



$$\begin{cases}
 \sum F_{ix} = 0 \\
 \sum F_{iy} = 0 \\
 \sum M_{ic} = 0 \\
 \sum M_{io} = 0
 \end{cases}
 \Rightarrow
 \begin{aligned}
 P + P - R_{cx} &= 0 \Rightarrow R_{cx} = 2P = 2qa \\
 R_A + P - 2qa + R_{cy} + R_D - 3qa \cdot \frac{1}{2} &= 0 \\
 -R_A \cdot 3a - P \cdot 2a + M + 2qa \cdot a + R_D \cdot a - 3qa \cdot \frac{1}{2} \cdot \frac{1}{3}a &= 0 \\
 -R_A \cdot 2a - P \cdot a + M + q \cdot a \cdot \frac{2}{3} &= 0
 \end{aligned}$$

$$\begin{cases} \sum M_{iC} = 0 & -P \cdot 2a - P \cdot 2a + 11 + 2pa \cdot a + 10 \cdot a - 4pa \cdot \frac{1}{4} \cdot a = 0 \\ \sum M_{iB} = 0 & -R_A \cdot 2a - P \cdot a + 11 + q \cdot a \cdot \frac{3}{2} = 0 \end{cases}$$

$$R_A = \frac{1}{2a} qa^2 (-1 + 1 + \frac{1}{2}) = \frac{1}{4} qa$$

$$R_D = \frac{1}{a} qa^2 (3 \cdot \frac{1}{4} + 2 - 1 - 2 + \frac{1}{2}) = qa (\frac{3}{4} - \frac{1}{2}) = \frac{1}{4} qa$$

$$R_{Cy} = qa (-\frac{1}{4} - 1 + 2 - \frac{1}{4} + \frac{3}{2}) = qa (-\frac{1}{2} - 1 + 2 + \frac{3}{2}) = 2qa$$

Spr:

$$\sum M_{iE} = P \cdot a - R_A \cdot a - Pa + 11 - 2pa \cdot a + R_{Cy} \cdot 2a + R_{Cx} \cdot a + R_D \cdot 3a - 3pa \cdot \frac{1}{2} (2a + \frac{1}{3}a) = 0$$

$$qa (-1 - \frac{1}{4} - 1 + 1 - 2 + \frac{1}{4} + 2 + \frac{3}{4} - \frac{3}{2} \cdot \frac{7}{3}) = qa (-\frac{1}{4} + 3 + \frac{3}{4} - \frac{7}{2}) = qa (\frac{-1 + 12 + 3 - 14}{4}) = 0$$

$$\underline{R_{Cx} = 2qa, R_{Cy} = 2qa, R_A = \frac{1}{4} qa, R_D = \frac{1}{4} qa}$$

① $0 \leq x < a$

$$M_p(x) = R_A \cdot x = \frac{1}{4} qa x, \quad M_p(x=0) = 0, \quad M_p(x=a) = \frac{1}{4} qa^2$$

$$T(x) = R_A = \frac{1}{4} qa, \quad N(x) = -P = -qa$$

② $a \leq x < 3a$

$$M_g(x) = R_A \cdot x - 11 + P(x-a) - \frac{q(x-a)^2}{2} = \frac{1}{4} qa \cdot x - qa^2 + qa(x-a) - \frac{q(x-a)^2}{2}$$

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

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

$$T(x) = R_A + P - q(x-a) = \frac{1}{4} qa + qa - q(x-a)$$

$$T(x=a) = \frac{5}{4} qa$$

$$T(x=3a) = \frac{5}{4} qa - \frac{8}{4} qa = -\frac{3}{4} qa$$

MSC. zERWZ:

$$T(x) = 0 \Leftrightarrow \frac{5}{4} qa - qx + qa = 0 \quad x = \frac{9}{4} a$$

$$M_g(x = \frac{9}{4} a) = qa^2 (\frac{9}{16} - 1 + \frac{5}{4} - \frac{25}{32}) =$$

$$qa^2 (\frac{11 - 32 + 40 - 25}{32}) = \frac{1}{32} qa^2$$

$$qQ^2 \left(\frac{1P - 32 + 40 - 25}{32} \right) = \frac{1}{32} qQ^2$$

$$N(x) = -P - P = -2P = -2qQ$$

$$\textcircled{\text{II}} 0 \leq x_2 < a$$

$$M_g(x_2) = R_D \cdot x_2 - \frac{3q(x_2-0)^3}{6a} = \frac{1}{4} qQ \cdot x_2 - \frac{3q(x_2)^3}{6a}$$

$$M_g(x_2=0) = 0$$

$$M_g(x_2=a) = qQ^2 \left(\frac{1}{4} - \frac{1}{2} \right) = -\frac{qQ^2}{4}$$

$$T(x_2) = -R_D + \frac{3q(x_2-0)^2}{2a} = -\frac{1}{4} qQ + \frac{3}{2} \frac{q x_2^2}{a}$$

$$T(x_2=0) = -\frac{1}{4} qQ$$

$$T(x_2=a) = qQ \left(-\frac{1}{4} + \frac{6}{4} \right) = \frac{5}{4} qQ$$

$$T(x_2) = 0 \Leftrightarrow -\frac{1}{4} qQ + \frac{3}{2} \frac{q x_2^2}{a} = 0$$

$$\frac{3}{2} x_2^2 = \frac{1}{4} a^2$$

$$x_2^2 = \frac{2}{12} a^2 = \frac{1}{6} a^2 \Rightarrow x_2 = a \sqrt{\frac{1}{6}} =$$

$$\approx 0,4 a$$

$$M_g(x = a \sqrt{\frac{1}{6}}) = \frac{1}{4} qQ \cdot a \sqrt{\frac{1}{6}} - \frac{3q \left(a \sqrt{\frac{1}{6}} \right)^3}{6a} = qQ^2 \frac{1}{35} \sqrt{6}$$

$$= 0,07 qQ^2$$

$$N(x_2) = 0$$