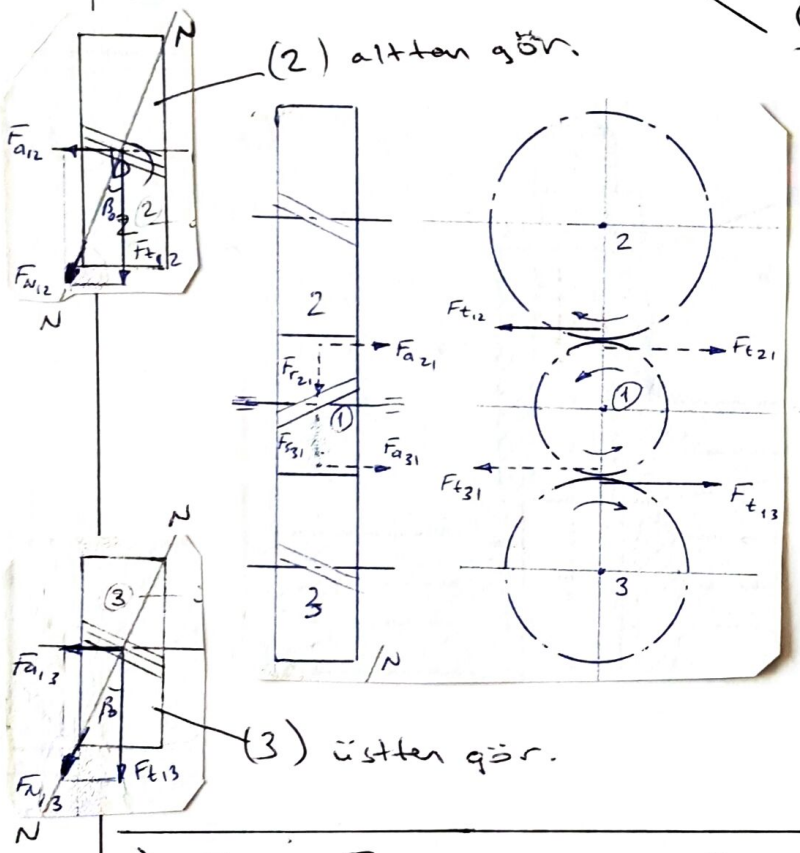
b) → (devamı)

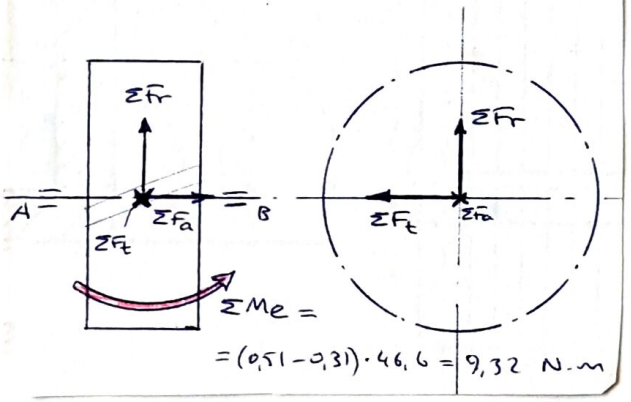
$$F_{t21} = \frac{M_{b2}}{\eta_{12} \cdot r_{02}} = \frac{86,8}{0,98 \cdot 77,6} = 1,14 \text{ kN} \Rightarrow \begin{cases} F_{a21} = F_{t21} \cdot \tan\beta_0 = 1,14 \cdot \tan 15^\circ = 0,31 \text{ kN} \\ F_{r21} = F_{t21} \cdot \frac{\tan\alpha_0}{\cos\beta_0} = 1,14 \cdot \frac{\tan 20^\circ}{\cos 15^\circ} = 0,43 \text{ "} \end{cases}$$

$$F_{t31} = \frac{M_{b3}}{\eta_{13} \cdot r_{03}} = \frac{120,6}{0,98 \cdot 64,7} = 1,90 \text{ "} \Rightarrow \begin{cases} F_{a31} = F_{t31} \cdot \tan\beta_0 = 1,9 \cdot \tan 15^\circ = 0,51 \text{ kN} \\ F_{r31} = F_{t31} \cdot \frac{\tan\alpha_0}{\cos\beta_0} = 1,9 \cdot \frac{\tan 20^\circ}{\cos 15^\circ} = 0,71 \text{ "} \end{cases}$$



1. dişlideki toplam kuvvetler:

$\Sigma F_r = 0,71 - 0,43 = 0,28$ kN
$\Sigma F_t = 1,90 - 1,14 = 0,76$ "
$\Sigma F_a = 0,51 + 0,31 = 0,82$ "



c) $F_{t31} > F_{t21}$ old. dan ⇒ $F_t \to F_{t31}$ ve i_{13} değeri alınır.

$$\begin{cases} v = \frac{\pi \cdot d_{01} \cdot n_1}{60} = \frac{\pi \cdot 0,093 \cdot 550}{60} = 2,7 \text{ m/s} \Rightarrow K_{dn} = \frac{50+2,7}{50} = 1,054 \\ \psi_m = \frac{b}{m_n} = \frac{50}{5} = 10 \Rightarrow K_{y\beta} = 1,2 \quad ; \quad \varepsilon_{top} = 2 \; ; \; Y_c^2 = 3,11 \\ z_{n1} = \frac{z_1}{\cos^3\beta_0} = \frac{18}{\cos^3 15^\circ} \cong 20 \Rightarrow Y_F = 2,92 \; ; \; i_{13} = \frac{25}{18} = 1,3\overline{8} \end{cases}$$

Kırılmaya göre: $\sigma_{emax} = K_{is} \cdot K_{dn} \cdot K_{y\beta} \cdot \frac{F_{t1}}{b \cdot m_n} \cdot \frac{Y_F}{\varepsilon_{top}} \leq \sigma_{em}$ → (St60 için)

$$\Rightarrow \sigma_{emax} = 1,5 \cdot (1,054) \cdot 1,2 \cdot \frac{1900}{50 \cdot 5} \cdot \frac{2,92}{2} \cong 21 \text{ N/mm}^2 < \sigma_{em} = 150 \text{ N/mm}^2$$

EMNİYETLİ

Ezilmeye göre: $p_{Hmax} = \sqrt{K_{is} \cdot K_{dn} \cdot K_{y\beta} \cdot \frac{0,35 \cdot F_{t1} \cdot E_{eq}}{b \cdot d_{01}} \cdot \frac{i+1}{i} \cdot \frac{Y_c^2}{\varepsilon_{top}}} \leq p_{Hem}$

$$\Rightarrow p_{Hmax} = \sqrt{1,25 \cdot (1,054) \cdot 1,2 \cdot \frac{0,35 \cdot 1900 \cdot 210 \cdot 10^3}{50 \cdot 93,2} \cdot \frac{2,3\overline{8}}{1,3\overline{8}} \cdot \frac{3,11}{2}} \cong 360 \frac{N}{mm^2} < 380 \frac{N}{mm^2}$$

EMNİYETLİ