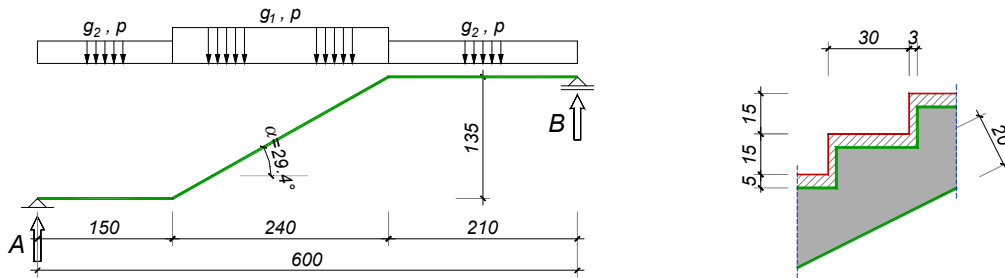
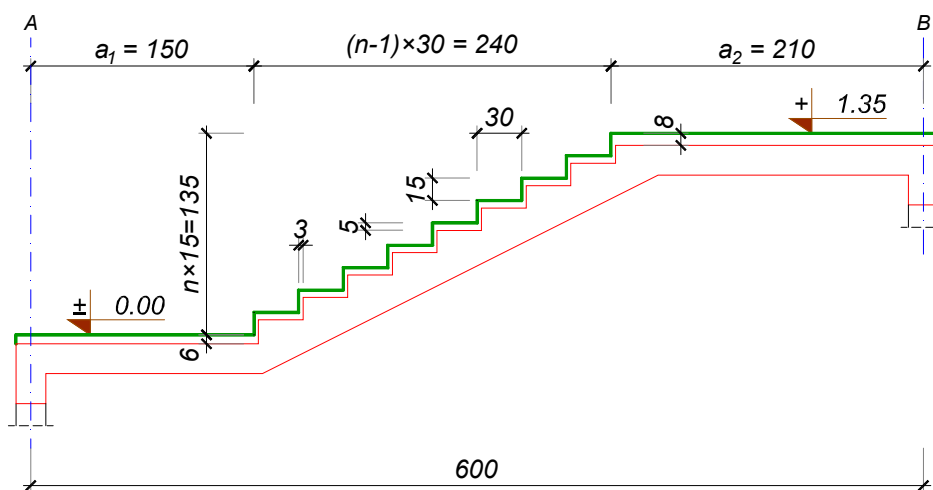


### PRORAČUN STEPENIŠTA POS ST1

Stepenište je statičkog sistema kolenaste ploče, debljine  $d_p = 20$  cm. Savladava visinsku razliku od 135 cm (9 visina po 15 cm). Stepenci su dimenzija  $b/h = 15/30$  cm. Debljina vertikalne obloge stepenika je 3 cm, a horizontalne 5 cm.



$$\operatorname{tg} \alpha = 135/240 = 0.5625 \Rightarrow \alpha = 29.4^\circ$$



Analiza opterećenja

kos deo:

## stalno opterećenje

- težina ploče	$0.20 \times 25.0 / \cos 29.4^\circ$	= 5.74 kN/m <sup>2</sup>
- težina stepenika	$0.5 \times 0.15 \times 24.0$	= 1.80 kN/m <sup>2</sup>
- horizontalna obloga	$0.05 \times 24$	= 1.20 kN/m <sup>2</sup>
- vertikalna obloga	$15/30 \times 0.03 \times 24$	= 0.36 kN/m <sup>2</sup>

ukupno:  $g_2$  = 9.10 kN/m<sup>2</sup>povremeno opterećenje  $p$  = 3.00 kN/m<sup>2</sup>

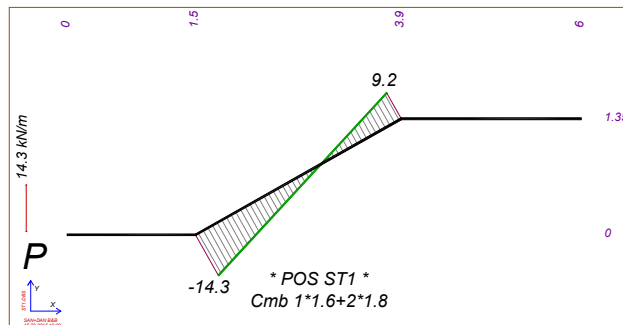
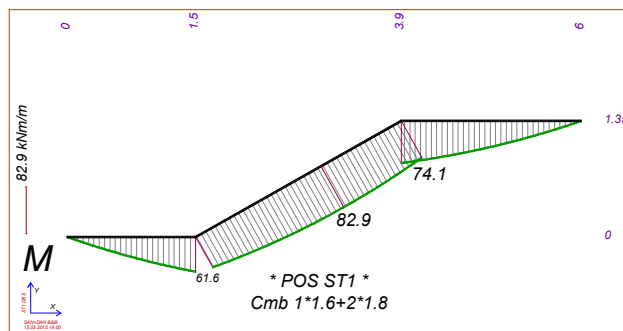
horizontalni delovi:

## stalno opterećenje

- težina ploče	$0.20 \times 25.0$	= 5.00 kN/m <sup>2</sup>
- horizontalna obloga	$0.06 \times 25.0$	= 1.50 kN/m <sup>2</sup>

ukupno:  $g_1$  = 6.50 kN/m<sup>2</sup>povremeno opterećenje  $p$  = 3.00 kN/m<sup>2</sup>

Dijagrami statičkih uticaja dati su u nastavku.



Dimenzionisanje

usvojeno: MB 30  $\Rightarrow f_B = 20.5 \text{ MPa} = 2.05 \text{ kN/cm}^2$

RA 400/500  $\Rightarrow \sigma_v = 400 \text{ MPa} = 40 \text{ kN/cm}^2$

$\max. M_u = 82.9 \text{ kNm/m}$  (donja zona)

pretp.  $a_1 = 3 \text{ cm} \Rightarrow b/d/h = 100/20/17 \text{ cm}$

$$k = \frac{17}{\sqrt{\frac{82.9 \times 10^2}{100 \times 2.05}}} = 2.673 \Rightarrow \frac{\varepsilon_b}{\varepsilon_a} = 2.582 / 10\text{‰}$$

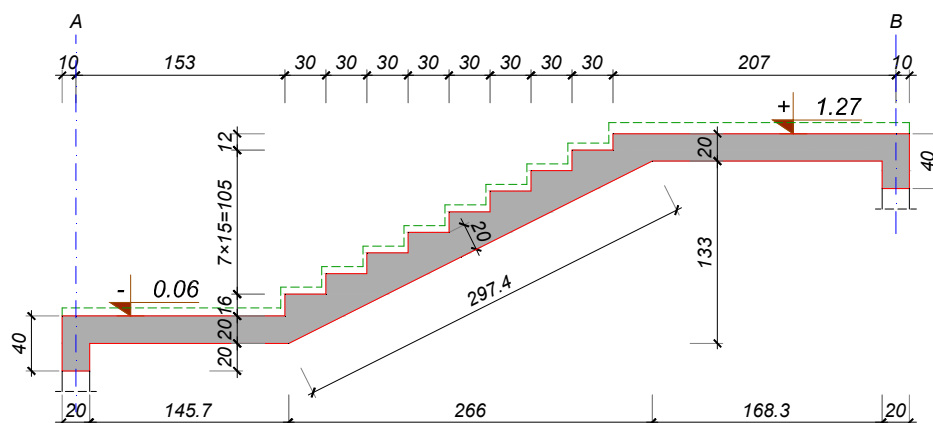
$$\mu = 15.221\%$$

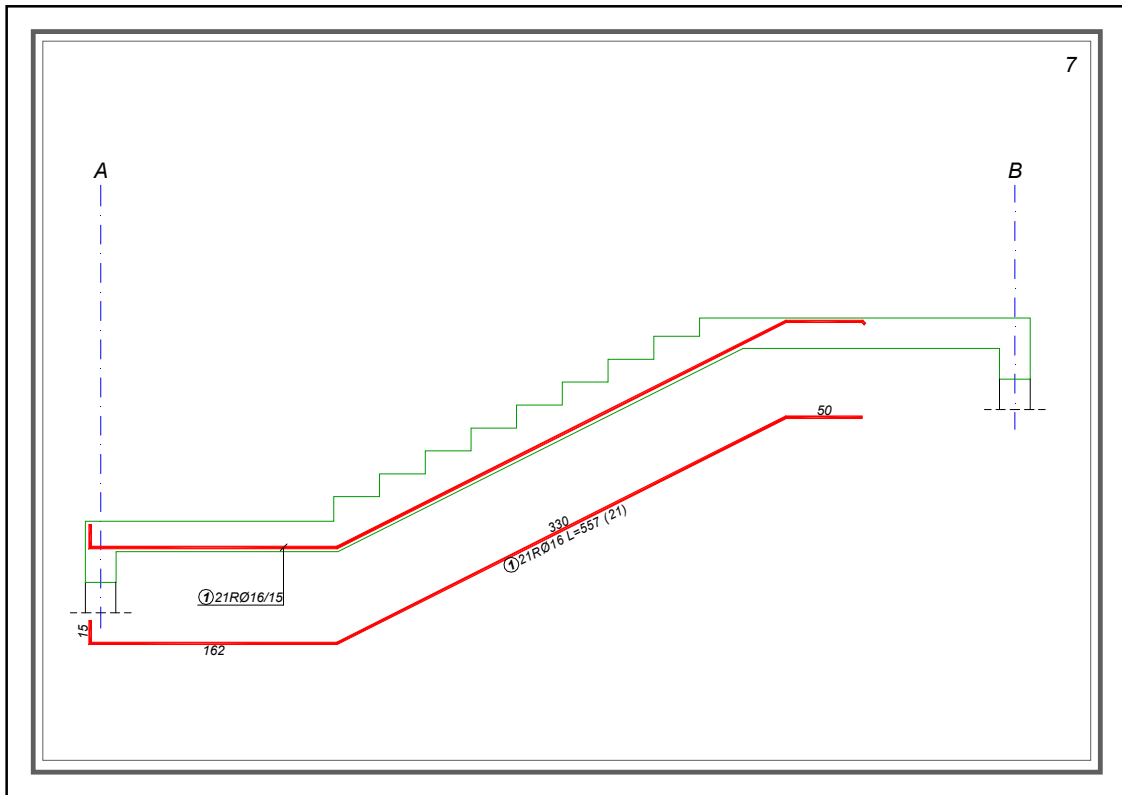
$$A_a = 15.221 \times \frac{100 \times 17}{100} \times \frac{2.05}{40} = 13.26 \text{ cm}^2/\text{m}$$

$$A_{ap} = 0.2 \times 13.26 = 2.65 \text{ cm}^2/\text{m}$$

usvojeno: **RØ 16/15** (13.40 cm<sup>2</sup>/m)

**RØ 10/25** (3.14 cm<sup>2</sup>/m) - podeona armatura





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$M_u = 74.1 \text{ kNm/m}$  (donja zona, presek na desnom podestu)  
 usv.  $a_1 = a_0 + \varnothing/2 = 2.0 + 1.6/2 = 2.8 \text{ cm}$   
 $b/d/h = 100/20/17.2 \text{ cm}$   
 $A_a = 13.157 \times 17.2 \times \frac{2.05}{40} = 11.60 \text{ cm}^2/\text{m}$   
 usv.  $e_a = 15 \text{ cm}$  (kao u polju)  $\Rightarrow a_a^{(1)} \geq \frac{A_{a, \text{potr.}} \times e_a}{100} = \frac{11.60 \times 15}{100} = 1.74 \text{ cm}^2$   
 usvojeno: **RØ 16/15** ( $13.40 \text{ cm}^2/\text{m}$ )  
**RØ 10/25** ( $3.14 \text{ cm}^2/\text{m}$ ) - podeona armatura

