

$$\textcircled{1} \quad \overset{\curvearrowleft}{\sum} C \cdot l + B \cdot l - M_a = 0$$

ΜΕΓΕΘΗ:  $M_a; B; C; C_1; C_2; C_3; C_4$

$$\textcircled{2} \quad \text{-----}$$

II

$$m(x) = C \cdot x - q \cdot l \left( x - \frac{l}{2} \right) + B(x - l)$$

$$\textcircled{I} \quad m(x) = C \cdot x - q \cdot x \frac{x}{2}$$

$$EI_y w''''(x) = \frac{1}{2} q x^2 - C x$$

$$EI_y w'''(x) = \frac{1}{6} q x^3 - C \cdot \frac{x^2}{2} + C_1$$

$$EI_y w''(x) = \frac{1}{24} q x^4 - C \frac{x^3}{6} + C_1 x + C_2$$

$$\textcircled{2} \quad w(0) = 0$$

$$\textcircled{3} \quad w(l) = 0$$

Ⓣ

$$EI_y w''''(x) = q l \cdot x - \frac{q l^2}{2} - C x - B x + B l$$

$$EI_y w'''(x) = q l \frac{x^2}{2} - \frac{q l^2}{2} x - C \frac{x^2}{2} - B \frac{x^2}{2} + B l x + C_3$$

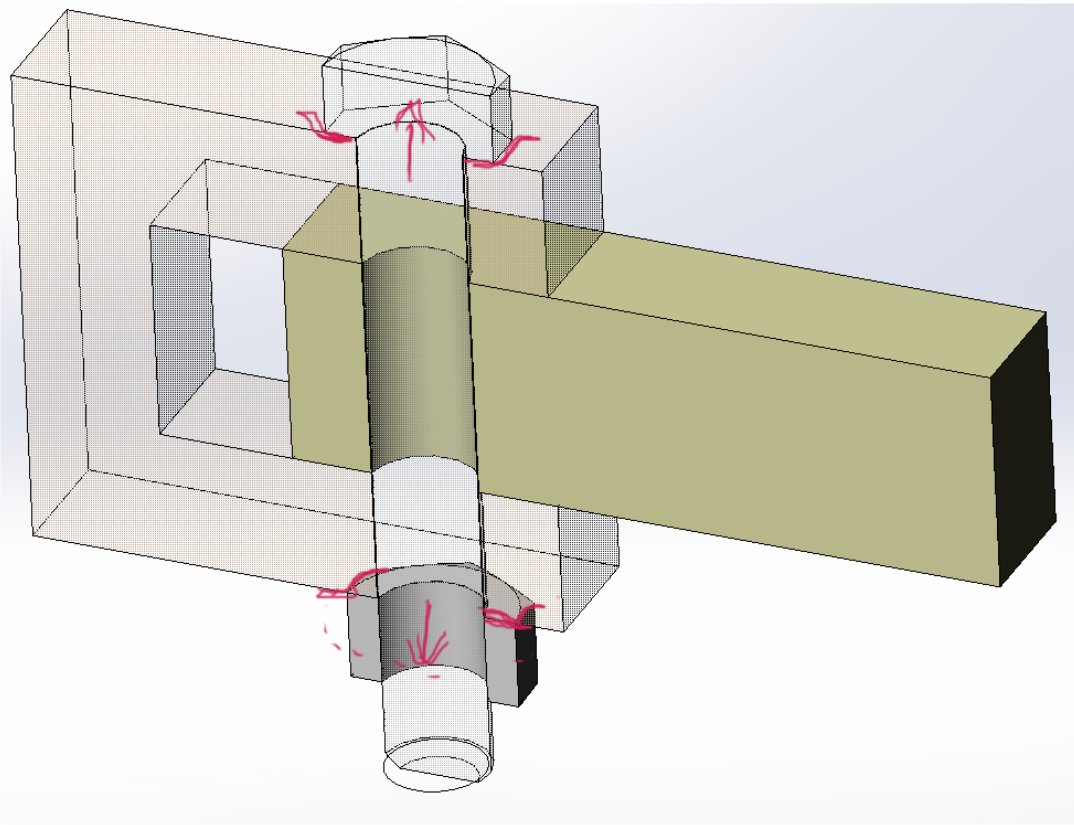
$$EI_y w''(x) = q l \frac{x^3}{6} - \frac{q l^2 x^2}{4} - C \frac{x^3}{6} - B \frac{x^3}{6} + B l \frac{x^2}{2} + C_3 x + C_4$$

$$\textcircled{4} \quad w(l) = 0$$

$$\textcircled{5} \quad w(2l) = 0$$

$$\textcircled{6} \quad \varphi(2l) = 0$$

$$\varphi(l) = \varphi(2l)$$



POSOUZENÍ SPOJOVACÍCH PROSTŘEDKŮ

→ NÁVRH ŠROUBOVÉHO SPOJE

KRITÉRIA

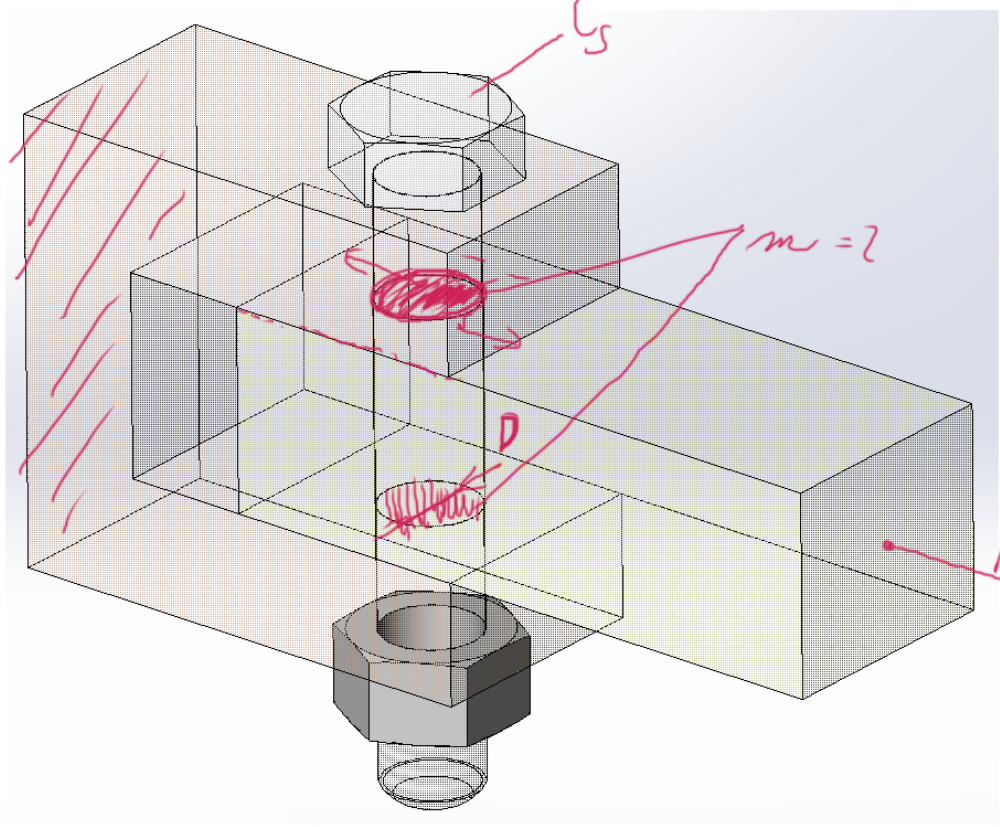
→ STŘÍH

→ OTLAK

→ PŘETŘŽENÍ V TĚLU  
- MATERIÁL ŠROUBU POKVĚ

→ PROTĚČENÍ HLAVY

STRĚH



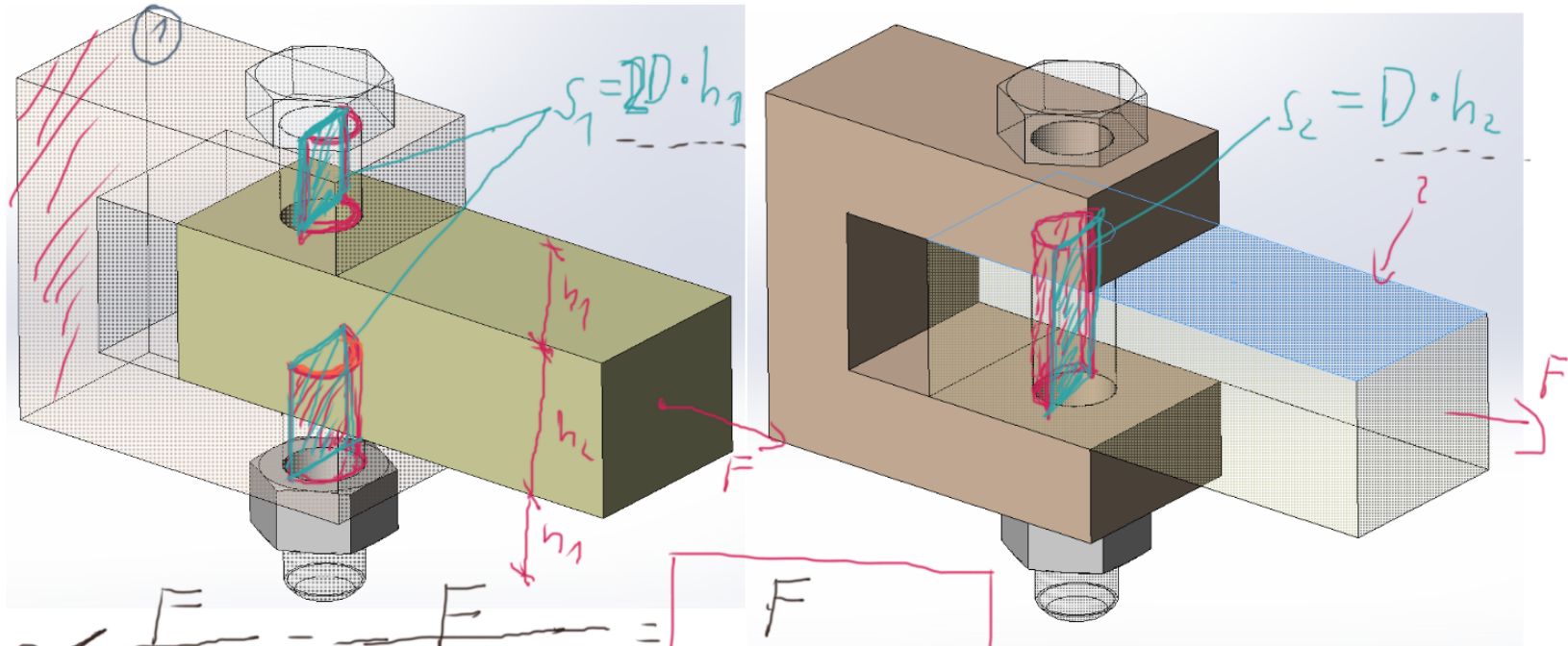
$$\tau_s \leftarrow \frac{F}{\frac{1}{4} \pi D^2 \cdot n \cdot m}$$
$$\sigma = \frac{F}{S}$$

$n$  - POČET ŠROUBŮ

$m$  - POČET STRŽENÝCH PLOCH

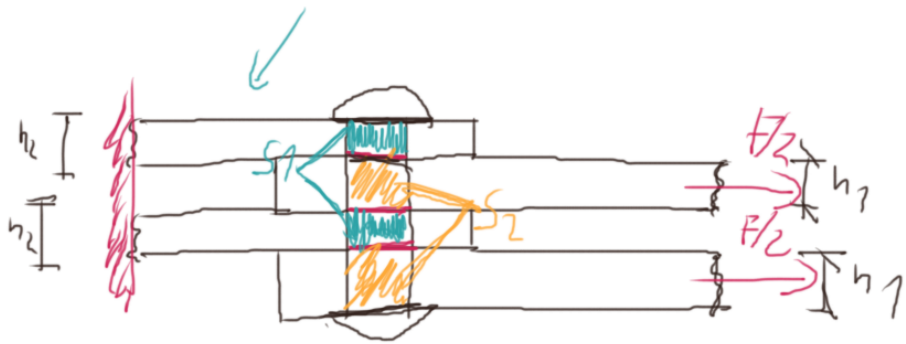
$\tau_s$  - SMYKOVÉ NAPŘÍŽÍ, STRĚH

# OTLAK



$$\sigma_0 \leq \frac{F}{S_n} = \frac{F}{\min\{s_1; s_2\}} = \frac{F}{D \cdot \min\{2h_1; h_2\} + n \cdot \min\{s_1; s_2\}}$$

$\sigma_0$  - DOVOLLENÍ NAPĚTÍ, OTLAKEM  
 $n$  - POČET ŠROUBŮ  
 $F$  - SILA



minimální počet nití?  $n$

STRÍH

$$\tau_s = \frac{F}{n \cdot m \cdot \frac{1}{4} D D^2} \rightarrow n = \frac{4 \cdot F}{n \cdot \tau_s \cdot D \cdot D^2} = 2$$

$F = 50 \text{ kN}$   
 $\tau_s = 150 \text{ MPa}$  (NÍTLU)  
 $\sigma_0 = 250 \text{ MPa}$  (DĚSKY)  
 $h_1 = 20 \text{ mm}$   
 $h_2 = 10 \text{ mm}$   
 $D = 10 \text{ mm}$

$m = 3$

$m - \text{PSP}$

OTLAK

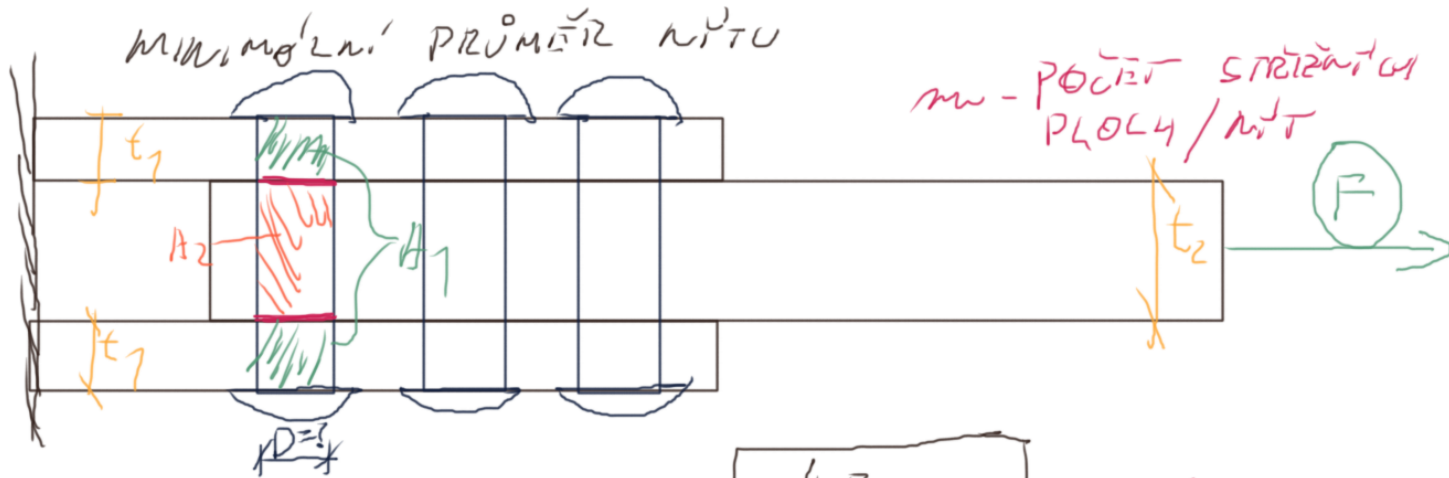
$$\sigma_0 = \frac{F}{n \cdot m \cdot \{S_1, S_2\} \cdot n} = \frac{F}{2 \cdot D \cdot m \cdot \{h_2, h_1\} \cdot n} \rightarrow n_0 = \frac{F}{2 \cdot D \cdot h_2 \cdot \sigma_0} = 1$$

$S_1 = D \cdot h_2 \cdot 2$

$S_2 = D \cdot h_1 \cdot 2$

Dva nití





$n = 3$   
 $F = 15 \text{ kN}$   
 $t_1 = 6 \text{ mm}$   
 $t_2 = 10 \text{ mm}$   
 $\tau_s = 150 \text{ MPa}$   
 $\sigma_0 = 200 \text{ MPa}$

a) STŘÍŽNÁ

$$\tau_s = \frac{4F}{n \cdot n \cdot \pi D^2} \rightarrow D = \sqrt{\frac{4F}{\tau_s \cdot n \cdot \pi}} = \underline{\underline{4.6 \text{ mm}}}$$

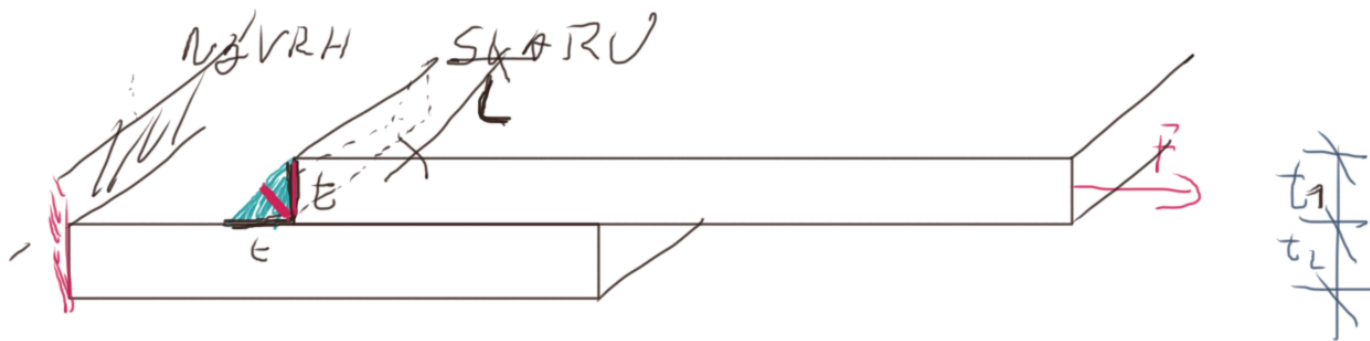
b) OHLAV

$$\sigma_0 = \frac{F}{\min\{A_1, A_2\} \cdot n} = \frac{F}{n \cdot D \cdot \min\{2t_1, t_2\}} = \frac{F}{n \cdot D \cdot t_2}$$

$A_1 = 2 \cdot D \cdot t_1$   
 $A_2 = D \cdot t_2$

$$D = \frac{F}{n \cdot t_2 \cdot \sigma_0} = \underline{\underline{2.5 \text{ mm}}}$$

$D = 5 \text{ mm}$



ಕೌಶಲ್ಯ ಸ್ವರ

$$\tau_D = \frac{F}{A} = \frac{F}{0.7 \cdot t_1 \cdot L}$$

$$\tau_D = \frac{F}{0.7 \cdot t \cdot L}$$