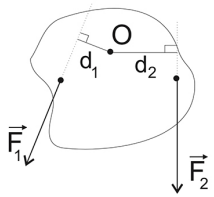
Статика.

Плечо и момент силы.



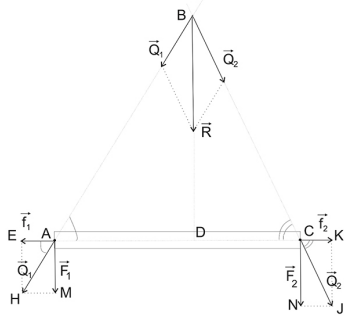
$$\boxed{|M| = F \cdot d} \qquad [M] = H \cdot м$$

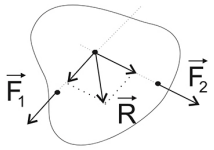
$$M_1 = F_1 d_1 < 0 \qquad M_2 = F_2 d_2 > 0$$

Условие равновесия.

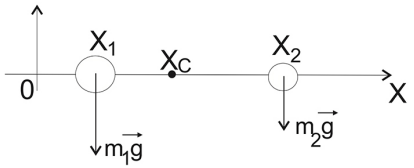
$$\boxed{\sum_i \vec{F}_i = \vec{0} \qquad \sum_i M_i = 0}$$

Сложение сил.





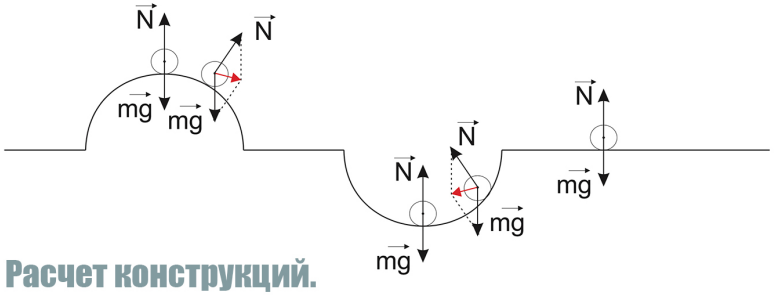
Центр масс и центр тяжести.



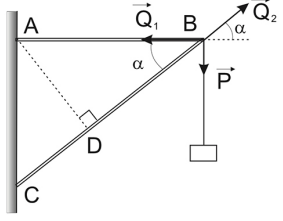
$$\frac{x_c - x_1}{x_2 - x_c} = \frac{m_2 g}{m_1 g} \quad \Rightarrow \quad x_c = \frac{m_1 x_1 + m_2 x_2}{m_1 + m_2}$$

$$\boxed{\vec{r}_c = \frac{\sum\limits_{i=1}^{N} \Delta m_i \vec{r}_i}{m}}$$

Виды равновесия.



Расчет конструкций.



$$\vec{P} + \vec{Q}_1 + \vec{Q}_2 = \vec{0}$$
$$M_P + M_{Q1} + M_{Q2} = 0$$

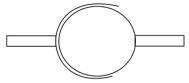
$$"x" : Q_2 \cos\alpha = Q_1$$
$$"y" : Q_2 \sin\alpha = mg$$

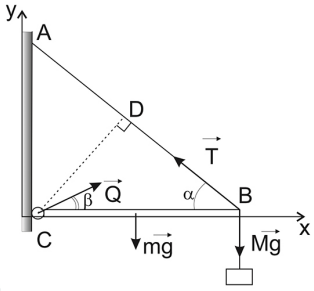
$$-Q_1 \cdot |AC| + Q_2 \cdot 0 + P \cdot |AB| = 0 \quad \Rightarrow \quad Q_1 = mg\frac{|AB|}{|AC|} = mg\,\mathrm{ctg}\,\alpha$$

$$"x" : Q_2 \cos\alpha = Q_1$$
$$"y" : Q_2 \sin\alpha = mg$$

$$Q_1 = mg\frac{\cos\alpha}{\sin\alpha} = mg\,\mathrm{ctg}\,\alpha$$
$$Q_2 = \frac{mg}{\sin\alpha}$$

Шарнирное соединение.





$$\vec{Q} + \vec{T} + m\vec{g} + M\vec{g} = \vec{0}$$

$$"x" : Q\cos\beta - T\cos\alpha = 0$$
$$"y" : Q\sin\beta + T\sin\alpha - mg - Mg = 0$$

$$mg\frac{l}{2} + Mgl - T|CD| = 0$$

$$T = \frac{g(\frac{m}{2} + M)}{\sin\alpha} \qquad Q = T\frac{\cos\alpha}{\cos\beta} \qquad \beta = \mathrm{arctg}\,\frac{(m+M)g - T\sin\alpha)}{T\cos\alpha}$$

Подшипник.