

Lösningar till Tentamen MF1015 - Produktframtagning för T (fd 4F1815)

Tisdag 13 januari 2009 kl 8-13

$$8. \quad u = \frac{z_2}{z_1} = 0.4, \quad M_1 = mg \cdot 0.250, \quad u = \frac{M_2}{M_1}, \quad F = \frac{M_2}{0.350} = 168 \text{ N}$$

$$9. \quad \text{Klockan ger att } i_k = 12. \text{ Looman C3} \rightarrow u = -\frac{z_3}{z_1} \text{ och } i_k = 1 - u \rightarrow z_3 = 154$$

$$\frac{z_1}{2} + z_2 - \frac{z_3}{2} = 0 \rightarrow z_2 = 70$$

$$10. \quad \text{Friläggning av vänster back ger } F_{f1} = \frac{F \cdot a}{\frac{a}{2\mu} - b} = 808 \text{ N}$$

$$\text{Friläggning av höger back ger } F_{f2} = \frac{F \cdot a}{\frac{a}{2\mu} + b} = 477 \text{ N}$$

$$M_{broms} = (F_{f1} + F_{f2})R = 96.4 \text{ Nm}$$

$$11. \quad M_1 = \frac{F_a \cdot d_m}{2} \left(\frac{\tan \alpha + \mu}{1 - \mu \tan \alpha} + 0 \right), \quad \tan \alpha = \frac{p}{\pi \cdot d_m} = 0.1061 \rightarrow F_a = 1067 \text{ N}$$

$$12. \quad K_I = 1, \quad K_V = \sqrt{\frac{78 + 14\sqrt{v}}{78}} = 1.14, \quad F_{ber} = \frac{2M_1}{d_1} K_I K_V = 6690 \text{ N}$$

$$\sigma_b = Y_F Y_\beta Y_\varepsilon \frac{F_{ber}}{b \cdot m} = \{Y_F = 3.12 \quad Y_\beta = 1 \quad Y_\varepsilon = 0.6061\} = 186 \text{ MPa}$$

$$N = L_h \cdot n_1 \cdot 60 = 9 \cdot 10^6 \text{ belastningar}, \quad K_{FN} = 1, \quad Y_S = 1, \quad \sigma_{b\lim} = 350 \text{ MPa}$$

$$\sigma_{btill} = \frac{\sigma_{\lim} Y_S K_{FN}}{S_F}, \quad \sigma_{btill} = \sigma_b \rightarrow S_F = 1.88$$

$$13. \quad \text{Lager 6007} \rightarrow C = 16.8 \text{ kN}, \quad C_0 = 10.2 \text{ kN}, \quad f_0 = 15$$

$$L_{nm} = a_1 \cdot a_{SKF} L_{10}, \quad L_{10} = \left(\frac{C}{P} \right)^p \text{ och } L_{nmh} = \frac{10^6}{60n} L_{nm}$$

$$p = 3, \quad a_1 = 0.21, \quad a_{SKF} = 1, \quad f_0 \frac{F_a}{C_0} = 4.12 \rightarrow e = 0.396$$

$$\frac{F_a}{F_r} = 0.40 > e \rightarrow X = 0.56, \quad Y = 1.1072, \quad P = 7020 \text{ N} \rightarrow L_{1h} = 95.9 \text{ timmar}$$

14. $F = 200 + 300 = 500 \text{ N}$, $R_B = \frac{F \cdot a_1}{a_1 + a_2} = 125 \text{ N}$, $R_A = F - R_B = 375 \text{ N}$

Lager B: $p = 2.5 \text{ MPa}$, $v = 0.01178 \text{ m/s}$, $pv = 0.02945 \text{ MPa} \cdot \text{m/s}$, PC OK

Lager A: $p = 7.5 \text{ MPa}$, $v = 0.01178 \text{ m/s}$, $pv = 0.08835 \text{ MPa} \cdot \text{m/s}$, PC ej OK

Fungerande material i lager A är Fenol , Nylon , PTFE + fyllmedel , PTFE-väv , Acetal , Trä