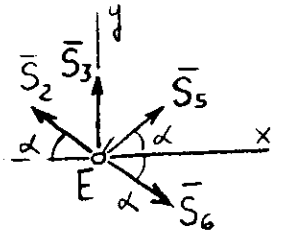


Узел E: $\Sigma X_i = 0$: $-S_2 \cdot \cos\alpha + S_5 \cdot \cos\alpha + S_6 \cdot \cos\alpha = 0$

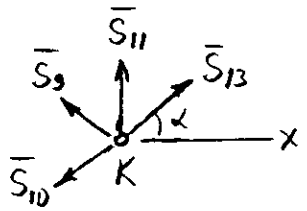
$\Sigma Y_i = 0$: $S_3 + S_2 \cdot \sin\alpha + S_5 \cdot \sin\alpha - S_6 \cdot \sin\alpha = 0$

$S_5 = S_2 - S_6$

$S_6 = \frac{S_3}{\sin\alpha} + S_2 + S_5 = \frac{S_3}{\sin\alpha} + S_2 + (S_2 - S_6) = \frac{S_3}{\sin\alpha} + 2S_2 - S_6$

$S_6 = S_2 + \frac{S_3}{2 \cdot \sin\alpha} = 11{,}25 - \frac{4}{2 \cdot 0{,}6} = 7{,}917\ кН$

$S_5 = 11{,}25 - 7{,}917 = 3{,}333\ кН$



Узел K: $\Sigma X_i = 0$: $S_{13} \cdot \cos\alpha - S_9 \cdot \cos\alpha - S_{10} \cdot \cos\alpha = 0$

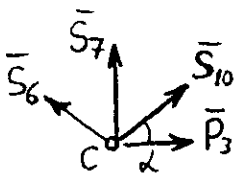
$S_9 = S_{13} - S_{10}$

$\Sigma Y_i = 0$: $S_{11} + S_9 \cdot \sin\alpha + S_{13} \cdot \sin\alpha - S_{10} \cdot \sin\alpha = 0$

$\frac{S_{11}}{\sin\alpha} + (S_{13} - S_{10}) + S_{13} - S_{10} = 0$

$S_{10} = S_{13} + \frac{S_{11}}{2 \cdot \sin\alpha} = 5{,}417 + 0 = 5{,}417\ кН$

$S_9 = 5{,}147 - 5{,}417 = 0$

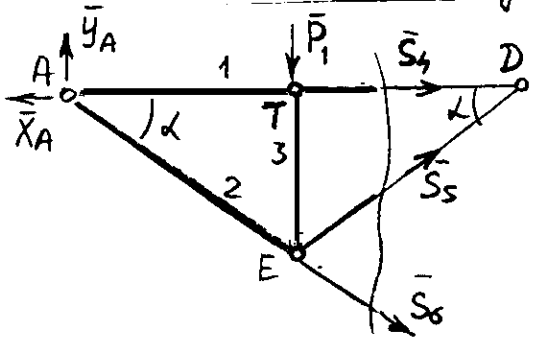


$\Sigma Y_i = 0$: $S_7 + (S_6 + S_{10}) \cdot \sin\alpha = 0$

$S_7 = -(S_6 + S_{10}) \cdot \sin\alpha = -(7{,}917 + 5{,}417) \cdot 0{,}6 = -8\ кН$

Для проверки: $\Sigma X_i = (-S_6 + S_{10}) \cdot \cos\alpha + P_3 = (-7{,}917 + 5{,}417) \cdot 0{,}8 + 2 = 0$

3. Метод сечений для определения усилий в стержнях.

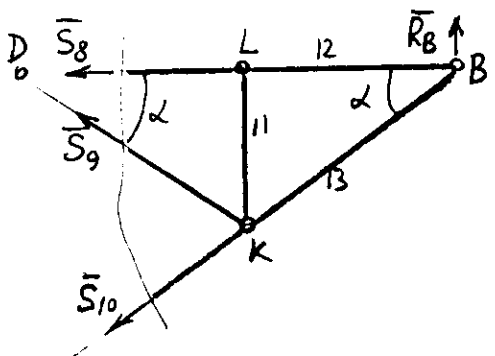


$\Sigma M_{iE} = 0$: $-S_4 \cdot h + X_A \cdot h - y_A \cdot a = 0$

$S_4 = X_A - y_A \cdot \frac{a}{h} = 2 - 6{,}75 \cdot \frac{4{,}8}{3{,}6} = -7\ кН$

$\Sigma M_{iA} = 0$: $-P_1 \cdot a + S_5 \cdot \sin\alpha \cdot 2a = 0$

$S_5 = \frac{P_1}{2 \cdot \sin\alpha} = \frac{4}{2 \cdot 0{,}6} = 3{,}333\ кН$



$\Sigma M_{iD} = 0$: $S_{10} \cdot \sin\alpha \cdot 2a - R_B \cdot 2a = 0$

$S_{10} = \frac{R_B}{\sin\alpha} = \frac{3{,}25}{0{,}6} = 5{,}417\ кН$