Hålfasthetsberäkning för polygonaxlar

Strength calculation for polygon shafts

Tt = Vridmoment (Ncm) / *Torsional moment (Ncm)*

τ = Vridpåkänning (Ncm^2) / *Torsional strain (Ncm^2)*

W_p = Polärt motståndsmoment (cm^3) / *Polar moment of resistance (cm^3)*

d_1; d_2 = Minsta diameter (cm) / *Minor diameter (cm)*

P = Specifikt yttryck / *Specific contact stress (Ncm^2)*

$e_r = \frac{d1-d2}{4}$ = Kalkylerat excentriskt värde (cm) / *Calculated eccentric value (cm)*

$d_r = d_2+2e$ = Teoretisk diameter (cm) / *Theoretical diameter (cm)*

T_b = Böjmoment (Ncm) / *Bending moment (Ncm)*

σ_b = Böjpåkänning (Ncm^2) / *Bending stress (Ncm^2)*

W_x = Axiellt motståndsmoment (cm^3) / *Equatorial moment of resistance (cm^3)*

s = Navvägens tunnaste del (cm) / *Thinnest section of hub wall (cm)*

σ_z = Dragpåkänning (Ncm^2) / *Tension stress (Ncm^2)*

l = Navlängd (cm) / *Length fo hub (cm)*

A = Tvärsnittsarea av profil (cm^2) / *Cross sectional area of profile (cm^2)*

$dm = \frac{d1+d2}{2}$ = Medeldiameter (cm) / *Mean diameter (cm)*

J_x = Axiellt tröghetsmoment (cm^4) / *Equatorial moment of inertia (cm^4)*

J_p = Vridning (cm^4) / *Torsion (cm^4)*

b = Navbredd (cm) / *Width of hub (cm)*

Vridmoment: / *Torsinoal moment:*

$$T_t = W_p \times \tau$$
$$W_p \sim 0.2 \times d_1^3$$
$$T_t \sim p \times l \left(\pi \times e_r \times d_r + \frac{d_r^2}{20} \right)$$

Böjmoment: / *Bending moment:*

$$T_b = W_x \times \sigma_b$$
$$W_x \sim 0.15 \times d_1^3$$

Navväggens tjocklek: / *Thickness of hub wall:*

$$s \sim 0.7 \sqrt{\frac{T_t}{\sigma_z \times b}}$$

Tvärsnittsarea: / *Cross sectional area:*

$$A \sim \frac{\pi \times d_m^2}{4}$$

Beräkningar för P4c polygonprofil enligt DIN 32712

Calculations for P4c polygon profile according to DIN 32712

Axlar / *Shafts*

Torsionspänning
Stress due torsion

$$\tau = \frac{T_t}{W_p}$$
$$W_p \sim 0.2 \times d_1^3$$
$$J_p \sim 0.14 \times d_1^4$$

Böjspänning
Contact stress

$$\sigma_b = \frac{T_b}{W_x} = \frac{T_b \times D_1}{2 \times J_x}$$
$$W_x \sim 0.15 \times d_1^3$$
$$J_x \sim 0.075 \times d_1^4$$

Nav
Hubs

$$s = 0.7 \sqrt{\frac{T_t}{\sigma_z \times b}}$$

Navväggens tjocklek, approximativ formel

Hub wall thickness approximation

Yttryck
Contact stress

$$P = \frac{T_t}{l \left(\pi \times e_r \times d_r + \frac{d_r^2}{20} \right)}$$