



$$\sum M_{ix} = 0 \quad M_A - 2M + M + M_B = 0$$
$$\psi_c = 0$$

$0 < x < l$	$l < x < 2l$	$2l < x < 4l$
$M_3 = M_A = -0,72M$	$M_3 = M_A = M = 1,72M$	$M_3 = M_A = M + 2M = 0,22M$
$\varphi_1 = \frac{M_A \cdot l}{6 \cdot J_{01}}$	$\varphi_2 = \frac{(M_A + M) \cdot l}{6 \cdot J_{01}}$	$\varphi_3 = \frac{(M_A + M) \cdot 2l}{6 \cdot J_{02}}$
$J_{01} = \frac{\pi D^4}{32}$	$J_{02} = \frac{\pi d^4}{32}$	
$J_{01} = \frac{\pi (2d)^4}{32}$		
$J_{01} = \frac{16\pi d^4}{32} = 16 J_{02}$		
$J_{01} = 16 J_{02}$		

$$\varphi_c = \varphi_1 + \varphi_2 + \varphi_3 = 0$$
$$\frac{M_A \cdot l}{6 \cdot J_{01}} + \frac{(M_A + M) \cdot l}{6 \cdot J_{01}} + \frac{(M_A + M) \cdot 2l}{6 \cdot J_{02}} = 0$$
$$\left\{ \begin{array}{l} \text{na } J_{02} \text{ podzielić } 16 J_{02} \end{array} \right\}$$

$$M_A + (M_A - M) + 16(M_A + M) \cdot 2 = 0$$
$$M_A + (M_A - M) + 32(M_A + M) = 0$$
$$34M_A + 31M = 0$$
$$M_A = -\frac{31}{34} M$$

$0 < x < l$	$l < x < 2l$	$2l < x < 4l$
$\gamma = \frac{M_s \cdot D}{J_{01}} \cdot \frac{D}{2}$	$\gamma = \frac{M_s \cdot D}{J_{01}} \cdot \frac{D}{2}$	$\gamma = \frac{M_s \cdot d}{J_{02}} \cdot \frac{d}{2}$
$\gamma = \frac{0,72M}{J_{01}} \cdot \frac{D}{2}$	$\gamma = \frac{1,72M}{J_{01}} \cdot \frac{D}{2}$	$\gamma = \frac{0,28M}{J_{02}} \cdot \frac{d}{2}$
$\gamma = \frac{0,72M \cdot 2d \cdot 32}{71d^4 \cdot 2}$	$\gamma = \frac{1,72M \cdot 2d \cdot 32}{71d^4 \cdot 2}$	$\gamma = \frac{0,28M \cdot d \cdot 32}{71d^4 \cdot 2}$
$\gamma = 7,6 \frac{M}{d^3}$	$\gamma = 17,5 \frac{M}{d^3}$	$\gamma = 1,4 \frac{M}{d^3}$

$$\tau = 17,5 \frac{M}{d^3}$$

$$d^3 \geq \frac{17,5 M}{\tau_{\text{dop}}}$$

$$d \geq \left(\frac{1175 \cdot 4,2 \cdot 10^3}{8 \cdot 10^6} \right)^{1/3}$$

$$d \geq 64 \text{ mm}$$