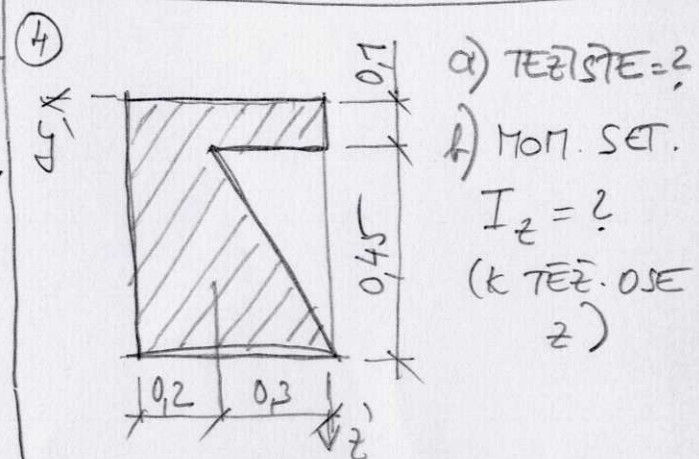
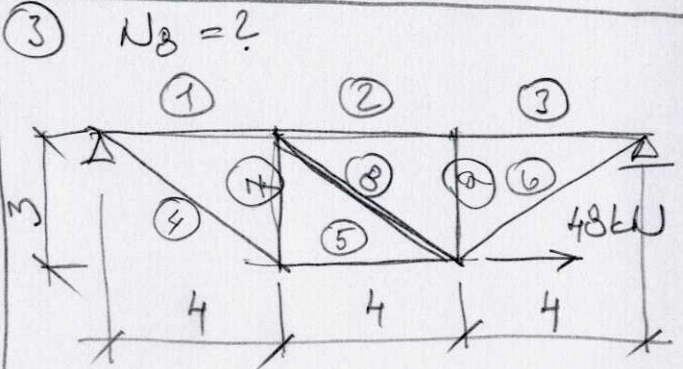
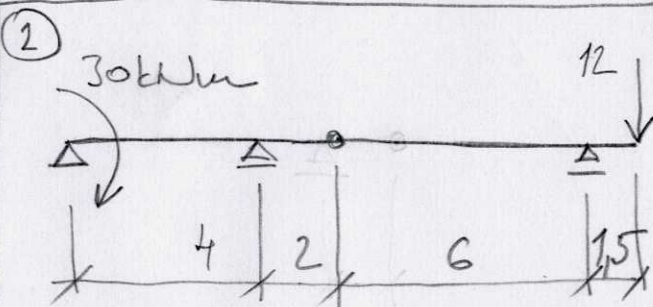
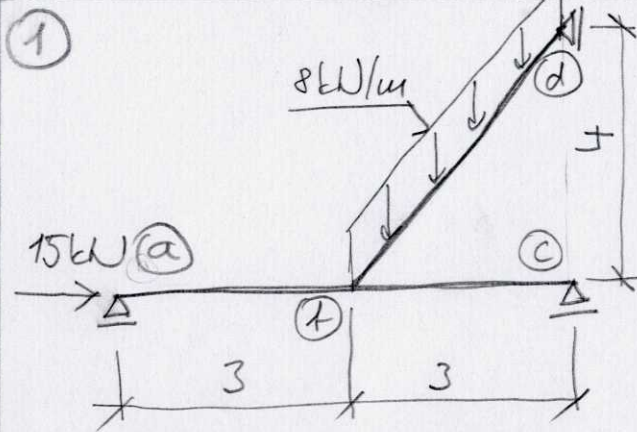
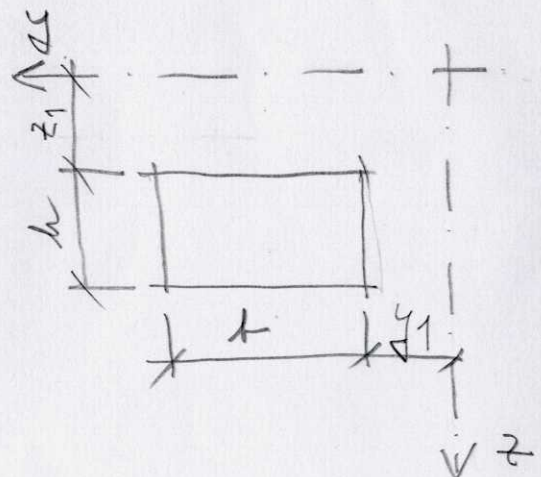
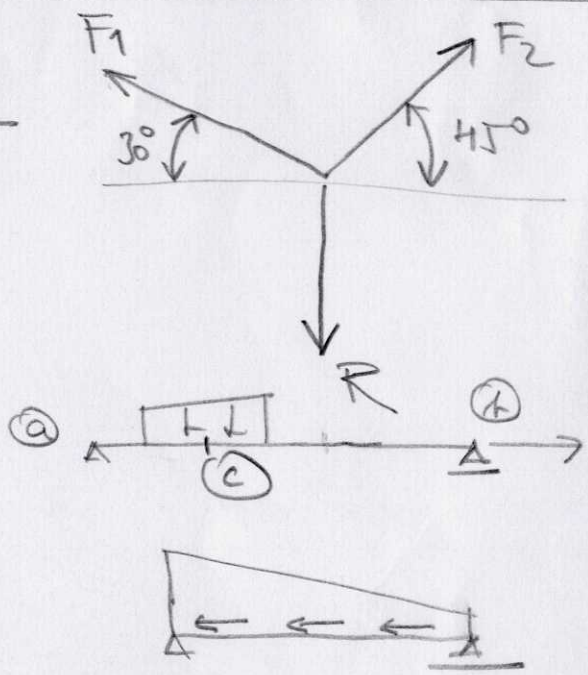


ZADÁNÍ ŽELOUSKÝ BDO1, 10. 6. 2016,
KOMBINOVANÉ STUDIUM, ŽELOUSKÝ R. ŽIDEK

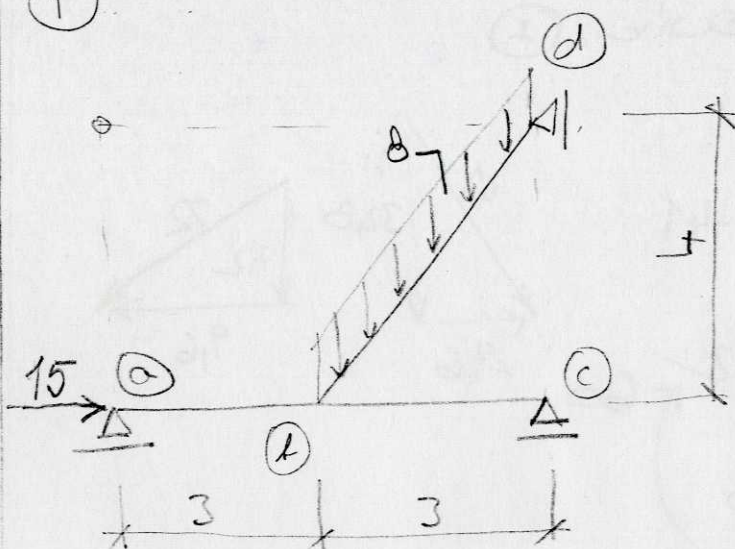


TEORIE

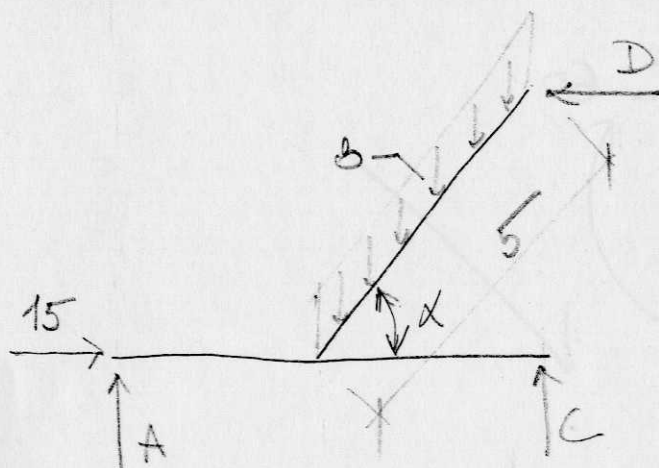
- 1) ROZLOŽTE SILU R DO SLOŽEK F_1 A F_2 . POUŽIJTE PODMINKY EKVIVALENCE.
2. DEFINUJTE VNITŘNÍ SILY V BODĚ C NOSNÍKU.
3. NAPIŠTE DIFERENCIÁLNÍ PODMINKU ROVNOVÁHY PRO HOR. SILY. JAKÝ BUDE TVAR FUNKCE HOR. SIL V PŘÍPADĚ LICHOB. ZATÍŽENÍ?
4. VYPOČÍTETE DEVIACNÍ MOMENT D_y Z OBRÁZKA PODLE OBRÁZKŮ



①

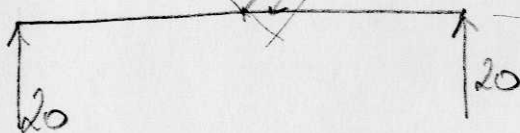
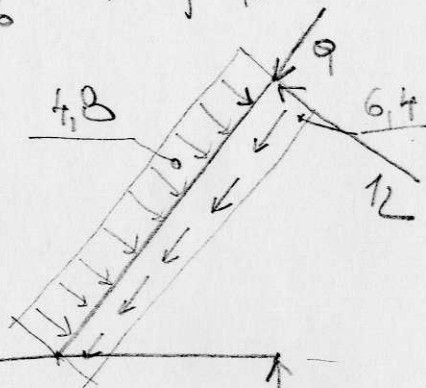


VERTEILETE LÄSTUNG UNTEREICH SIL

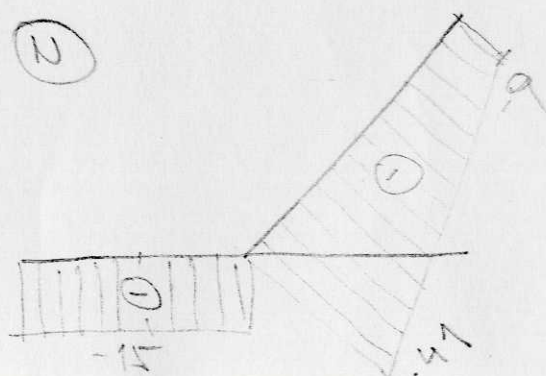


$$\cos \alpha = \frac{3}{5} = 0,6$$

$$\sin \alpha = \frac{4}{5} = 0,8$$



②



$$\sum F_{ix} = 0: 15 - D = 0$$

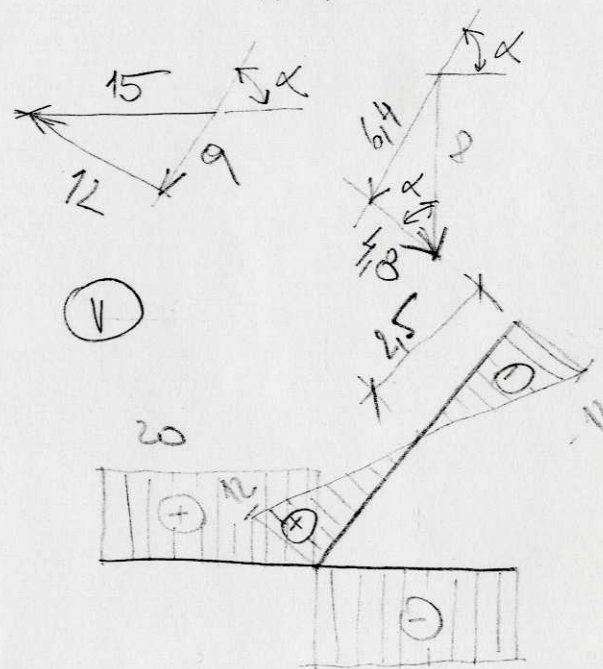
$$D = 15$$

$$\sum M_{ia} = 0: C \cdot 6 + D \cdot 4 - 8 \cdot 5 \cdot 4/5 = 0$$

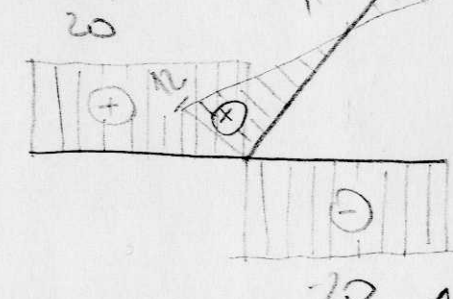
$$C = 20 \text{ kN}$$

$$\sum M_{ic} = 0: A \cdot 6 + D \cdot 4 + 8 \cdot 5 \cdot 1/5 = 0$$

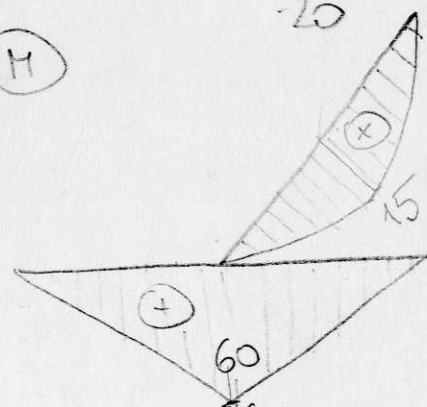
$$A = 20 \text{ kN}$$



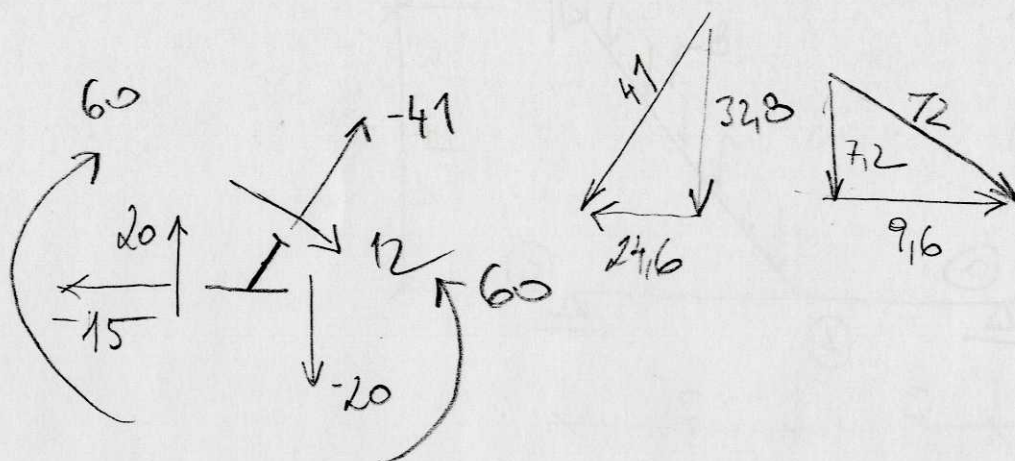
③



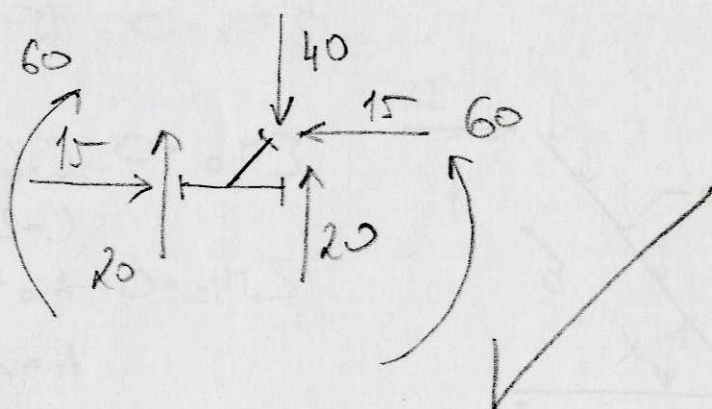
④



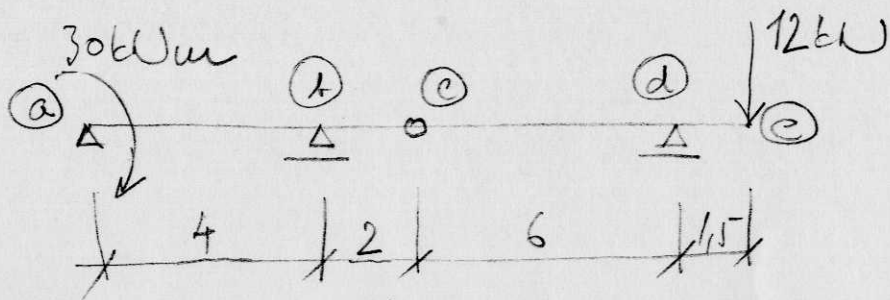
KONTROLA - STATIKA (1)



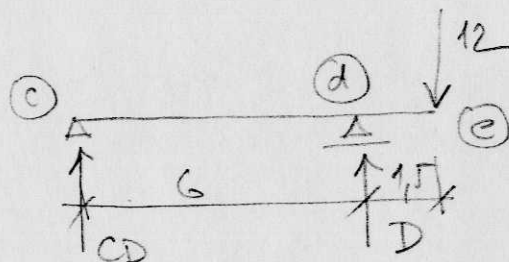
=



2

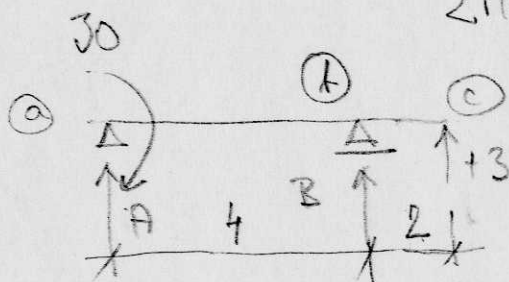


PESTE GERBEROV NOSNÍK VYKRESLETE PRŮBĚHY
Vnitřních sil



$$\sum M_{ic} = 0: D \cdot 6 - 12 \cdot 7,5 = 0 \quad D = 15$$

$$\sum M_{id} = 0: -CD \cdot 6 - 12 \cdot 1,5 = 0 \quad CD = -3$$

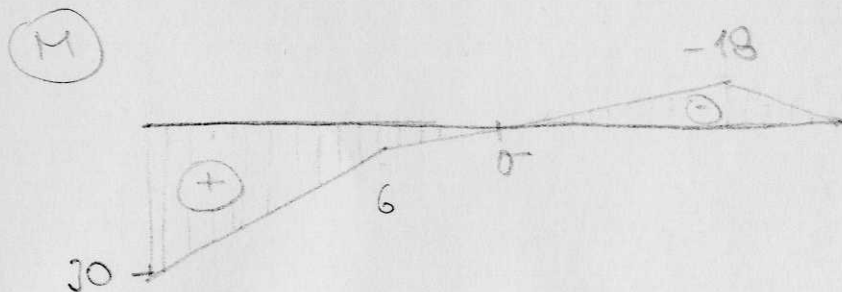
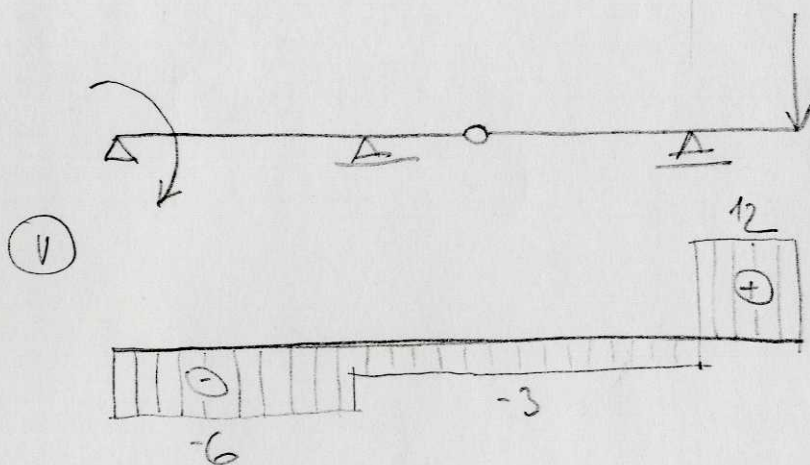


$$\sum M_{ia} = 0: 3 \cdot 6 - 30 + B \cdot 4 = 0$$

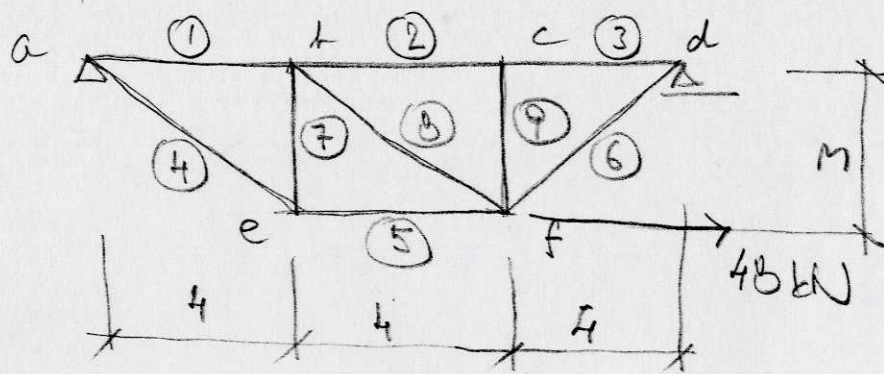
$$B = 3$$

$$\sum M_{ib} = 0: 3 \cdot 2 - A \cdot 4 - 30 = 0$$

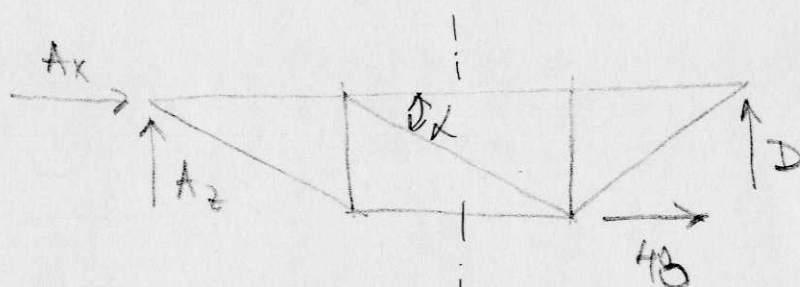
$$A = -6$$



3

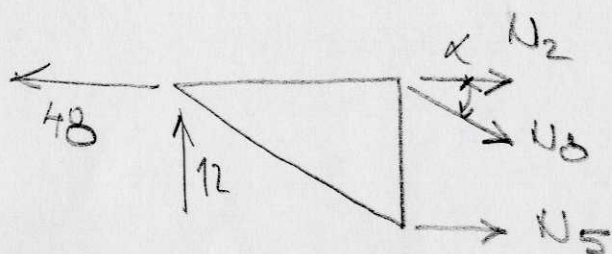


URCETE SILU I PRUTU 8.



$$\cos \alpha = 0,8 \quad \sin \alpha = 0,6$$

PRUSECJA METODA



$$\sum F_{12} = 0: N_8 \cdot \sin \alpha - 12 = 0$$

$$N_8 = 20 \text{ kN}$$

$$\sum F_{ix} = 0$$

$$A_x + 48 = 0$$

$$A_x = -48$$

$$\sum M_a = 0:$$

$$D \cdot 12 + 48 \cdot 3 = 0$$

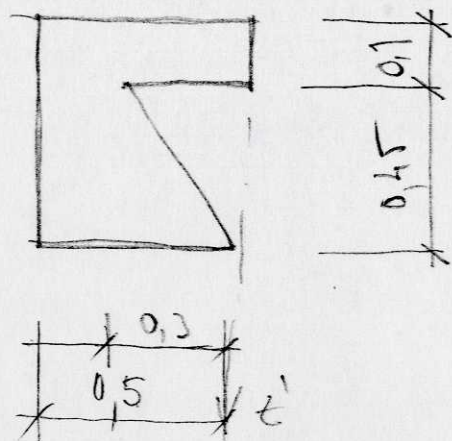
$$D = -12$$

$$\sum H_{id} = 0:$$

$$-A_y \cdot 12 + 48 \cdot 3 = 0$$

$$A_y = 12$$

↑ ac , (4)



Pro zadaný průřez
vypočítejte těžiště a mo-
ment setrvačnosti I_z
k těžišti.

$$A_1 = 0,55 \cdot 0,1 = 0,055$$

$$A_2 = -\frac{1}{2} \cdot 0,3 \cdot 0,45 = -0,0675$$

$$A = 0,055 - 0,0675 = -0,0125$$

$$S_{y1} = 0,55 \cdot 0,1 \cdot \frac{0,55}{2} = 0,015875$$

$$S_{y2} = 0,055 \cdot \frac{0,1}{2} = 0,00275$$

$$S_{y2} = -0,0675 \cdot 0,25 = -0,016875$$

$$S_{y2} = -0,0675 \cdot 0,1 = -0,00675$$

$$S_y = 0,015875 - 0,016875 - 0,00675 = -0,00775 \text{ m}^3$$

$$S_z = 0,00275 - 0,00675 = -0,004 \text{ m}^3$$

$$t_y = \frac{S_z}{A} = 0,2988 \text{ m}$$

$$t_z = \frac{S_y}{A} = 0,28313 \text{ m}$$

$$I_{z1} = \frac{1}{12} \cdot 0,55 \cdot 0,1^3 + 0,055 \cdot \left(\frac{0,1}{2} - 0,2988\right)^2 = 6,006384 \cdot 10^{-5} \text{ m}^4$$

$$I_{z2} = \frac{1}{36} \cdot 0,45 \cdot 0,3^3 + 0,0675 \cdot (0,1 - 0,2988)^2 = 3,005197 \cdot 10^{-3} \text{ m}^4$$

$$I_z$$

$$= 3,0012 \cdot 10^{-3} \text{ m}^4$$