

## Příloha 3: Výpočet reakcí v ložiskách převodovky

$$d_{w1} = 33,26 \text{ mm}$$

$$F_{t12} = F_{t21} = 466,01 \text{ N}$$

$$F_{a34} = F_{a43} = 214,24 \text{ N}$$

$$d_{w2} = 108,74 \text{ mm}$$

$$F_{a12} = F_{a21} = 99,16 \text{ N}$$

$$F_{r34} = F_{r43} = 492,51 \text{ N}$$

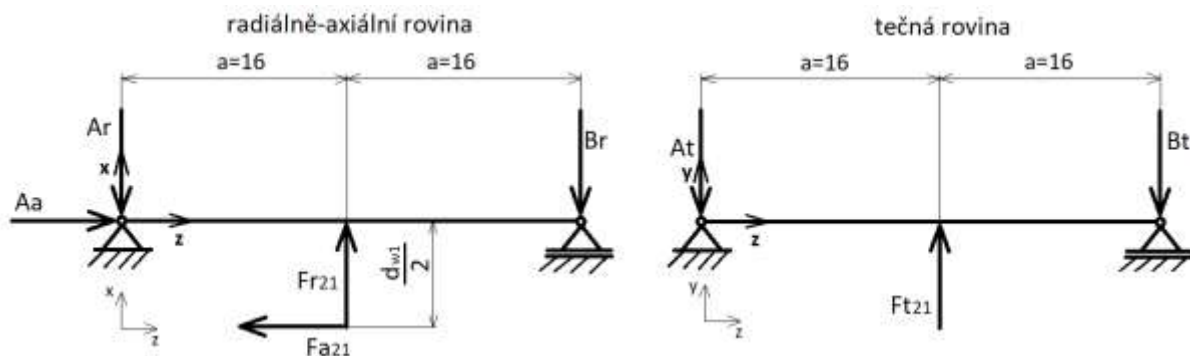
$$d_{w3} = 41,34 \text{ mm}$$

$$F_{r12} = F_{r21} = 178,82 \text{ N}$$

$$d_{w4} = 100,66 \text{ mm}$$

$$F_{t34} = F_{t43} = 1\,201,2 \text{ N}$$

### Vstupní hřídel



$$x: F_{r21} - A_r - B_r = 0$$

$$y: A_a - F_{a21} = 0$$

$$M_A = F_{r21} * a - F_{a21} * \frac{d_{w1}}{2} - B_r * 2 * a = 0$$

$$B_r = \frac{F_{r21} * a - F_{a21} * \frac{d_{w1}}{2}}{2 * a} = 37,88 \text{ N}$$

$$A_r = F_{r21} - B_r = 140,94 \text{ N}$$

$$A_a = F_{a21} = 99,16 \text{ N}$$

$$y: F_{t21} - A_t - B_t = 0$$

$$M_A = F_{t21} * a - B_t * 2 * a = 0$$

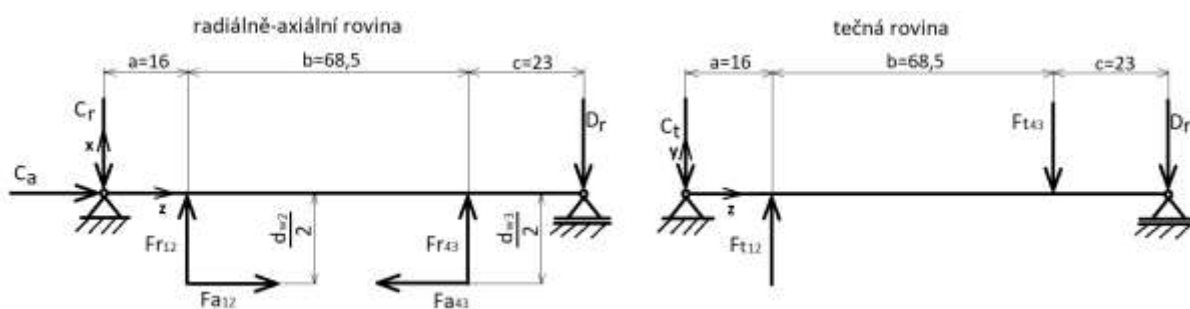
$$B_t = \frac{F_{t21} * a}{2 * a} = 233 \text{ N}$$

$$A_t = F_{t21} - B_t = 233 \text{ N}$$

$$A_{rad} = \sqrt{140,94^2 + 233^2} = 272,32 \text{ N}$$

$$B_{rad} = \sqrt{37,88^2 + 233^2} = 236,06 \text{ N}$$

### Předloková hřídel



$$x: F_{r12} + F_{r43} - C_r - D_r = 0$$

$$y: C_a + F_{a12} - F_{a43} = 0$$

$$M_A = F_{r12} * a + F_{a12} * \frac{d_{w2}}{2} + F_{a43} * \frac{d_{w3}}{2} - D_r * (a + b + c) = 0$$

$$D_r = \frac{F_{r12} * a + F_{a12} * \frac{d_{w2}}{2} + F_{a43} * \frac{d_{w3}}{2}}{(a + b + c)} = 422,71 \text{ N}$$

$$C_r = F_{r12} + F_{r43} - D_r = 248,63 \text{ N}$$

$$C_a = F_{a43} - F_{a12} = 115,08 \text{ N}$$

$$C_{rad} = \sqrt{248,63^2 + 115,08^2} = 285,16 \text{ N}$$

$$D_{rad} = \sqrt{422,71^2 + 874,84^2} = 971,61 \text{ N}$$

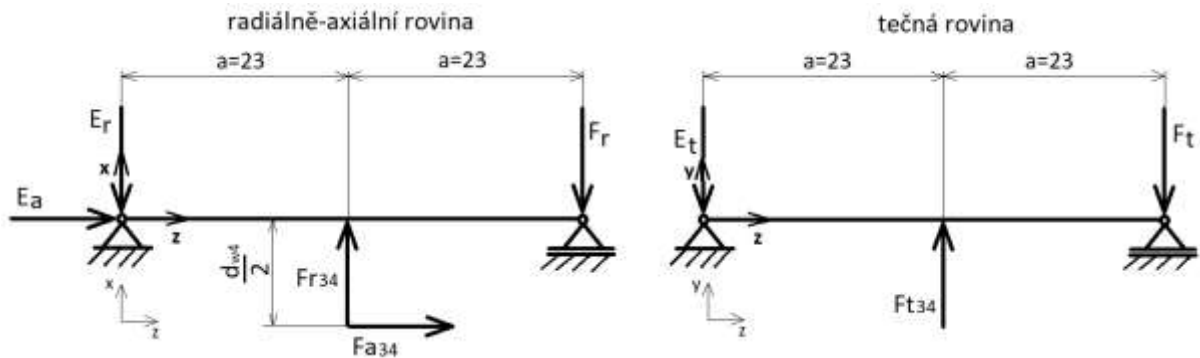
$$y: F_{t12} - F_{t43} - C_t - D_t = 0$$

$$M_A = F_{t12} * a - F_{t43} * (a + b) - D_t * (a + b + c) = 0$$

$$D_t = \frac{F_{t12} * a - F_{t43} * (a + b)}{(a + b + c)} = -874,84 \text{ N}$$

$$C_t = F_{t12} - F_{t43} - D_t = 139,65 \text{ N}$$

## Výstupní hřídel



$$x: F_{r34} - E_r - F_r = 0$$

$$y: F_{a34} - E_a = 0$$

$$M_A = F_{r34} * a - F_{a34} * \frac{d_{w4}}{2} - F_r * 2 * a = 0$$

$$F_r = \frac{F_{r34} * a - F_{a34} * \frac{d_{w4}}{2}}{2 * a} = 480,67 \text{ N}$$

$$E_r = F_{r34} - F_r = 11,85 \text{ N}$$

$$E_a = F_{a34} = 214,24 \text{ N}$$

$$E_{rad} = \sqrt{11,85^2 + 214,24^2} = 600,72 \text{ N}$$

$$F_{rad} = \sqrt{480,67^2 + 600,6^2} = 769,26 \text{ N}$$

$$y: F_{t34} - E_t - F_t = 0$$

$$M_A = F_{t34} * a - F_t * 2 * a = 0$$

$$F_t = \frac{F_{t34} * a}{2 * a} = 600,6 \text{ N}$$

$$E_t = F_{t21} - F_t = 600,6 \text{ N}$$