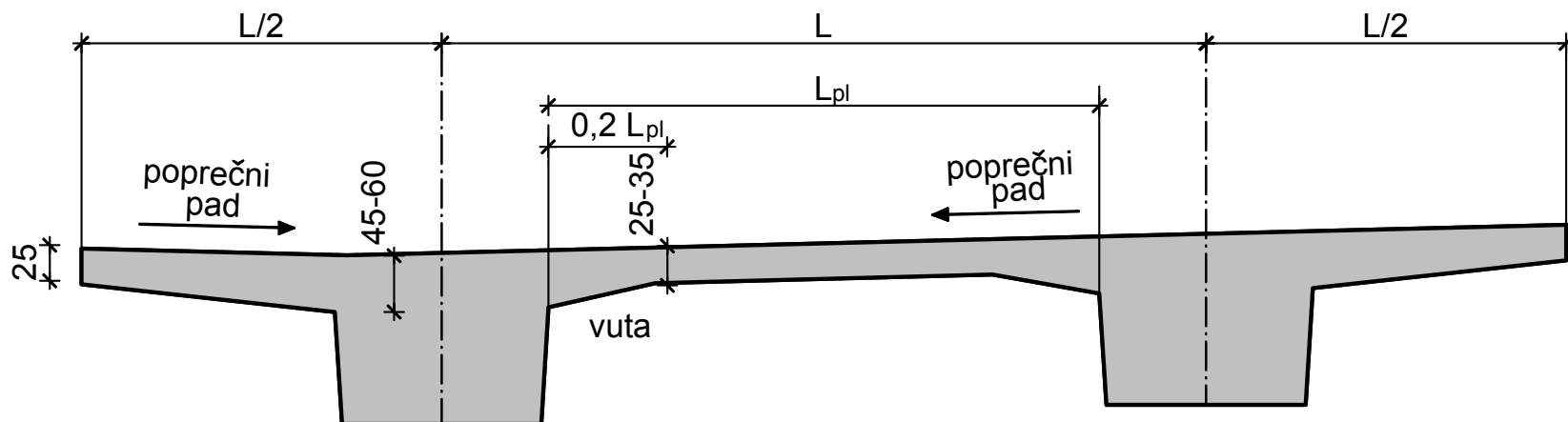


MASIVNI MOSTOVI

**Priprema za rješavanje
programa**

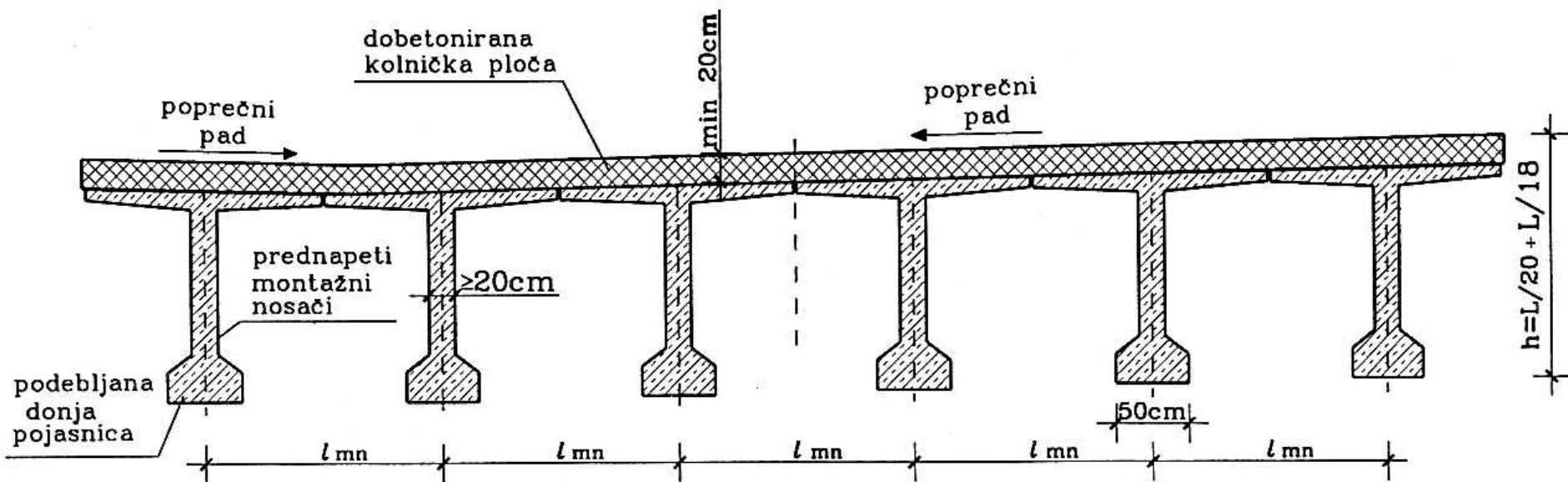
**OBLIKOVANJE POPREČNIH
PRESJEKA**

REBRASTI SKLOP



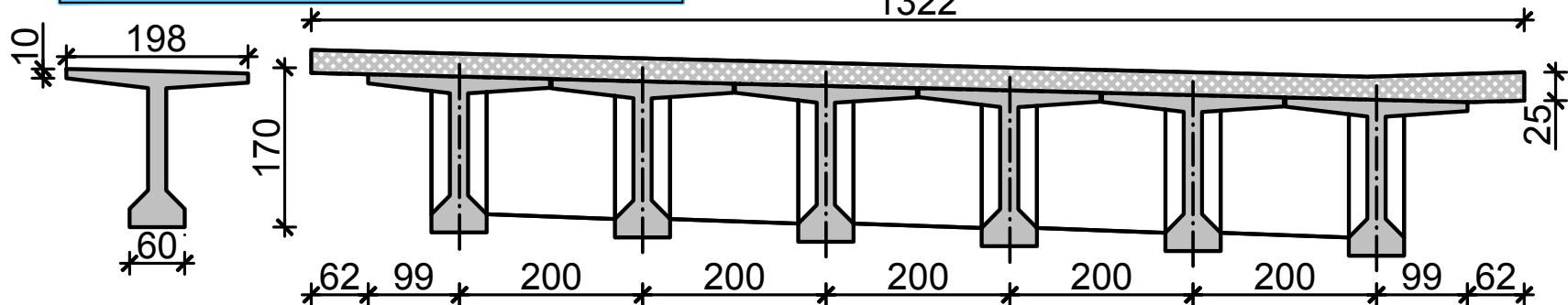
širina rebra: $\begin{matrix} * 100-140cm * \\ * 60-100cm * \end{matrix}$ armirani beton
prednapeti beton

	L/h		max L (m)	
statički sustav	armirano-betonski	prednapeti	armirano-betonski	prednapeti
slobodna greda	14	18	25,0	30,0
kontinuirani nosač	16	20	45,0	45,0



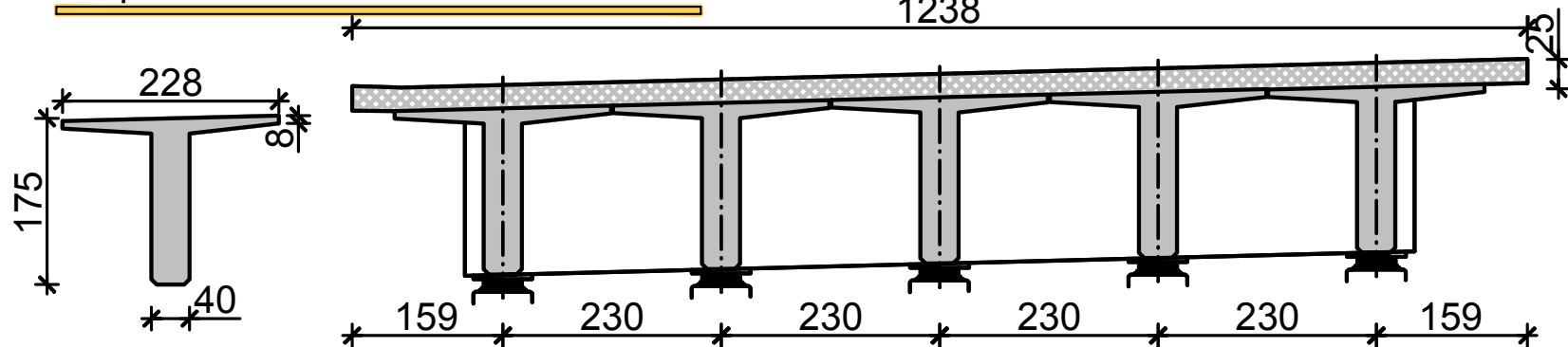
Raspon: 30m

TIPSKI MOST "I"

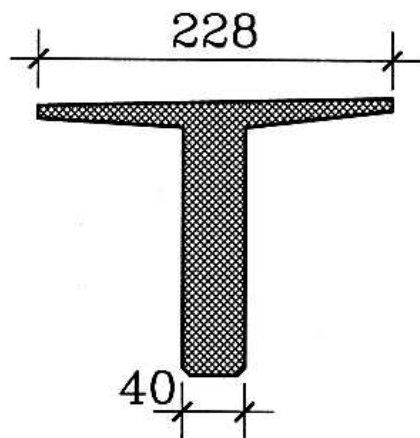


Raspon: 30m

TIPSKI MOST "T"



HIMK - Gf

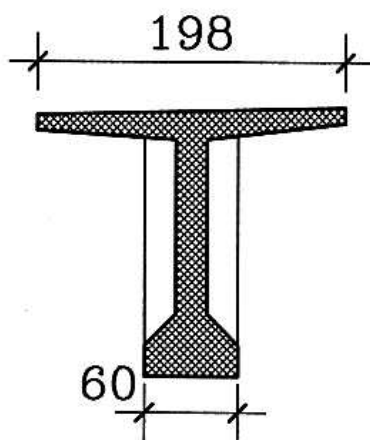


visina nosača:

$h=175$ cm

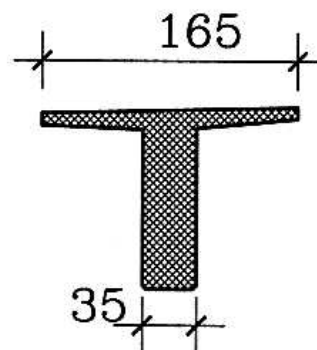
raspon:

$l=30,0$ m



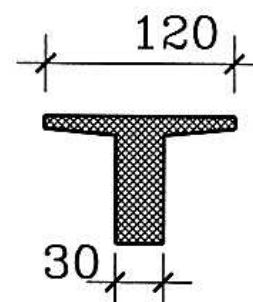
$h=170$ cm

$l=30,0$ m



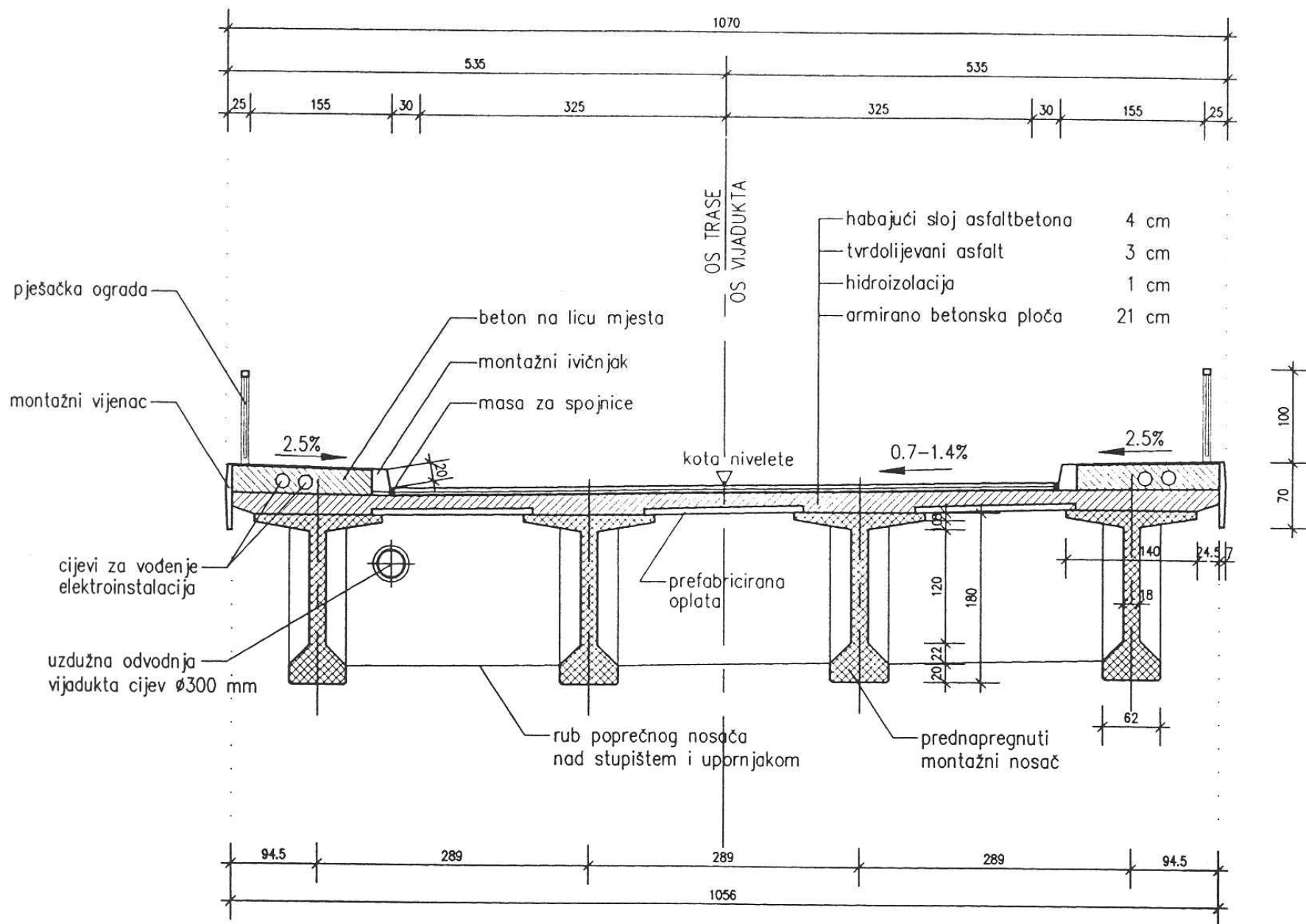
$h=115$ cm

$l=24,2$ m

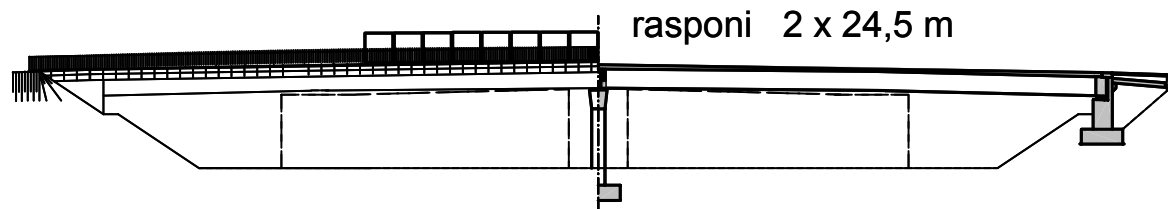
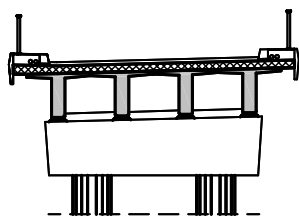


$h=80$ cm

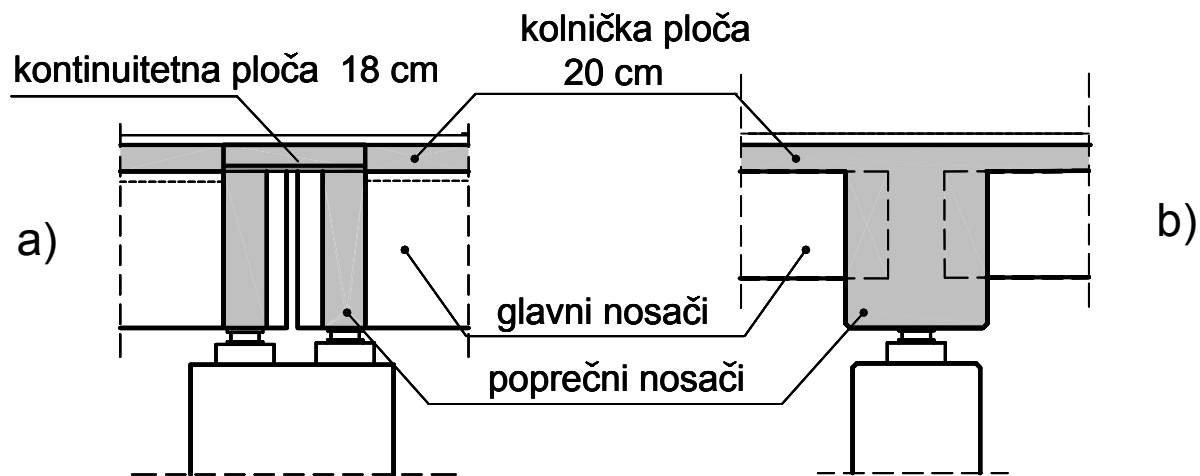
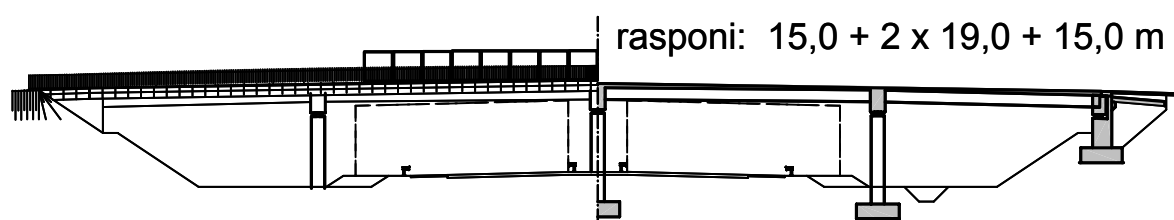
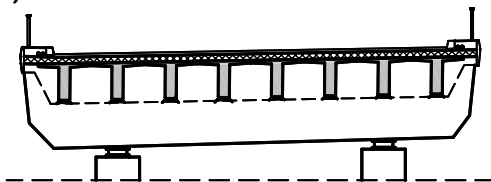
$l=19,0$ m



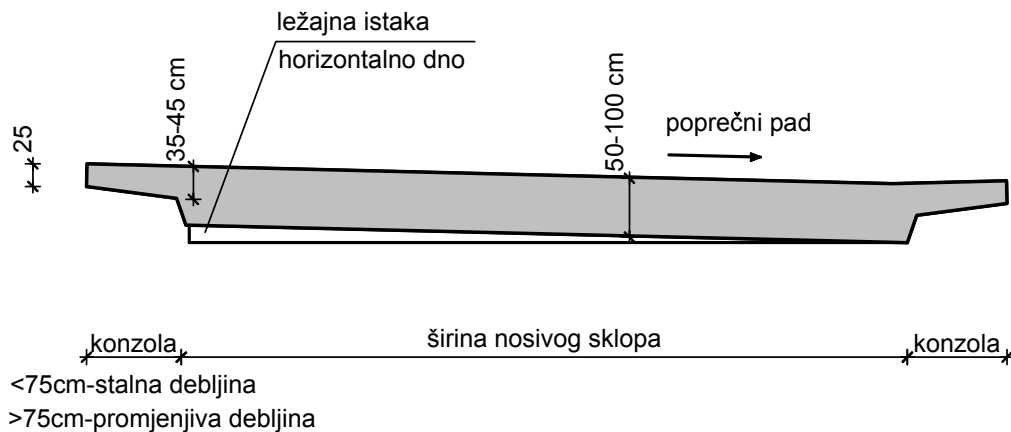
a)



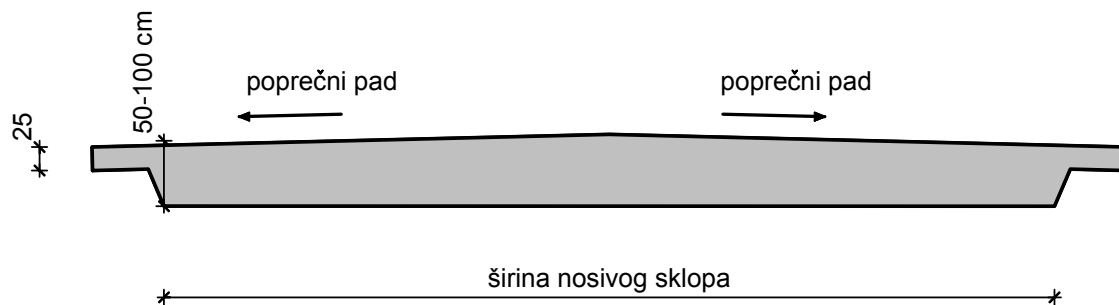
b)



PLOČASTI SKLOP



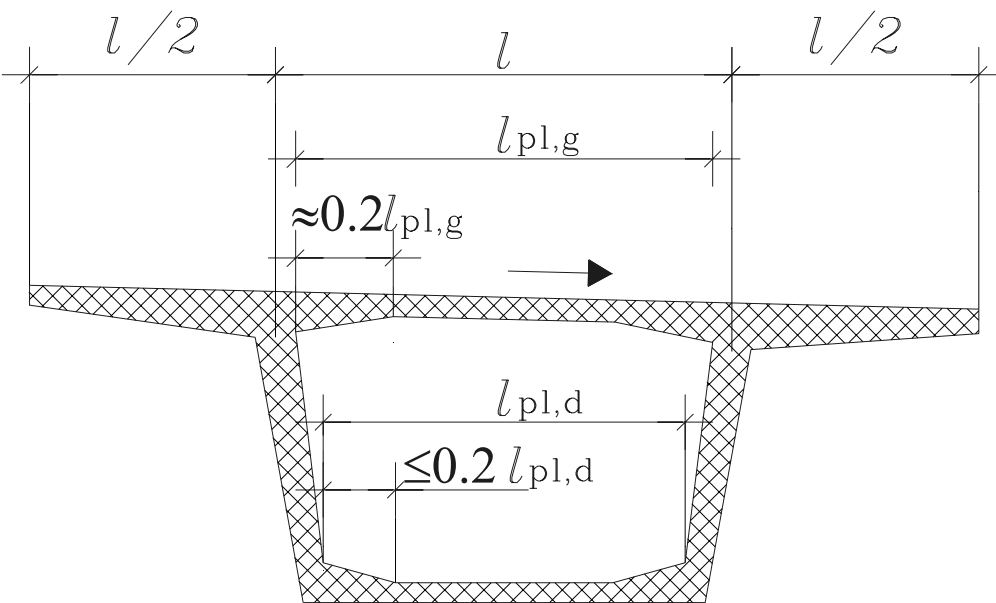
a) jednostrešni poprečni pad



b) dvostrešni poprečni pad

tip mosta	statički sustav	L/h		max L (m)	
		armirano-betonski	prednapeti	armirano-betonski	prednapeti
cestovni	slobodno oslonjena greda	17	22	15,0	25,0
	kontinuirani nosač	22	28*	20,0	30,0
željeznički	slobodno oslonjena greda	12	16	12,0	20,0
	kontinuirani nosač	16	18	15,0	20,0

* kod pločastih mostova s vutama L/h može ići do 40



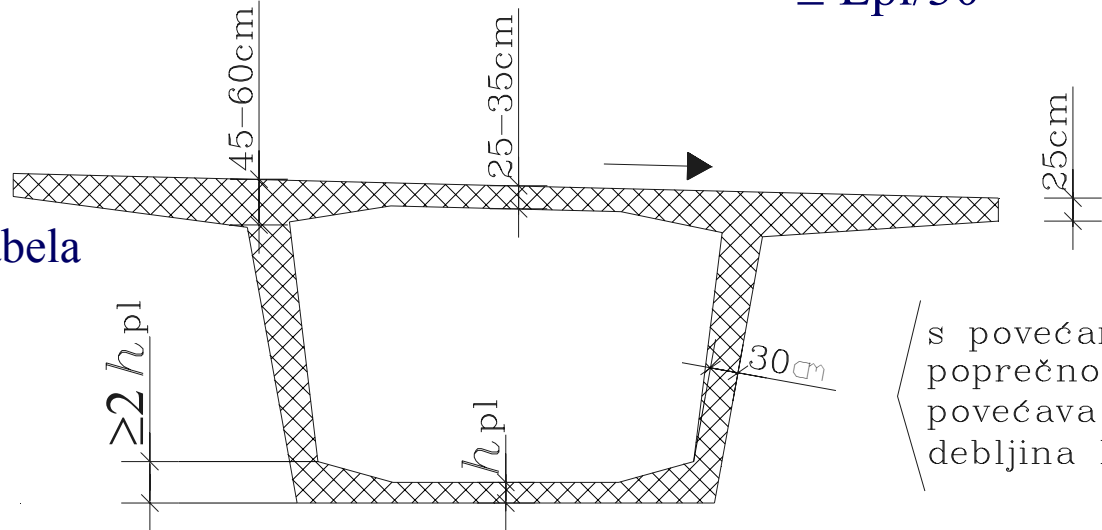
SANDUČASTI SKLOP

Debljina hrptova odabire se iz nekoliko uvjeta:

- $\geq H/15$,
- $\geq 30 \text{ cm}$,
- $\geq 20 \text{ cm} + 2\phi_{\text{cijevi}}$,
- $\geq 4\phi_{\text{cijevi}}$,
- i potrebi smještaja sidara kabela

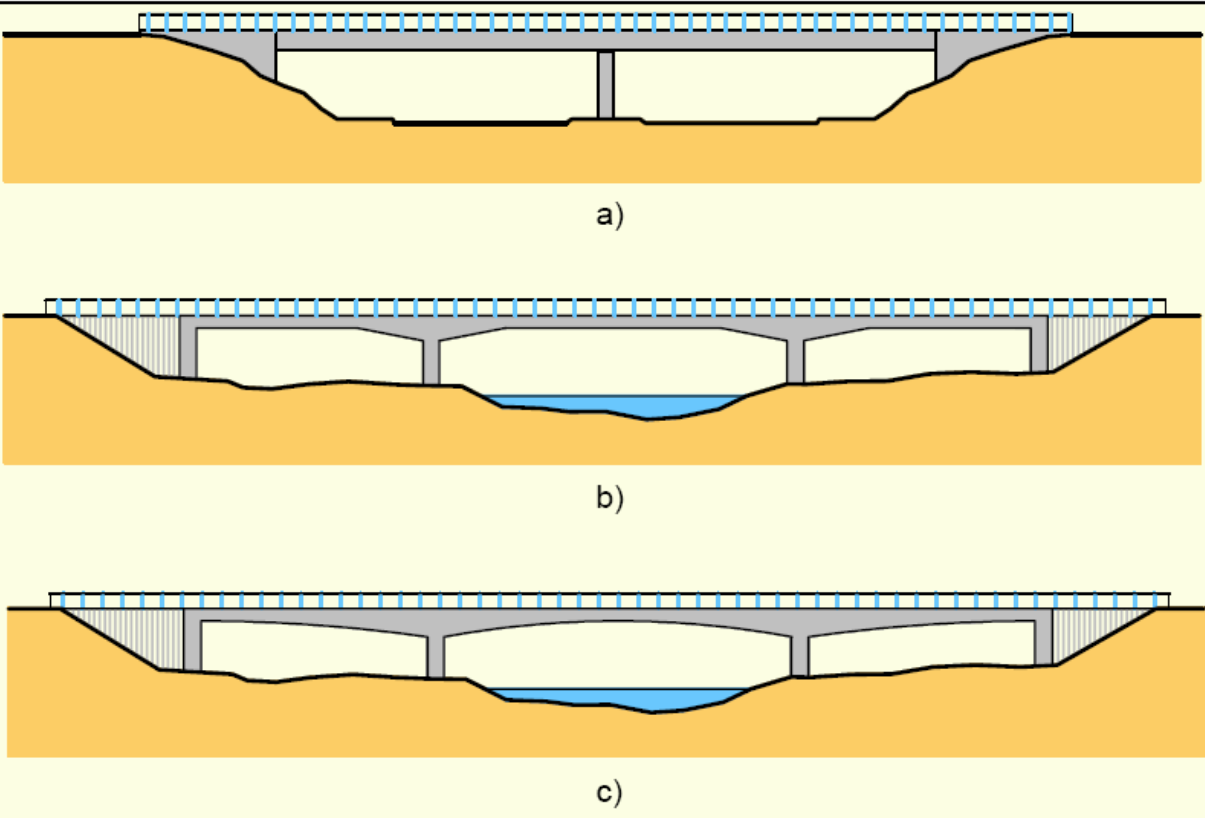
Debljina donje ploče:

- $\geq H/8$,
- $\geq 20 \text{ cm}$
- $\geq L_{pl}/30$



s povećanjem visine
poprečnog presjeka
povećava se i
debljina hrpta

SANDUČASTI PREDNAPETI SKLOP



statički sustav	L max	L/h
slobodna greda	45	21
kontinuirani nosač stalne visine	80	20-25
kontinuirani nosač s vutama	L > 50 m ⇒ nedovoljni h nad stupom ⇒ prekoračenje tlačnih napreznja ⇒ podebljanje donje ploče na $\frac{1}{4}$ - $\frac{1}{2}$ L	LEŽAJ: L/h = 16-20 (18) POLJE: L/h = 22-28 (24)
kontinuirani nosač promjenljive visine	300	LEŽAJ: L/h = 18-22 (20) POLJE: L/h = 30-60 (45)

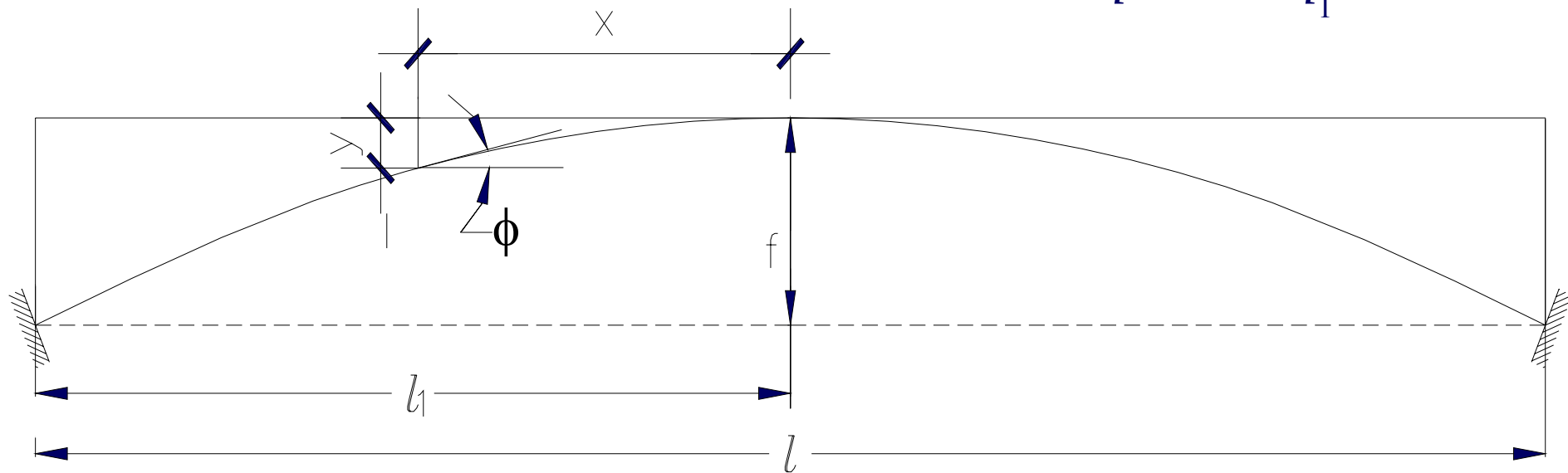
LUČNI NOSAČ

Spljoštenost: $f/l = 0,1 - 0,3$

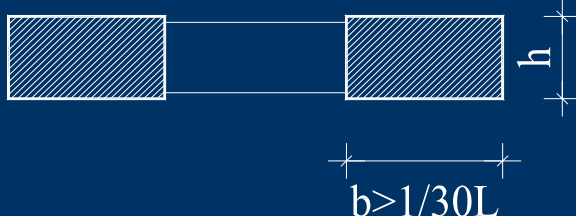
Statički sustav: trozglobni, dvozglobni, UPETI

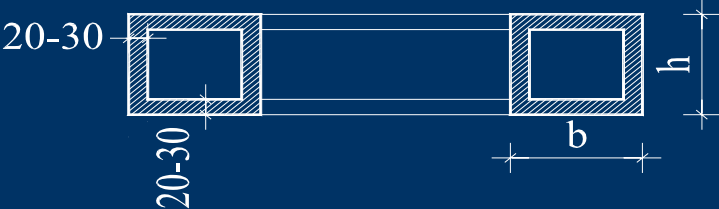
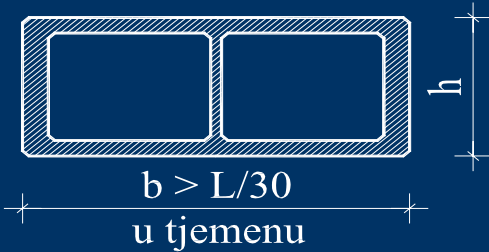
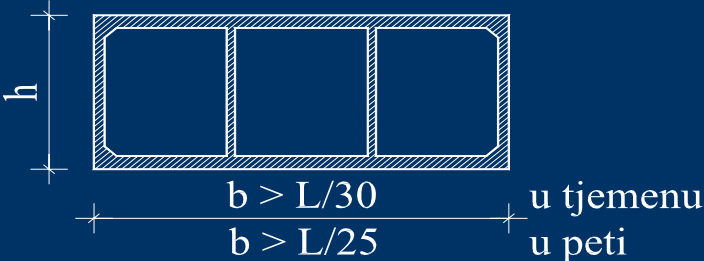
Os luka: idejna razrada – parabola s koord.početkom u tjemenu

$$y = \frac{4f}{l^2} x^2 = \frac{f}{l_1^2} x^2$$



PRESJECI LUKOVA

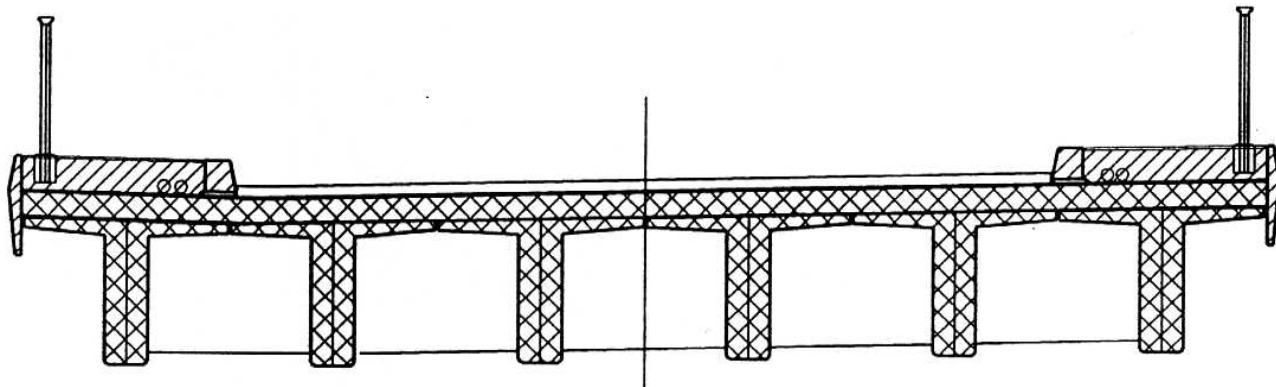
	SKICA POPREČNOG PRESJEKA	Raspon luka u m Visina presjeka
PUNI SVOD		$L = 40 \text{ do } 100 \text{ m}$ visina h u tjemenu luka: $h = (1/40 \text{ do } 1/60) L$ (manji rasponi) $h = (1/60 \text{ do } 1/100) L$ (veći rasponi)
DVOSTRUKI SVOD		$L = 40 \text{ do } 100 \text{ m}$ $h = (1/60 \text{ do } 1/100) L$ (u tjemenu)
RAZDVOJENI PUNI LUKOVI		$L = 40 \text{ do } 100 \text{ m}$ $h = (1/40 \text{ do } 1/60) L$ $h/b = 1 \text{ do } 2$

	SKICA POPREČNOG PRESJEKA	Raspon luka u m Visina presjeka
RAZDVOJENI LUKOVI "I" PRESJEKA		$L = 70 \text{ do } 150 \text{ m}$ $h = (1/40 \text{ do } 1/60) L$ $h/b = 2 \text{ do } 2.5$
RAZDVOJENI SANDUČASTI LUKOVI		$L = 100 \text{ do } 200 \text{ m}$ $h = (1/50 \text{ do } 1/70) L$ $h/b = 1 \text{ do } 1,5$
SANDUČASTI S DVIJE KOMORE		$L = 150 \text{ do } 250 \text{ m}$ $h = (1/50 \text{ do } 1/100) L$
SANDUČASTI S TRI KOMORE		$L = 200 \text{ do } 400 \text{ m}$ $h = (1/50 \text{ do } 1/100) L$

MASIVNI MOSTOVI

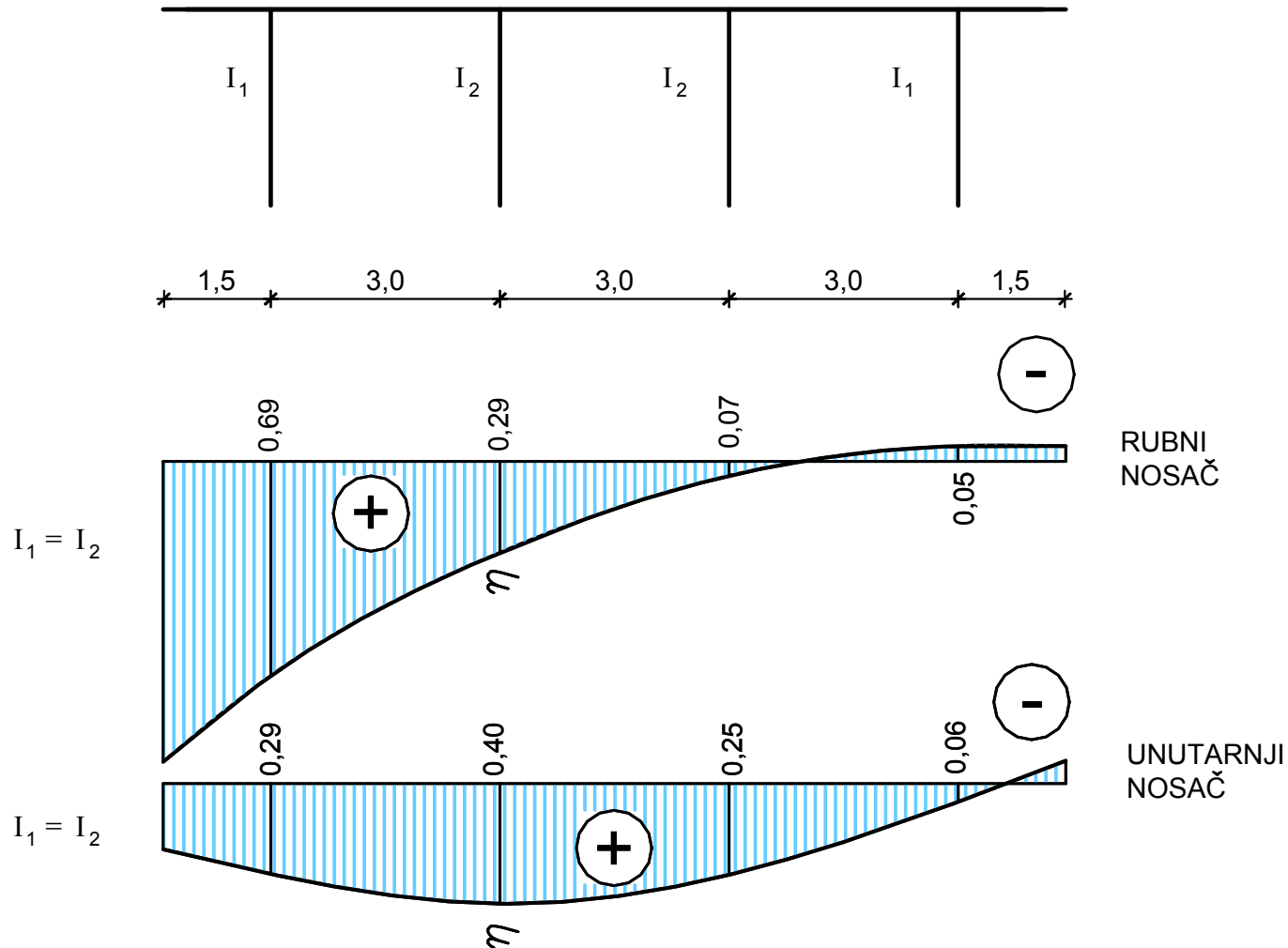
Priprema za rješavanje
programa

POPREČNA RASPODJELA



Rebrasti gredni mostovi s dva i više glavnih nosača

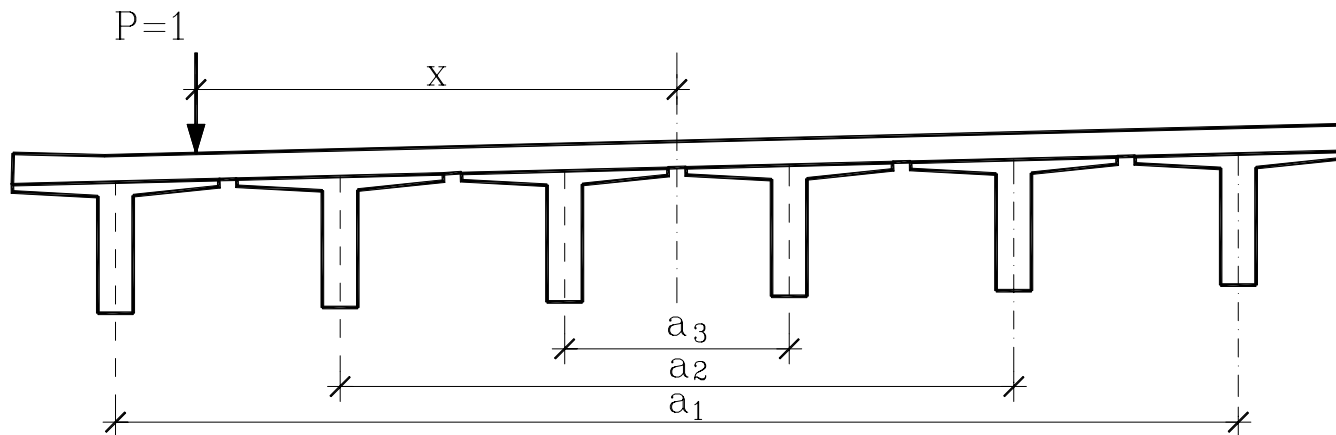
- Za proračun pojedinačnog nosača valja provesti raspodjelu osnovnih opterećenja – linije poprečne raspodjele



Metoda ekscentričnog pritiska

- $l/b \geq 2$ - poprečni nosač deformira po pravcu (poprečni nosač apsolutno je krut – pretpostavka Courbona) - opterećenje koje otpada na pojedine glavne nosače može odrediti analogno naprezanju ravnog presjeka opterećenog uzdužnom silom i momentom savijanja.

$$\sigma = \frac{P}{A} \pm \frac{M \cdot \xi}{I}$$

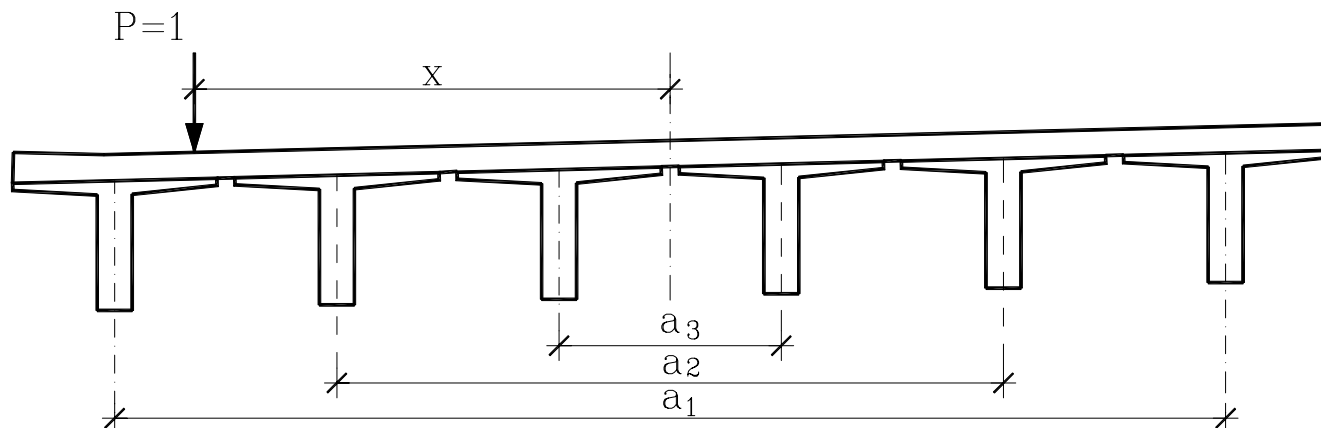


Metoda ekscentričnog pritiska

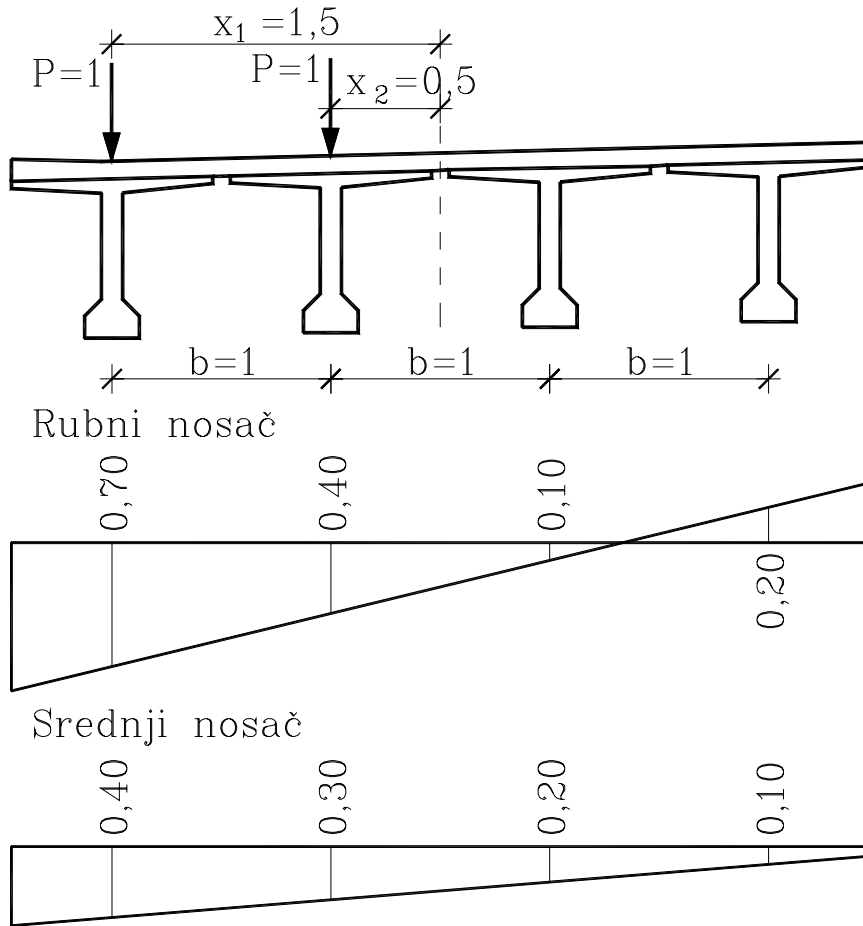
- I_i : moment tromosti nosača
- S_i : opterećenje koje otpada na pojedini nosač

$$\sigma = \frac{S_i}{I_i} \quad A = \sum I_i \quad I = 2 \sum I_i \left(\frac{a_i}{2} \right)^2 \quad M = P \cdot x \quad \xi = \frac{a_i}{2}$$

$$\frac{S_i}{I_i} = \frac{P}{\sum I_i} \pm \frac{P \cdot x}{2 \sum I_i \left(\frac{a_i}{2} \right)^2} \cdot \frac{a_i}{2} \quad S_i = P \left(\frac{I_i}{\sum I_i} \pm \frac{I_i \cdot a_i \cdot x}{\sum I_i \cdot a_i^2} \right) \quad \begin{matrix} P = 1 \text{ i} \\ I_i = \text{const} \end{matrix} \quad \eta_i = \frac{1}{n} \pm \frac{a_i \cdot x}{\sum a_i^2}$$



Ordinate utjecajnih linija poprečne razdiobe za most sa 4 glavna nosača



$$\eta_i = \frac{1}{n} \pm \frac{a_i \cdot x}{\sum a_i^2}$$

$$\eta_{1,4} = \frac{1}{4} \pm \frac{3,0 \cdot 1,5}{1,0^2 + 3,0^2} = 0,25 \pm 0,45 = \begin{cases} + 0,70 \\ - 0,20 \end{cases}$$

$$\eta_{2,3} = \frac{1}{4} \pm \frac{3,0 \cdot 0,5}{1,0^2 + 3,0^2} = 0,25 \pm 0,15 = \begin{cases} + 0,40 \\ + 0,10 \end{cases}$$

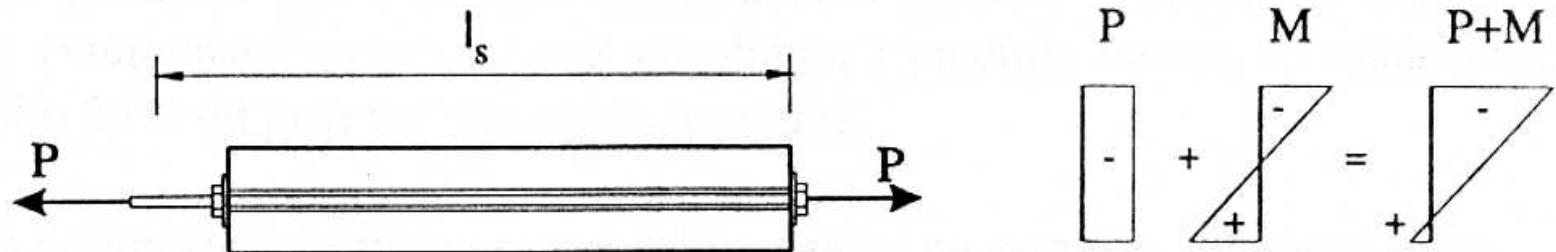
$$\eta_{1,4} = \frac{1}{4} \pm \frac{1,0 \cdot 1,5}{1,0^2 + 3,0^2} = 0,25 \pm 0,15 = \begin{cases} + 0,40 \\ + 0,10 \end{cases}$$

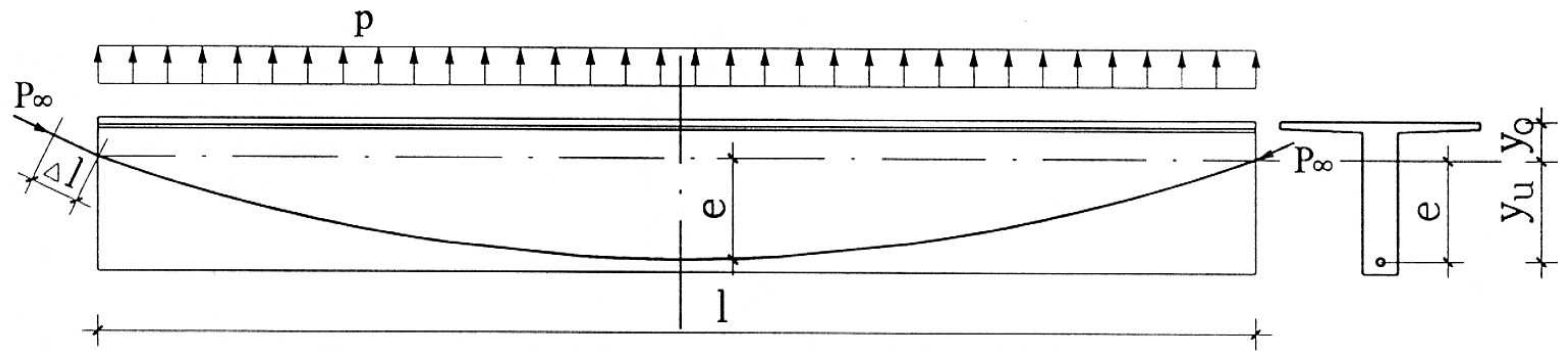
$$\eta_{2,3} = \frac{1}{4} \pm \frac{1,0 \cdot 0,5}{1,0^2 + 3,0^2} = 0,25 \pm 0,05 = \begin{cases} + 0,30 \\ + 0,20 \end{cases}$$

MASIVNI MOSTOVI

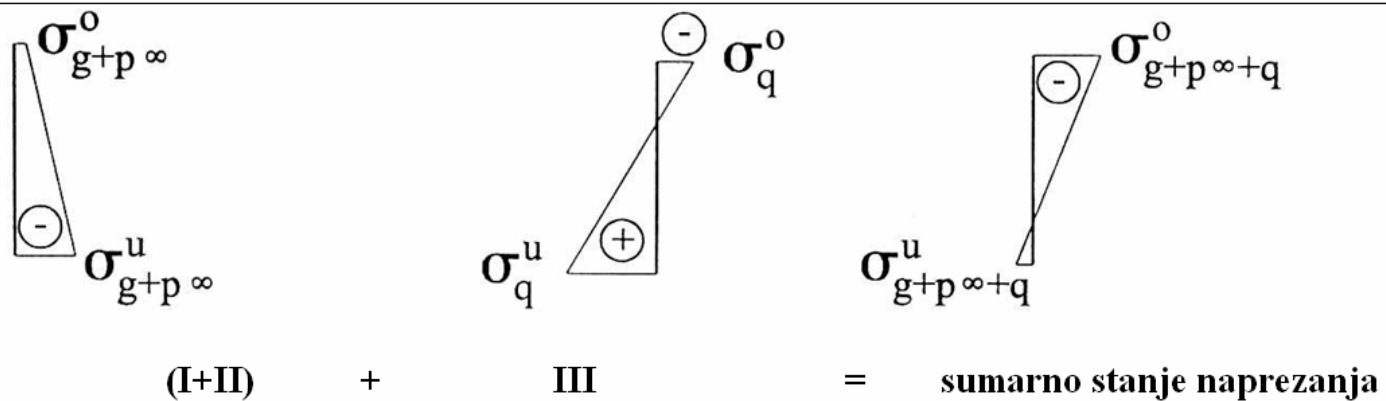
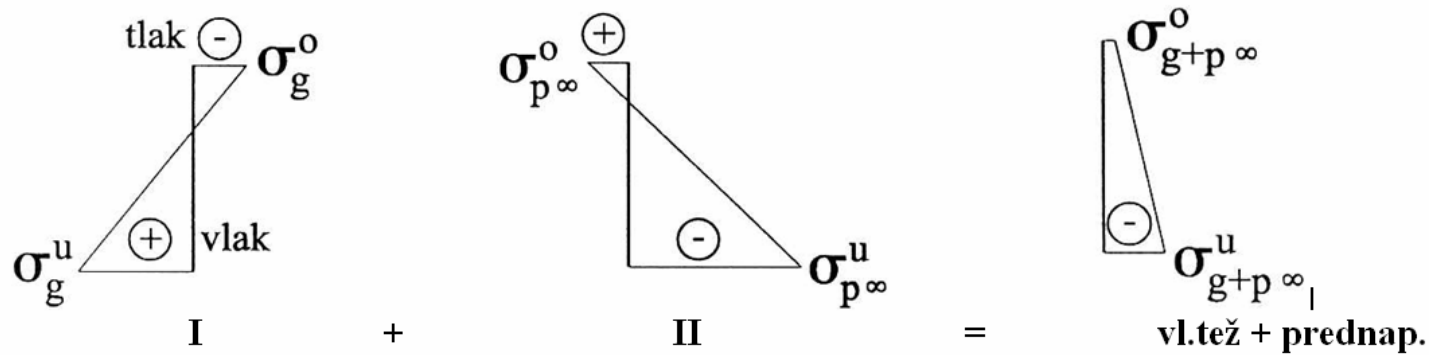
Priprema za rješavanje programa

OSNOVNI PRINCIPI PREDNAPINJANJA





Prednapinjanje nosača mosta



$$k = M_{dek} / M_{G+Q}$$

M_{dek} moment savijanja izazvan vanjskim opterećenjem koji je po veličini i smjeru takav da na vlačnom rubu poništi tlačna naprezanja izazvana silom prednapinjanja

Puno prednapinjanje:

vlačno naprezanje = 0, $k=1,0$

Ograničeno prednapinjanje:

vlačno naprezanje < graničnog, $k < 1,0$

Djelomično prednapinjanje:

$a_k < a_g$ (širine pukotina); $k = 0,4 - 0,7$