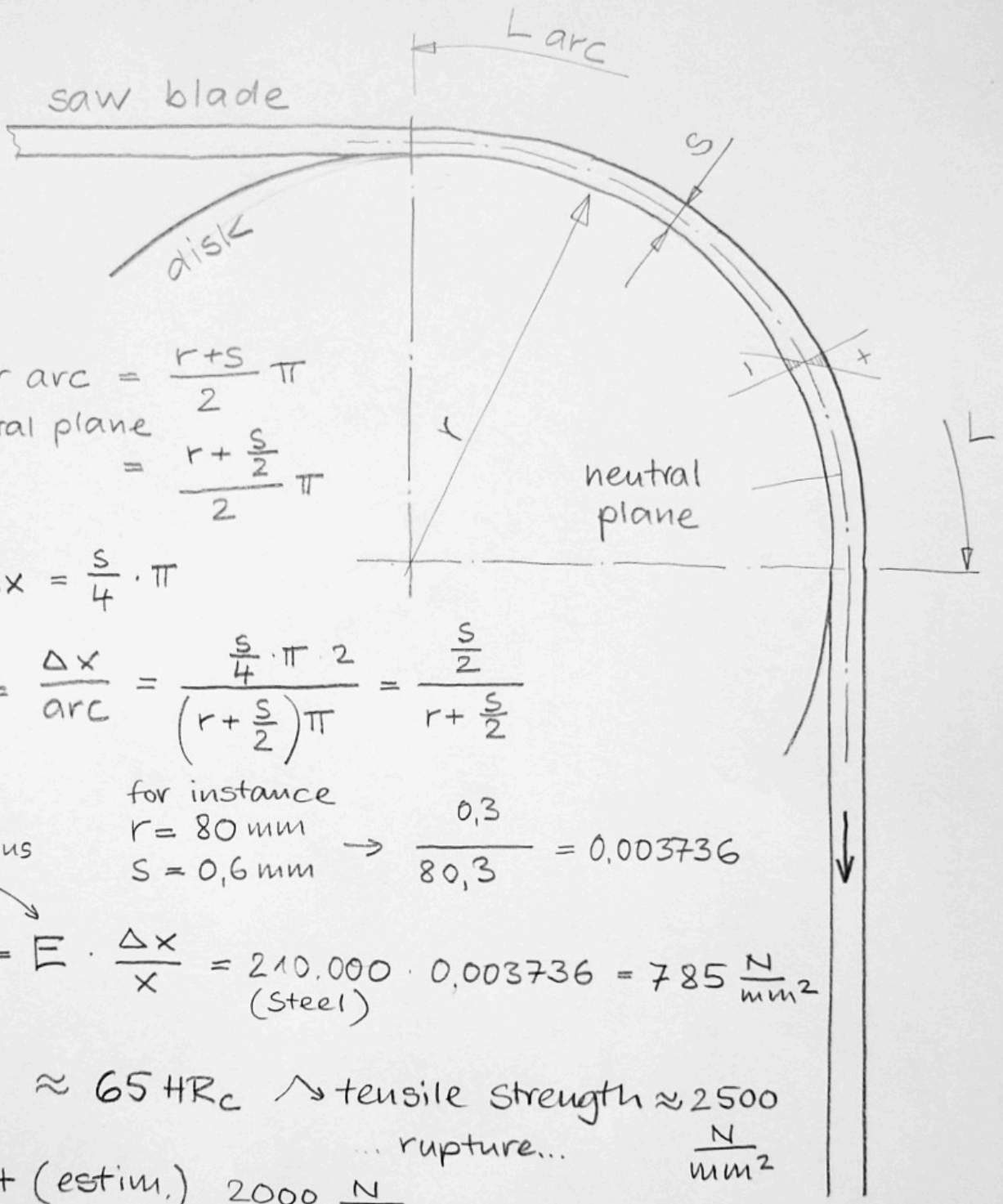

length outer arc $= \frac{r+s}{2}\pi$

length neutral plane $= \frac{r+\frac{s}{2}}{2}\pi$

elongation $\Delta x = \frac{s}{4} \cdot \pi$

strain $\frac{\Delta x}{x} = \frac{\Delta x}{arc} = \frac{\frac{s}{4} \cdot \pi \cdot 2}{\left(r+\frac{s}{2}\right)\pi} = \frac{\frac{s}{2}}{r+\frac{s}{2}}$

for instance
$r = 80\,mm$
$s = 0{,}6\,mm$ $\rightarrow \frac{0{,}3}{80{,}3} = 0{,}003736$

Young's modulus

stress $\sigma = E \cdot \frac{\Delta x}{x} = 210.000 \cdot 0{,}003736 = 785\,\frac{N}{mm^2}$ (Steel)

Hardness saw blade $\approx 65\,HR_C$ ↘ tensile strength $\approx 2500\,\frac{N}{mm^2}$ ... rupture...

yield point (estim.) (static load) $2000\,\frac{N}{mm^2}$

fatigue limit (pulsating forces) $\sim \frac{1}{3} \ldots \frac{1}{4}$ of Yield ↘ $670 \ldots 500\,\frac{N}{mm}$

in analogy to screw steels

↘ even a disk diameter of 160 is too small