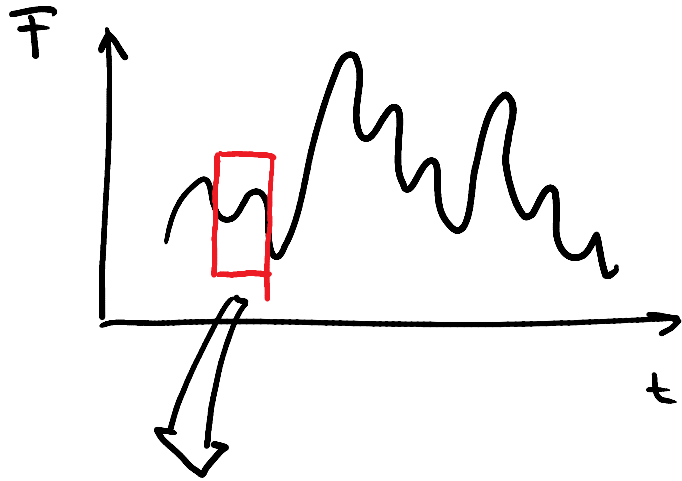


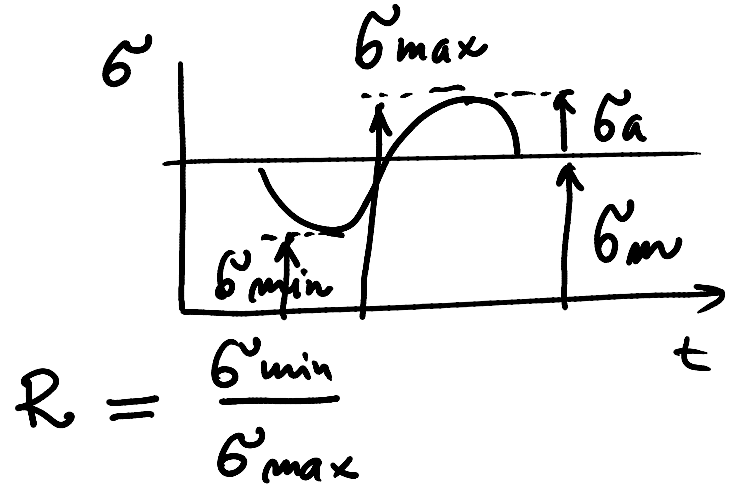
# DINAMIČNE MATERIALNE LASTNOSTI

OBREMENITVENI CIKEL



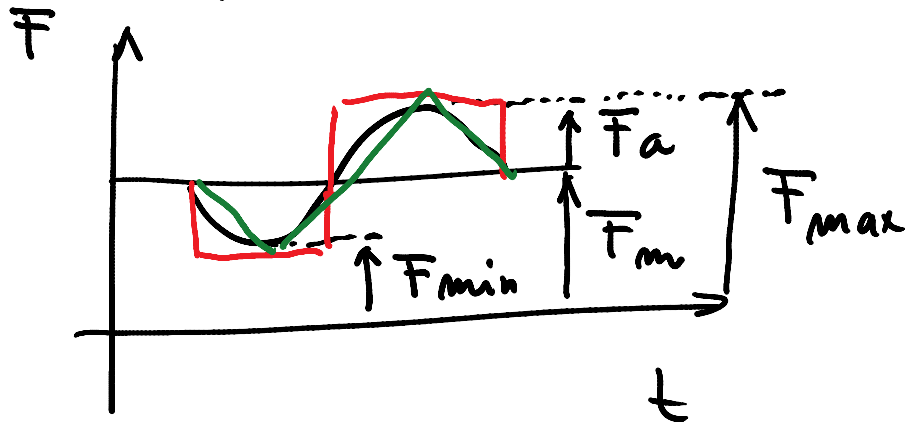
$$F \rightarrow \sigma$$

$$\sigma = \frac{F}{A}$$

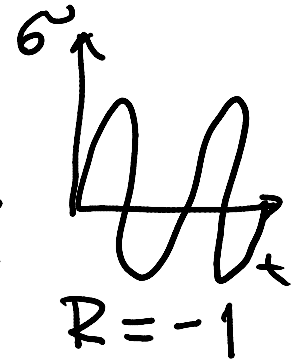
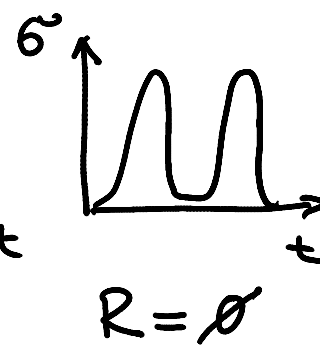
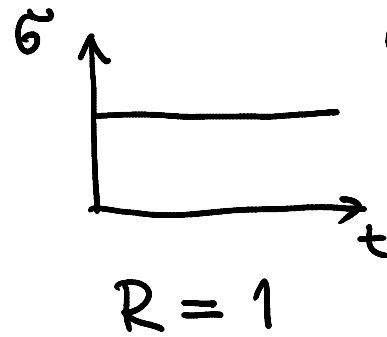


$$R = \frac{\sigma_{min}}{\sigma_{max}}$$

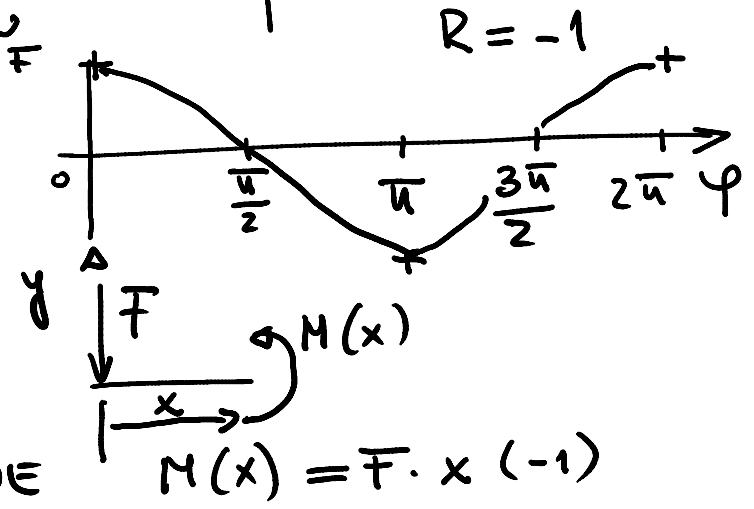
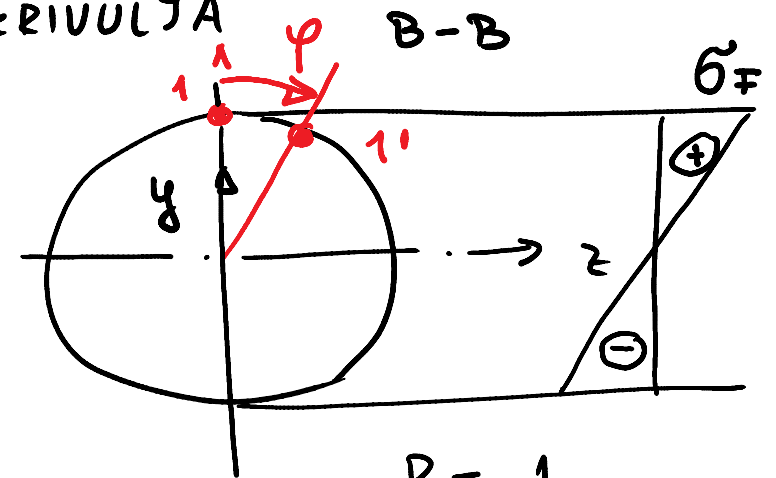
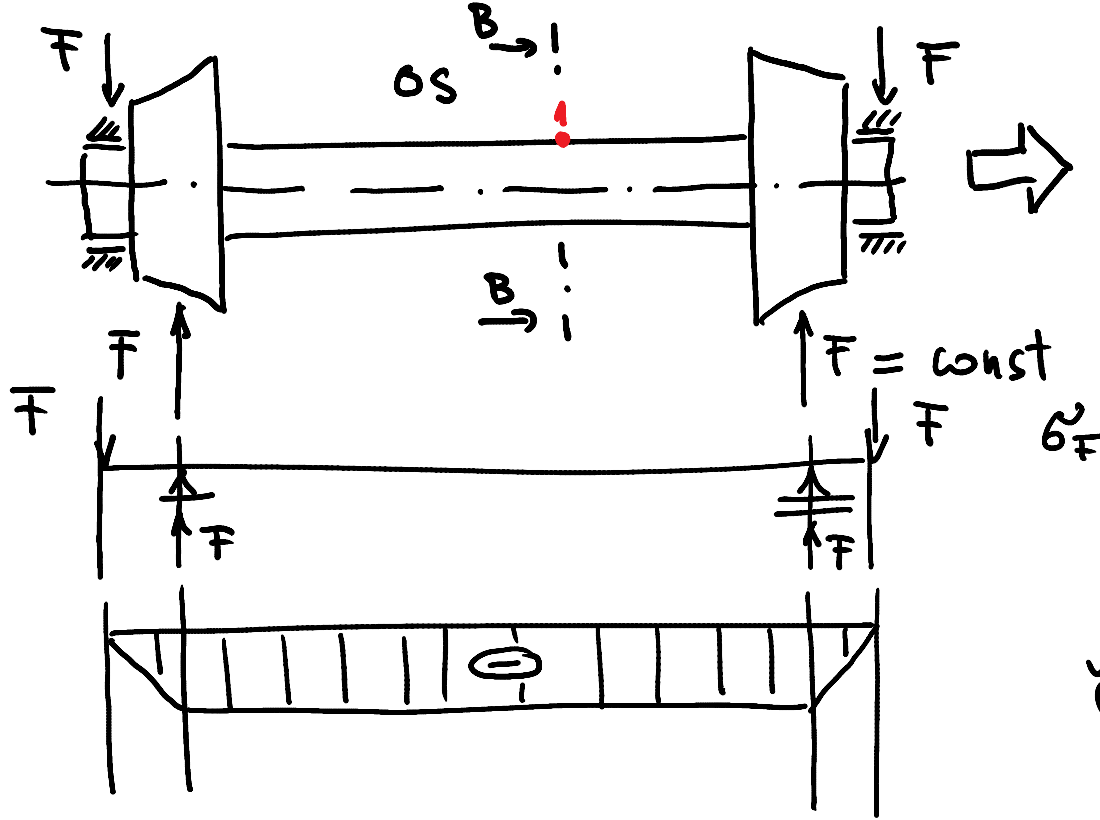
RAZMERJE NAPETOSTI



OBREMENITVENI CIKEL



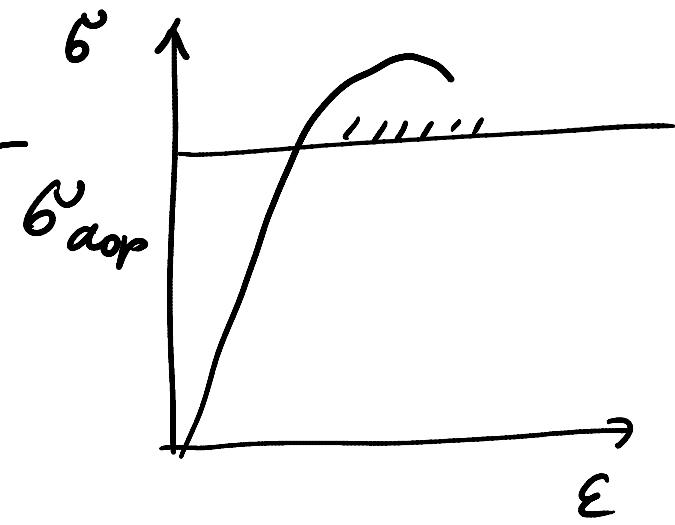
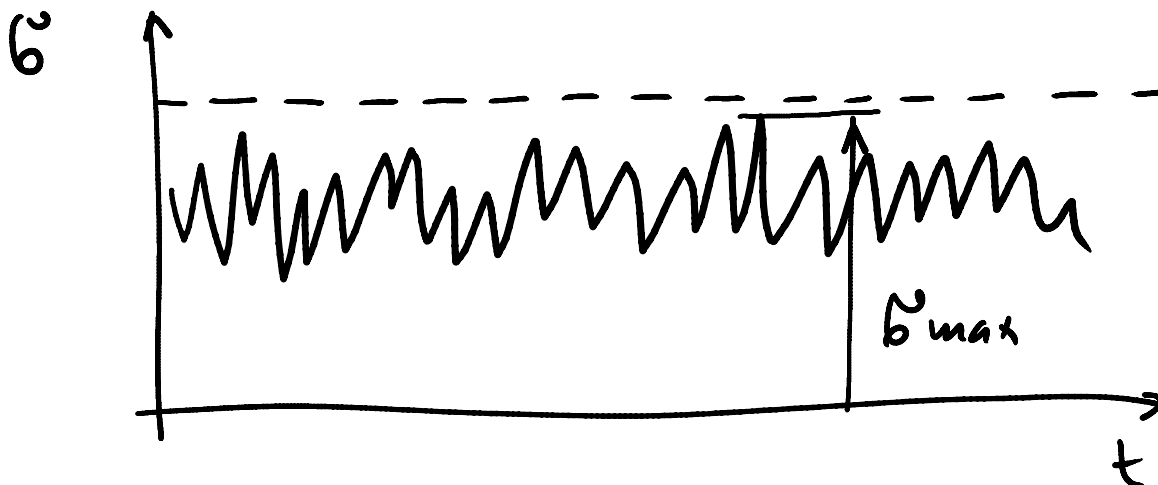
# WÖHLERJEVA ALI S-N KRIVULJA



17 MENIČNA NAP  $\rightarrow$  UTRUJENOSTNE POŠKODBE

$\sigma_F \ll R_{p0.2} \rightarrow$  UTRUJENOSTNA POŠKODBA

NI TA IZPIT

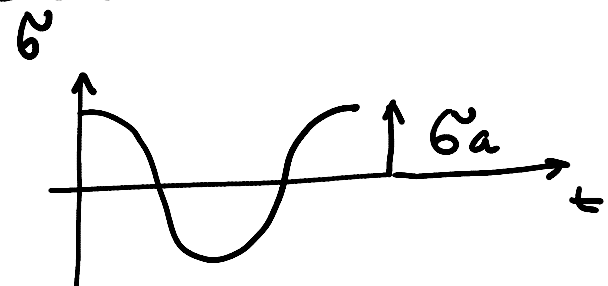
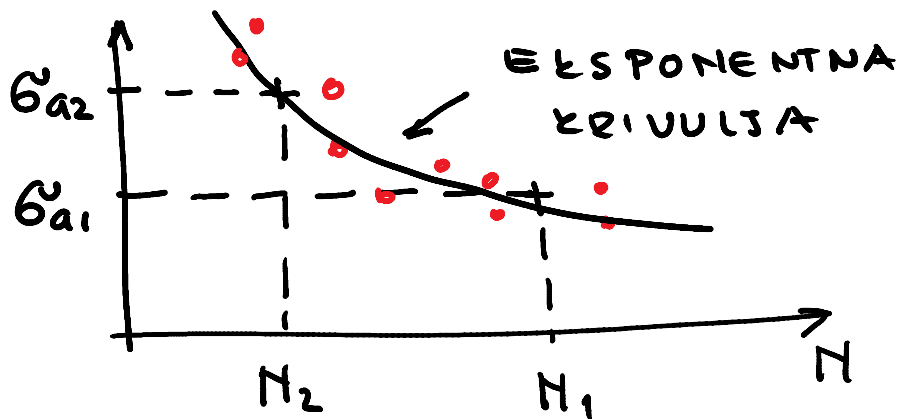


NI GARANCIJA, DASE  
NE POJAVI UTRUJENOSTNI  
LOM!

$\sigma_{max} < \sigma_{dop}$

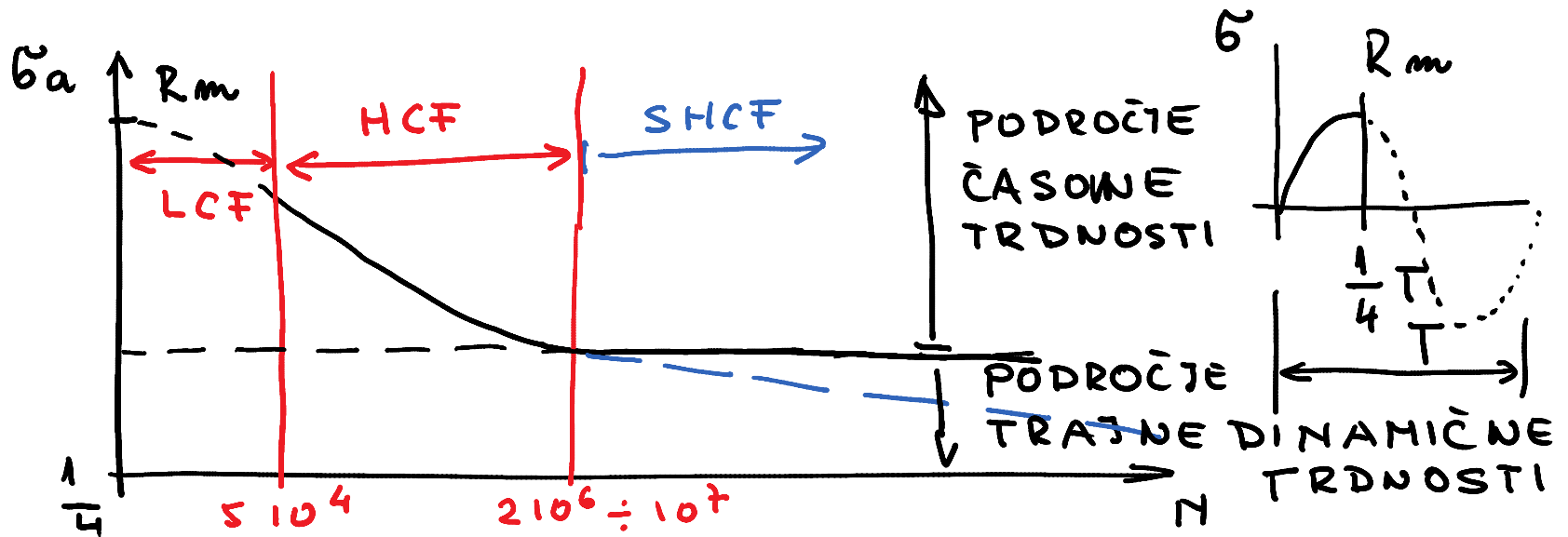
TRENUJNI LOM NI  
PRICAYOVAN

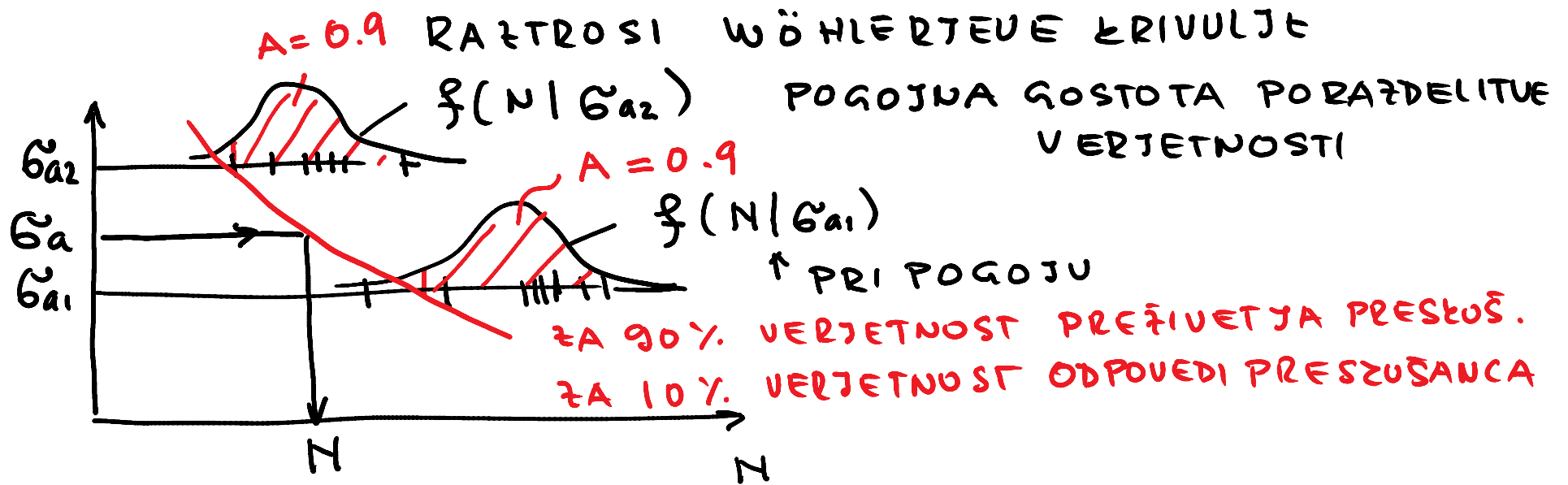
1 VRTLJAJ OSI = 1 OBRHEMITUENI CIKEL



ŠTEVILO OBR. CIKLOU DO KRITIČNE POŠKODBE

PODROČJA WÖHLERJEVE KRIVULJE



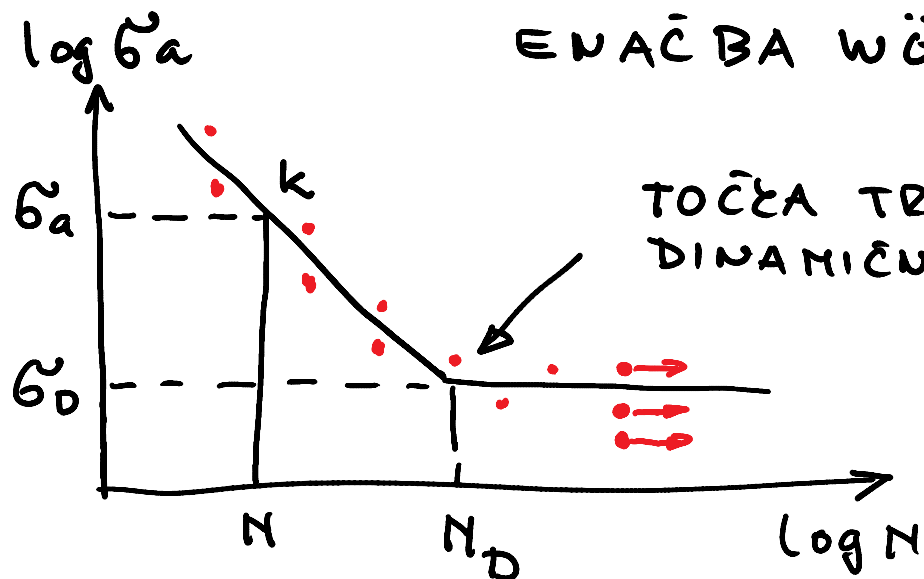


$N$  - NAČIŠOČNA SPREMENLJIVA

$G_{a1}, G_{a2}$  - POGOJ

- DETERMINISTIČNA SPREMENLJIVA

# ENACĀBA WÖHLERTJEVE ĒRIVULĒJE



$\sigma_0, N_0, k$

LINEARNA  
REGRESIJA

$$\frac{\sigma_a}{\sigma_0} = \left( \frac{N}{N_0} \right)^{-k}$$

ENACĀBA WÖHLERTJEVE  
ĒRIVULĒJE

$$\left( \frac{\sigma_a}{\sigma_0} \right)^{-\frac{1}{k}} N_0 = N$$

$$N = f(\sigma_a, \dots)$$

$$y = -kx + m$$

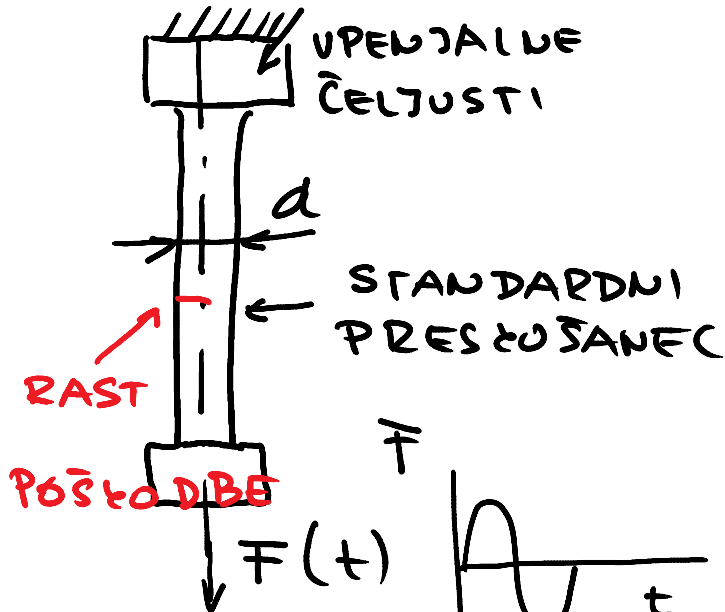
$$\log \sigma_a = -k \log N + m$$

$$\log \sigma_0 = -k \log N_0 + m$$

$$\log \sigma_a - \log \sigma_0 = -k (\log N - \log N_0)$$

$$\log \frac{\sigma_a}{\sigma_0} = -k \log \frac{N}{N_0} = \log \left( \frac{N}{N_0} \right)^{-k}$$

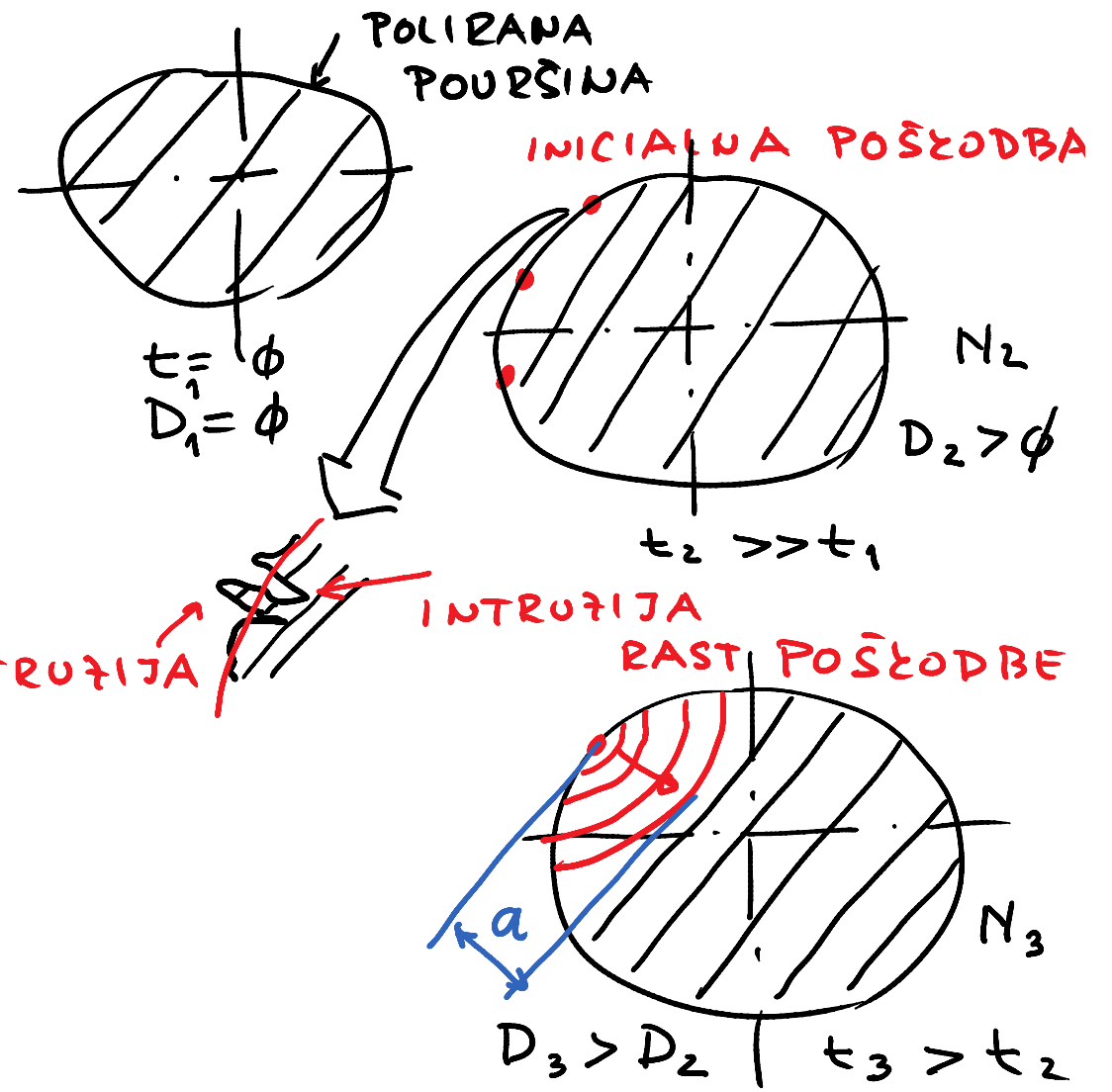
# KRITERIJI POŠKODBE

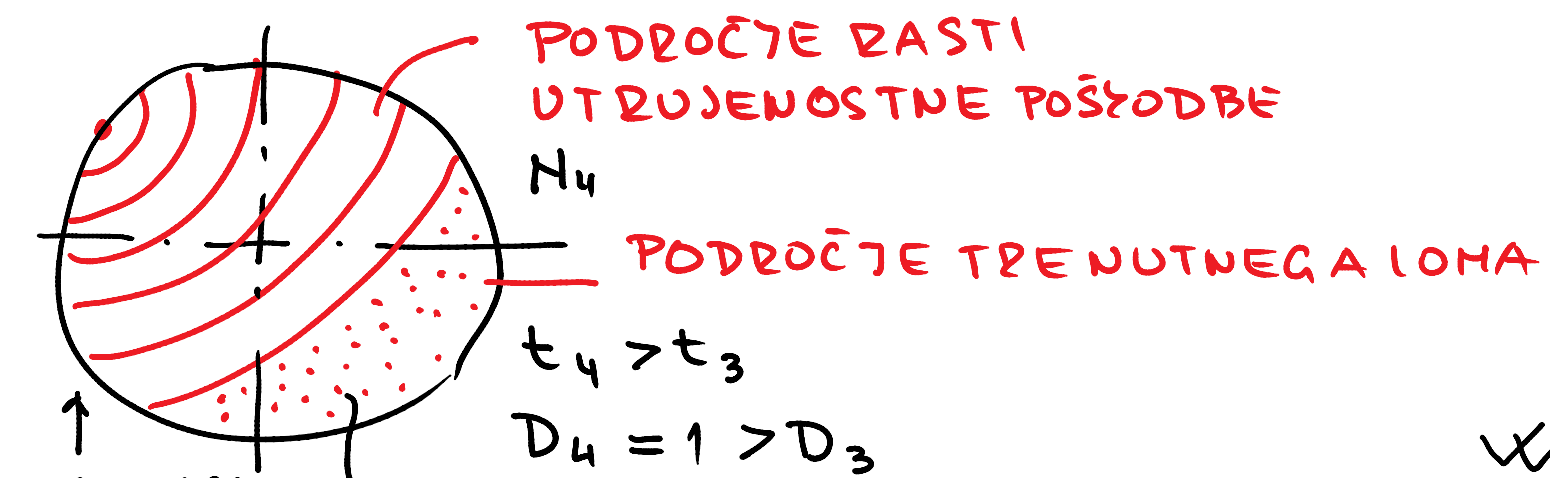


$$A = \frac{\pi d^2}{4}$$

$$\sigma(t) = \frac{F(t)}{A}$$

IMENSKI PRERET

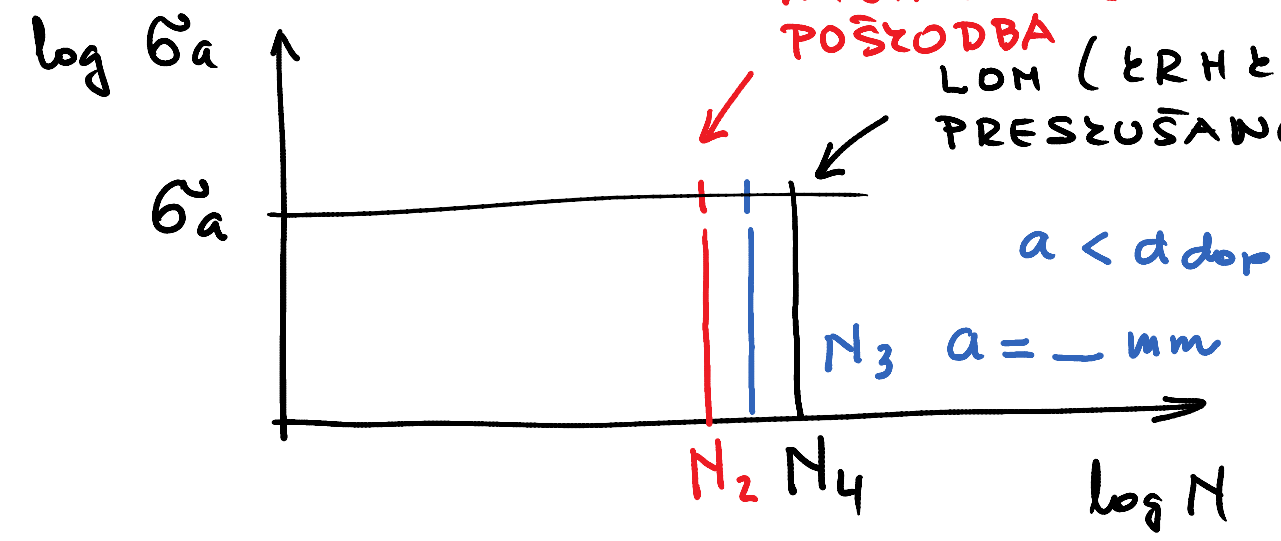




↑  
POSLEDICA  
ENERGIJE  
CIKLA

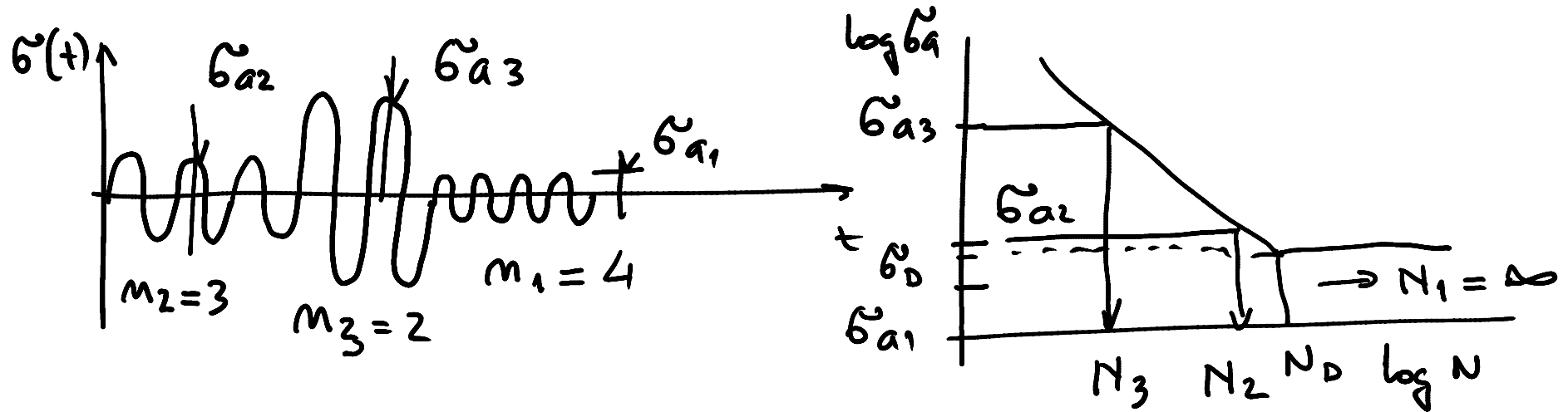
$\sigma_a \cong R_m$

✓  
MERIMO POSREDNO PREKO  
MODULA ELASTIČNOSTI  
INICIALNA (ČILAVI MATERIALI)  
POŠKODBA  
LOM (ČRNI MATERIALI)  
PRESUŠANCA





# MINERJEVO PRAVILO O LINEARNI AKUMULACIJI POŠKODBE



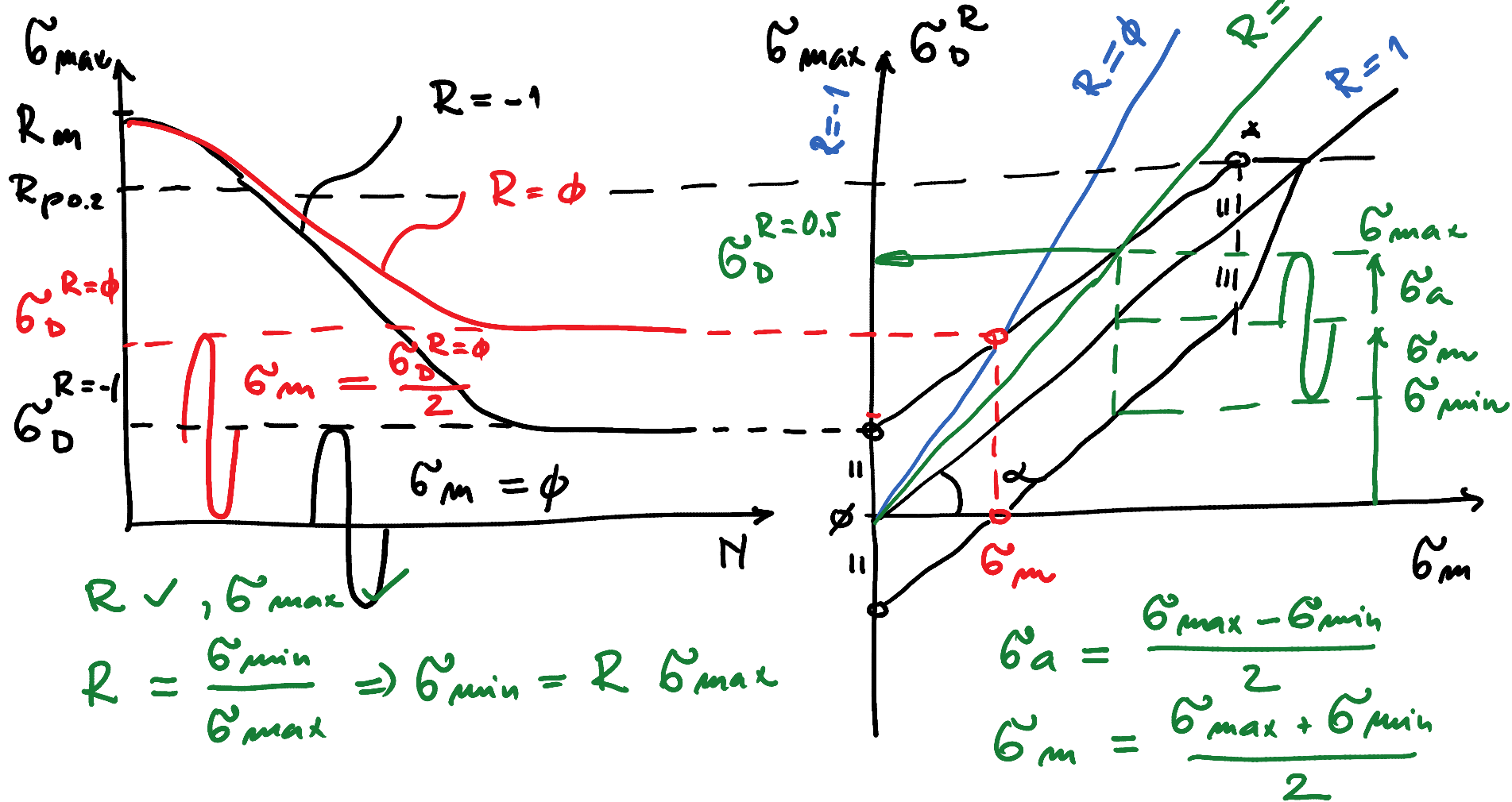
$$D = D_1 + D_2 + D_3 + \dots$$

$$= \frac{m_1}{N_1} + \frac{m_2}{N_2} + \frac{m_3}{N_3} + \dots$$

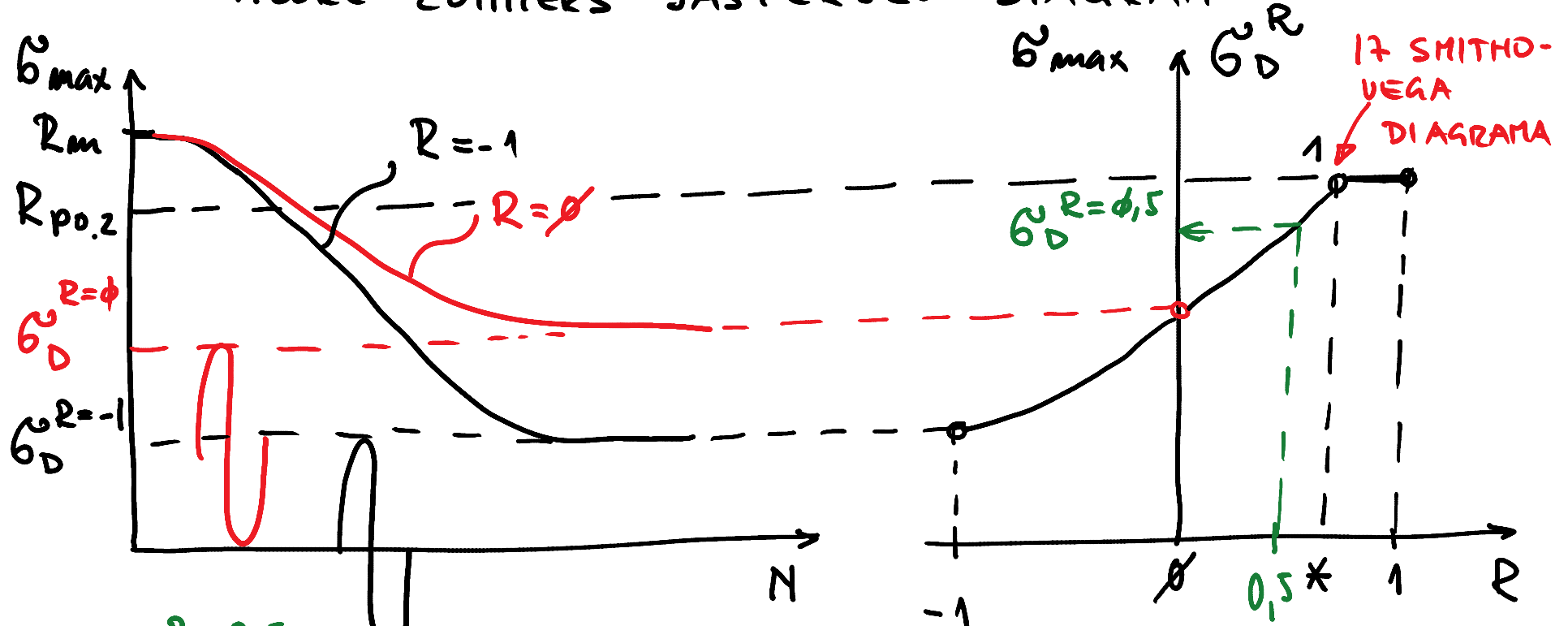
$$0 \leq D \leq 1$$

$$D = \sum_{i=1}^{\infty} D_i = \sum_{i=1}^{\infty} \frac{m_i}{N_i} \quad \blacksquare$$

# TRAJNA DINAMIČNA TRDNOST SMITHOU DIAGRAM



# MOORE KOHMERS JASPER JEU DIAGRAM

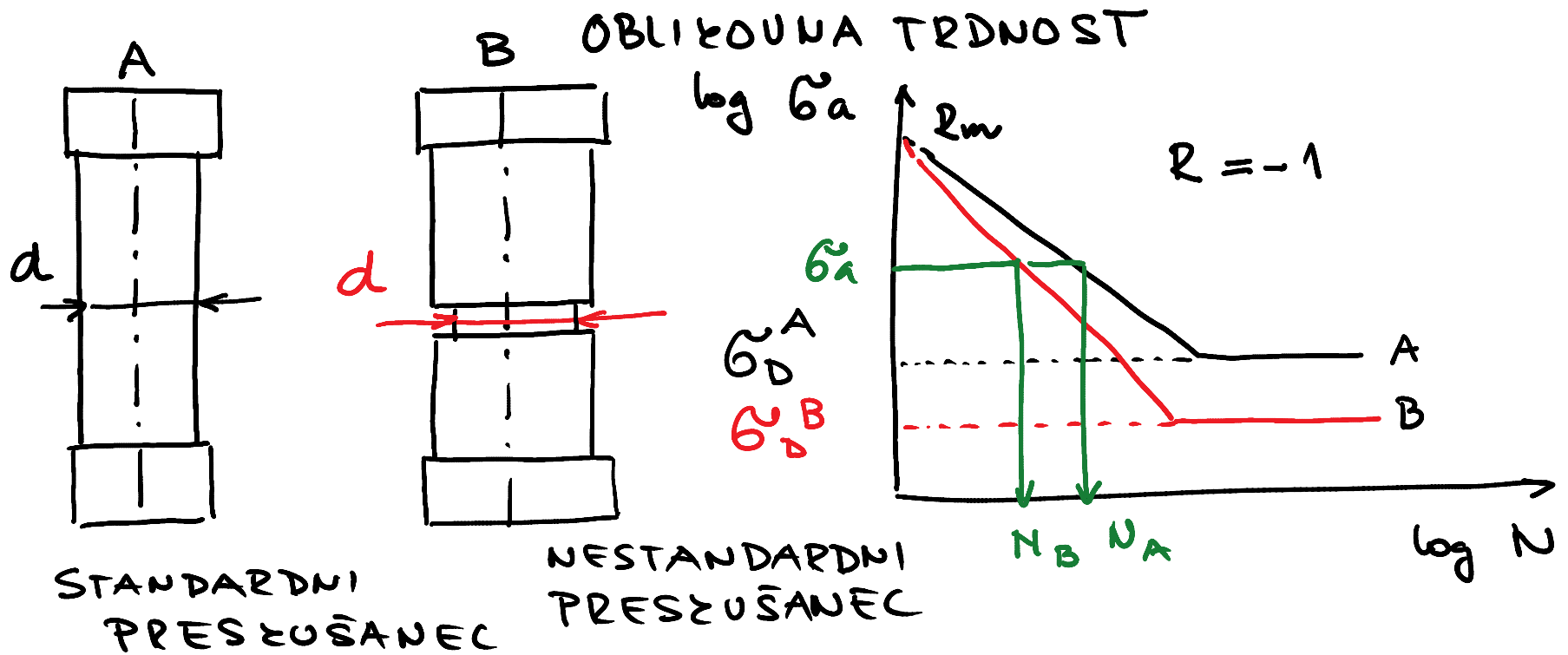


$$\sigma_D^{R=0.5} = \sigma_{max} \checkmark R \checkmark$$

$$\sigma_{min} = R \cdot \sigma_{max}$$

$$\sigma_a = \frac{\sigma_{max} - \sigma_{min}}{2}$$

$$\sigma_m = \frac{\sigma_{max} + \sigma_{min}}{2}$$



$$\sigma_D^A = \sigma_D^R \quad \text{TRAJNA DINAMIČNA TRDNOST}$$

$$\sigma_D^B = \sigma_{obl}^R \quad \text{OBLIKOVNA TRDNOST}$$

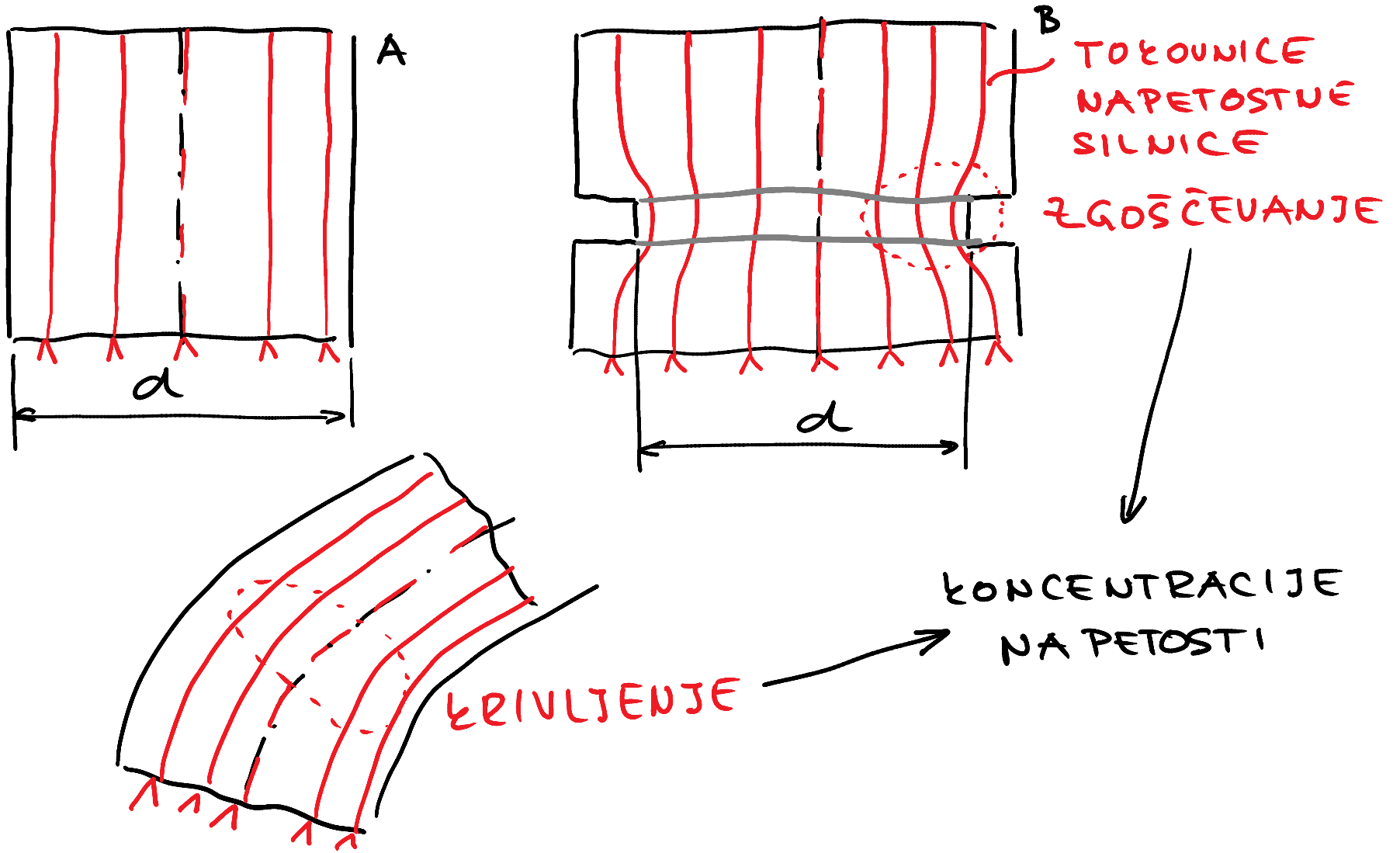
$b_1$  - UPLIV HRAPAVOSTI POUŠINE

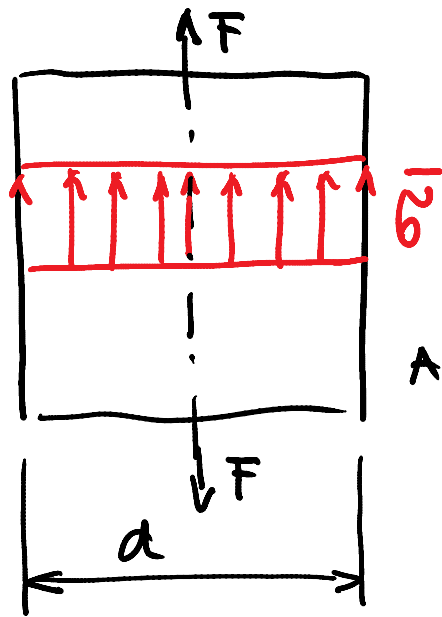
$b_2$  - UPLIV VELIKOSTI PREREZA

$$\sigma_{obl}^R = \frac{\sigma_D^R \cdot b_1 \cdot b_2}{\beta_L}$$

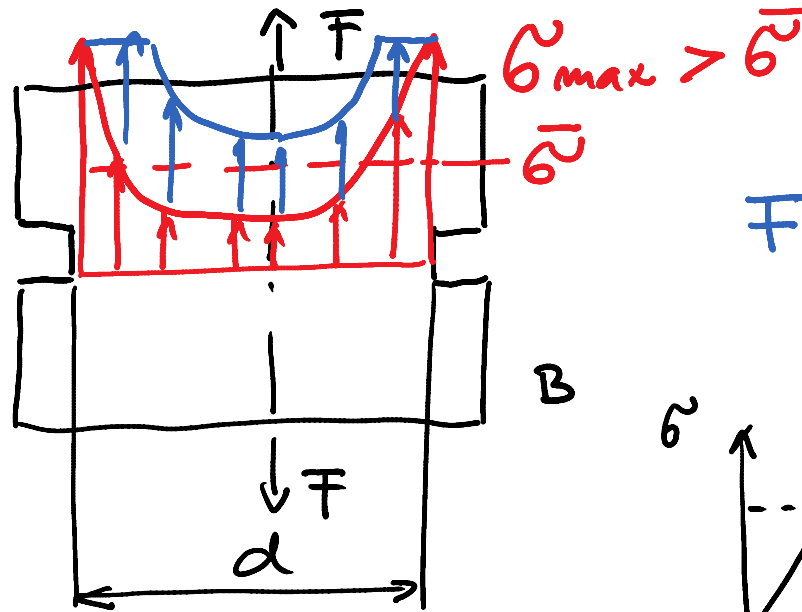
FAKTOR ZAREŽNEGA UC.

# OBLIKOVNO ŠTEVILO IN TAREŽNI UČINEK

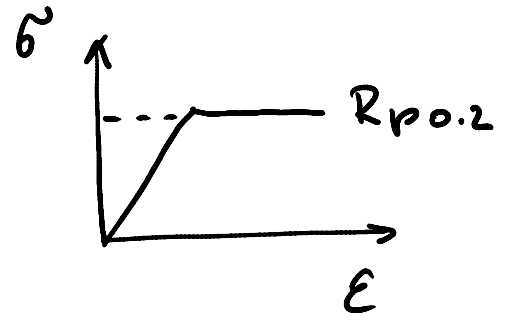




$$\bar{\sigma} = \frac{F}{A} = \frac{F}{d^2}$$



$$F = \int_A \sigma dA = \bar{\sigma} A$$



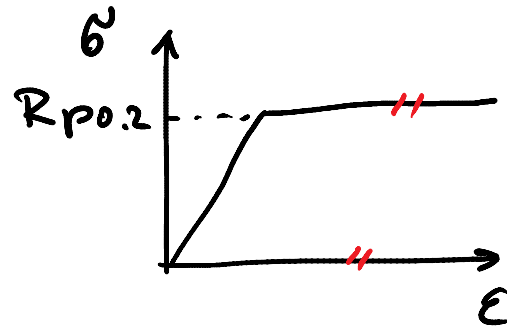
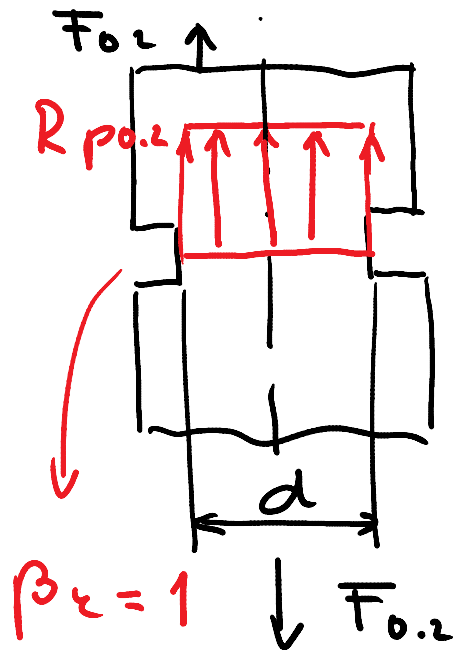
$\sigma_{max} = \bar{\sigma} \cdot \alpha_k$  - OBLIKOVNO ŠTEVILO VELJA LE ČE JE

$$\sigma_{max} \leq R_{po.2}$$

# FAKTOR ZAREZNEGA UČINEKA

$$\beta_z = f(\alpha_z) \quad 1 \leq \beta_z < \alpha_z$$

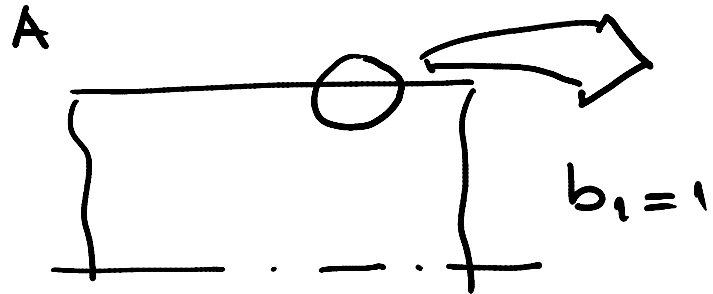
$$F \uparrow \Rightarrow \beta_z \downarrow$$



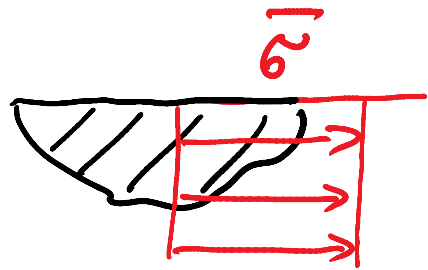
$$\sigma_{max} \leq R_{p0.2} = \frac{F_{0.2}^4}{\pi d^2}$$

PODPORN  
UČINEK

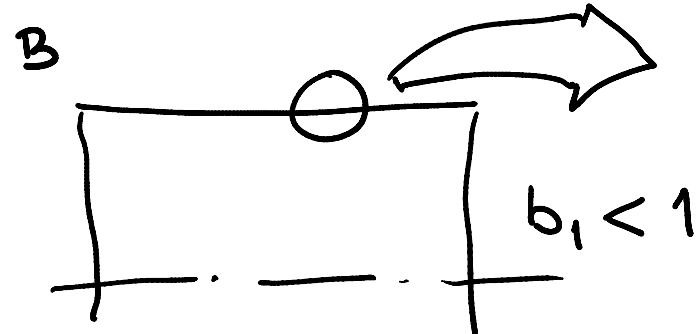
# VPLIV HRPAVOSTI POUŠINE



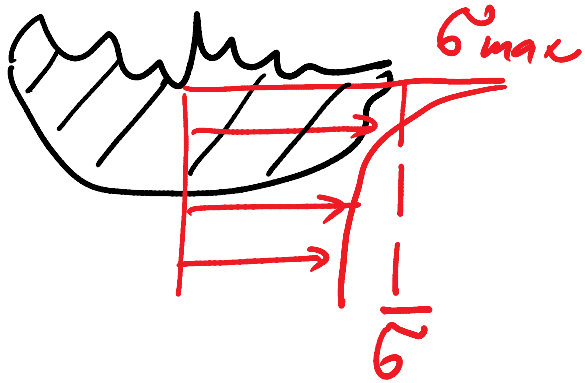
STANDARDNI  
PRESUŠANEC



$$\phi < b_1 \leq 1$$

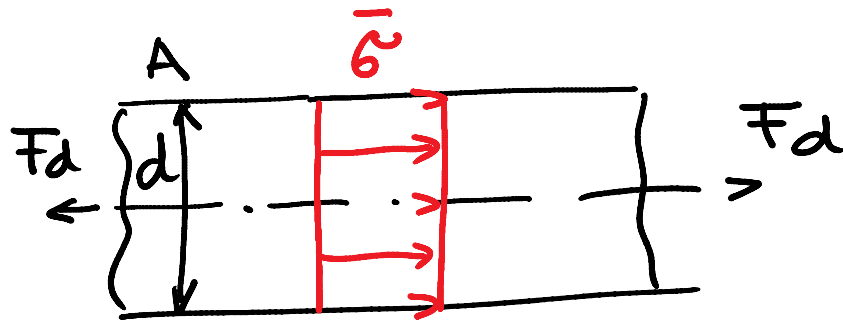


NESTANDARDNI  
PRESUŠANEC





# VPLIV VELIKOSTI PREREZA

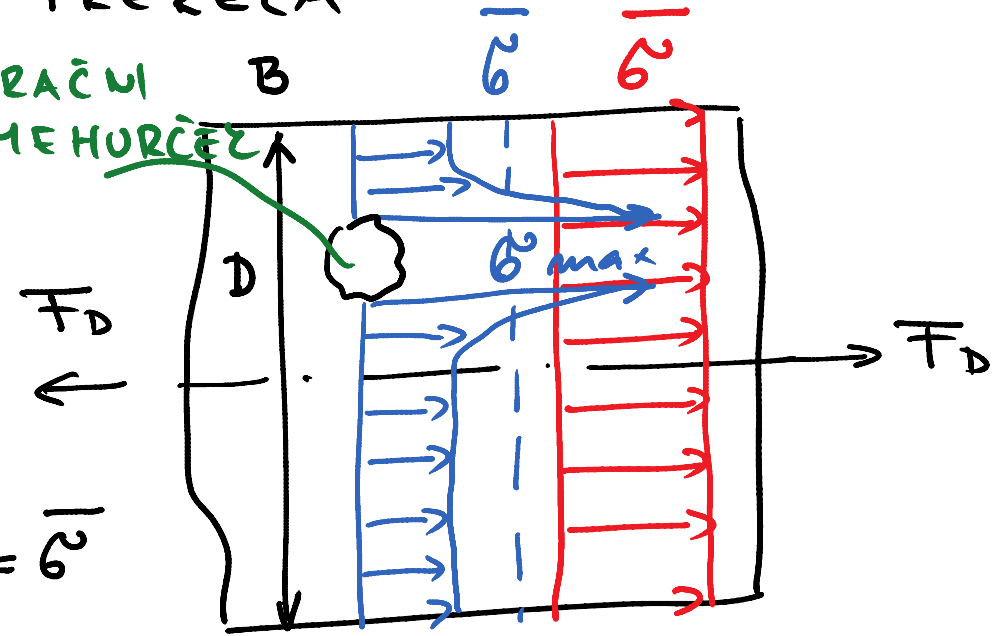


STANDARDNI  
PRESUŠANEC

$$\bar{\sigma}_d = \frac{F_d}{d^2} = \bar{\sigma}_D = \frac{F_D}{D^2} = \bar{\sigma}_0$$

$$b_2 = 1$$

ŽRAČNI  
MEHURČEZ



NESTANDARDNI  
PRESUŠANEC

$$0 < b_2 \leq 1 \text{ (VEČ KOT ENA)} \quad b_2 < 1$$

$$\frac{F_D}{F_d} = \left(\frac{D}{d}\right)^2$$

↑  
ČE JE TANJŠI OD  
STANDARDNEGA PRESUŠANCA

## DOZUSTNA NAPETOST

$$\sigma_{dop}^R = \frac{\sigma_{obl}^R}{\psi}$$

- VARNOSTNI  
FAKTOR

$$R=1 \Rightarrow \sigma_{obl}^{R=1} = R_{p0.2} \Rightarrow \sigma_{dop}^{R=1} = \frac{R_{p0.2}}{\psi}$$