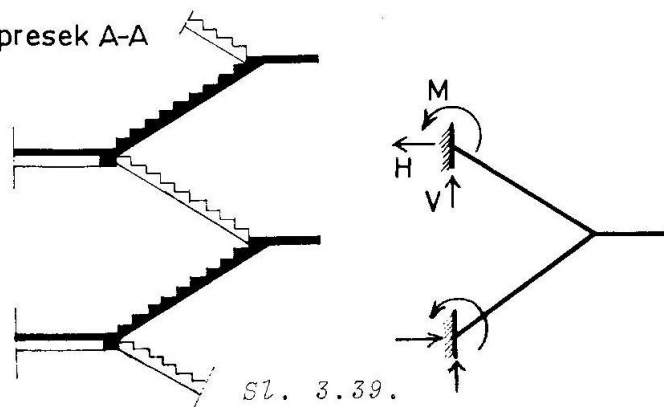




Sl. 3.37.



presek A-A



Sl. 3.39.

