Wskaźniki:

$$W_g = \frac{J_y}{z_g} = \frac{2529,5\,a^4}{5a} = 5059,1\,a^3$$

$$W_d = \frac{J_y}{z_d} = \frac{2529,5\,a^4}{5a} = 5059,1\,a^3$$

Wyznaczam „a":

$N = 5059,1$

$R = 0,12\ MPa = 1,2\ \frac{kN}{cm^2}$

$M_{max} = 4\ kNm = 400\ kNcm$

$$\sigma_{max} = \frac{M_{max}}{W_{min}} \leq R \qquad W_{MIN} \geq \frac{M_{MAX}}{R}$$

$$5059,1\,a^3 \geq \frac{400}{1,2}$$

$$5059,1\,a^3 \geq 333,33$$

$$a^3 \geq \frac{333,33}{5059,1}$$

$$a^3 \geq 0,066\ cm^3$$

$$a \geq 0,40\ cm \Rightarrow \text{przyjmuję} \quad a = 0,5 > 0,4$$

Stąd:

$$J_y = 2529,5 \cdot 0,5^4 = 158,09\ cm^4$$

$$W_g = 5059,1 \cdot 0,5^3 = 632,38\ cm^3$$

$$W_d = 5059,1 \cdot 0,5^3 = 632,38\ cm^3$$

Sprawdzam naprężenia normalne:

$$\sigma_g = \frac{M_{max}}{W_g} = \frac{400}{632,38} = 0,632\ \frac{kN}{cm^2} = 6,32\ MPa$$

$$\sigma_d = \frac{M_{max}}{W_d} = 0,632\ \frac{kN}{cm^2} < R = 1,2\ \frac{kN}{cm^2}$$