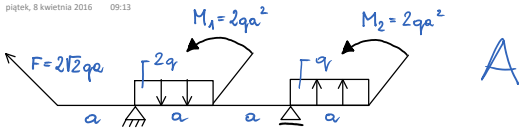
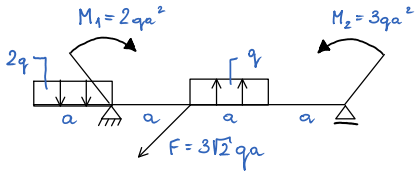
Belki - kartkówka

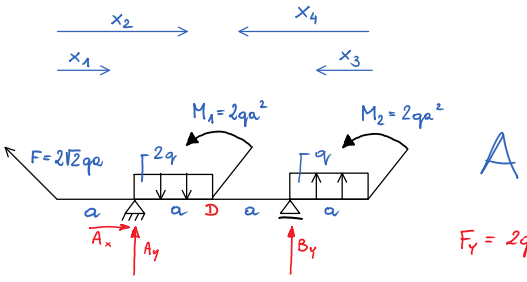
piątek, 8 kwietnia 2016 09:13



A



B



A

$F_y = 2qa$

$\Sigma F_{iy}: \quad A_y + B_y + F_y - 2qa + qa = 0$

$\Sigma M_i^A: \quad F_y a + 2qa \cdot \frac{a}{2} - M_1 - 2a B_y - qa \cdot 2{,}5a - M_2 = 0$

z drugiego równania:

$2qa \cdot a + 2qa \cdot \frac{a}{2} - 2qa^2 - 2{,}5qa^2 - 2qa^2 = 2a B_y$
$2qa^2 + qa^2 - 2qa^2 - 2{,}5qa^2 - 2qa^2 = 2a B_y$
$-3{,}5qa^2 = 2a B_y$
$B_y = -1{,}75qa$

z pierwszego równania:

$A_y - 1{,}75qa + 2qa - 2qa + qa = 0$
$A_y = 0{,}75qa$

SPRAWDZENIE: względem bieguna D

$F_y \cdot 2a + A_y \cdot a - M_1 - B_y a - M_2 - 2qa \cdot \frac{a}{2} - qa \cdot 1{,}5a = 0$

$4qa^2 + 0{,}75qa^2 - 2qa^2 + 1{,}75qa^2 - 2qa^2 - qa^2 - 1{,}5qa^2 = 0$

$6{,}5qa^2 - 6{,}5qa^2 = 0$

$M_g^I = F_y x_1 \qquad M_g^I(0) = 0 \qquad M_g^I(a) = 2qa^2$

$T^I = F_y = 2qa$

$M_g^{II} = F_y x_2 + A_y (x_2 - a) - 2q \frac{(x_2 - a)^2}{2}$

$M_g^{II} = F_y x_2 + A_y (x_2 - a) - q (x_2 - a)^2$

$M_g^{II}(a) = 2qa^2 \qquad M_g^{II}(2a) = 4qa^2 + 0{,}75qa^2 - qa^2 = 3{,}75qa^2$

$T^{II} = F_y + A_y - 2q(x_2 - a)$

$T^{II}(a) = 2qa + 0{,}75qa = 2{,}75qa \qquad T^{II}(2a) = 2qa + 0{,}75qa - 2qa = 0{,}75qa$

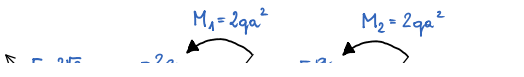
$M_g^{III} = M_2 + \frac{q}{2} x_3^2 \qquad M_g^{III}(0) = 2qa^2 \qquad M_g^{III}(a) = 2qa^2 + \frac{1}{2}qa^2 = 2{,}5qa^2$

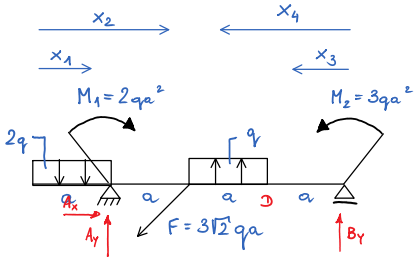
$T^{III} = -q x_3 \qquad T^{III}(0) = 0 \qquad T^{III}(a) = -qa$

$M_g^{IV} = M_2 + qa(x_4 - \frac{a}{2}) + B_y (x_4 - a)$

$M_g^{IV}(a) = 2qa^2 + \frac{1}{2}qa^2 = 2{,}5qa^2 \qquad M_g^{IV}(2a) = 2qa^2 + 1{,}5qa^2 - 1{,}75qa^2 = 1{,}75qa^2$

$T^{IV} = -qa - B_y = -qa + 1{,}75qa = 0{,}75qa$





$F_y = 3qa$

$\Sigma F_{iy}: \quad -2qa + A_y - F_y + qa + B_y = 0$

$\Sigma M_i^A: \quad -2qa \cdot \frac{a}{2} + M_1 + F_y a - qa \cdot 1{,}5a - M_2 - 3a B_y = 0$

drugiego równania:

$-2qa \cdot \frac{a}{2} + 2qa^2 + 3qa^2 - 1{,}5qa^2 - 3qa^2 = 3a B_y$
$-qa^2 + 2qa^2 + 3qa^2 - 1{,}5qa^2 - 3qa^2 = 3a B_y$
$0{,}5qa^2 = 3a B_y$
$B_y = \frac{1}{6}qa$

z pierwszego równania

$A_y = -B_y - qa + F_y + 2qa$
$A_y = \frac{1}{6}qa - qa + 3qa + 2qa$
$A_y = 4\frac{1}{6}qa = \frac{25}{6}qa$

SPRAWDZENIE: względem bieguna D

$-2qa \cdot 2{,}5a + M_1 + A_y \cdot 2a - F_y a + qa \cdot \frac{1}{2}a - M_2 - B_y a = 0$
$-5qa^2 + 2qa^2 + 8\frac{1}{3}qa^2 - 3qa^2 + 0{,}5qa^2 - 3qa^2 + \frac{1}{6}qa^2 = 0$

$-11qa^2 + 11qa^2 = 0$

$M_g^I = -2q x_1 \cdot \frac{x_1}{2} = -q x_1^2 \qquad M_g^I(0) = 0 \qquad M_g^I(a) = -qa^2$

$T^I = -2q x_1 \qquad T^I(0) = 0 \qquad T^I(a) = -2qa$

$M_g^{II} = -2qa(x_2 - \frac{a}{2}) + M_2 + A_y(x_2 - a)$

$M_g^{II}(a) = -qa^2 + 2qa^2 = qa^2$

$M_g^{II}(2a) = -3qa^2 + 2qa^2 + 4\frac{1}{6}qa^2 = 3\frac{1}{6}qa^2$

$T^{II} = -2qa + A_y = 2\frac{1}{6}qa$

$M_g^{III} = B_y x_3 + M_2$

$M_g^{III}(0) = M_2 = 3qa^2 \qquad g^{III}(a) = M\frac{1}{6}qa^2 + 3qa^2 = 2\frac{5}{6}qa^2$

$T^{III} = -B_y = \frac{1}{6}qa$

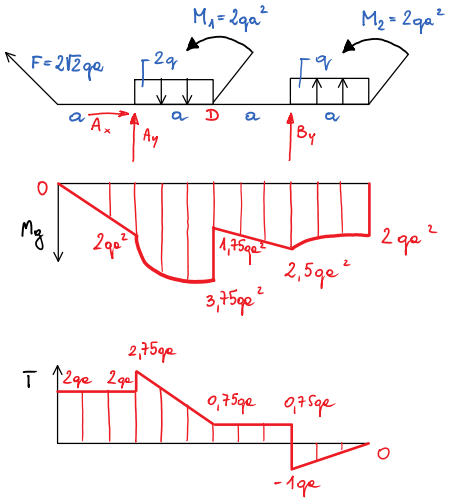
$M_g^{IV} = B_y x_4 + M + \frac{1}{2}q(x_4 - a)^2$

$M_g^{IV}(a) = -\frac{1}{6}qa^2 + 3qa^2 = 2\frac{5}{6}qa^2$

$M_g^{IV}(2a) = -\frac{1}{3}qa^2 + 3qa^2 + \frac{1}{2}qa^2 = 3\frac{1}{6}qa^2$

$T^{IV} = -B_y - q(x_4 - a)$

$T^{IV}(a) = \frac{1}{6}qa \qquad T^{IV}(2a) = \frac{1}{6}qa - qa = -\frac{5}{6}qa$



$T^{IV}(a) = \frac{1}{6}qa$ $T^{IV}(2a) = \frac{1}{6}qa - qa = -\frac{5}{6}qa$