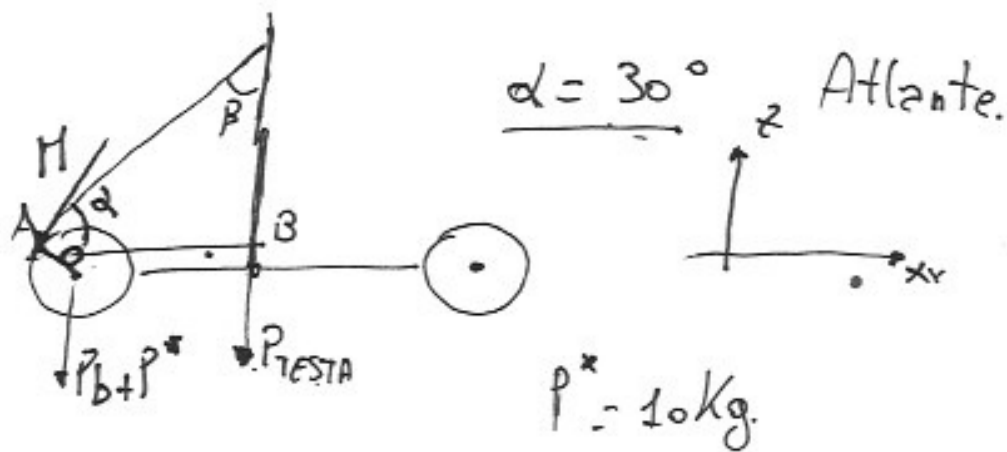


①



$$M_{OA} = P_T \cdot OB \quad \underline{M = P_T \frac{OB}{OA} = P_T \cdot K}$$

$$OA = 1 - 1.5 \text{ cm}$$

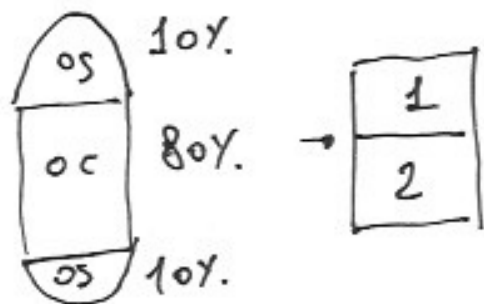
$$OB = 3 - 10 \text{ cm}$$

$$R_z = -M \sin \alpha - P_T - P_B - P^* = -P_T (1 + K) - P_B - P^*$$

$$R_{xy} = -M \cos \alpha = -PK \cos \alpha$$

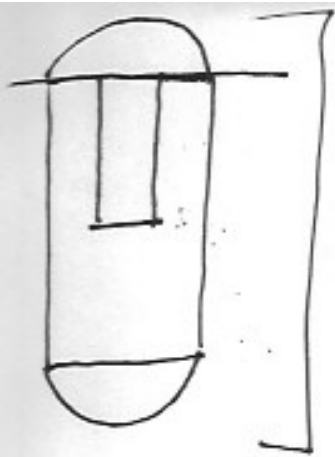
$$R = \sqrt{R_z^2 + R_{xy}^2}$$

Parte omogenea



$$E_z = \frac{E_c \cdot E_{os}}{0.8 E_{os} + 0.2 E_c}$$

$$E_{xy} = 0.8 E_c + 0.2 E_{os}$$



$$\sigma = \epsilon E$$

$$\frac{R_z}{A_{epif}} = \frac{R_z}{A_{TEST}}$$

$E_{TOT}$

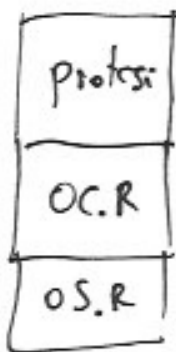
$$\sigma_{ep} = \epsilon E_p = \epsilon 0.5 [GPe]$$

$$\sigma_{ep,p} = \epsilon E_T = \epsilon 210 [GPe]$$

$\epsilon_{TEST}$

$h_{STEB}$

$z_{STEB}$



$$\left\{ \begin{array}{l} \frac{1}{E_z} = \frac{f_p}{E_p} + \frac{f_{oc,z}}{E_{oc,z}} + \frac{f_{os,z}}{E_{os,z}} \\ E_{xy} = f_p E_p + f_{oc,z} E_{oc,z}^{xy} + f_{os,z} E_{os,z} \\ f_p + f_{oc,z} + f_{os,z} = 1 \end{array} \right.$$

$$E_{oc,z}^z = E_0 (1-p)^d A^B \epsilon^{\gamma}$$

$$V_{TOT} = \frac{4}{3} \pi r_{om}^3 + h_{om} \cdot \pi r_{om}^2$$

$$f_p = \frac{2}{3} \pi r_{test}^3 + \pi r_{steb}^2 h_{steb} / V_{TOT}$$

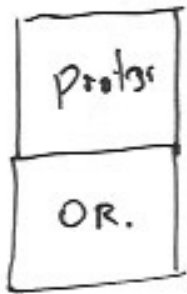
$$f_{oc,z} = (\pi r_{om}^2 h_{om} - \pi r_{steb}^2 h_{steb}) / V_{TOT}$$



$$f_{OSZ} = \left( \frac{2}{3} \pi r_{0m}^3 + \epsilon \right) / V_{TOT}$$

(3)

$$\epsilon \approx 0$$



$$E_Z = E_0^Z (1-p)^d A^B \epsilon \int \delta$$

$$E_{XY} = E_0^{XY} (1-p)^d A^B \epsilon \int \delta$$

$$\left\{ \frac{1}{E_Z} = \frac{f_P}{E_P} + \frac{f_{OZ}}{E_0^Z} \right.$$

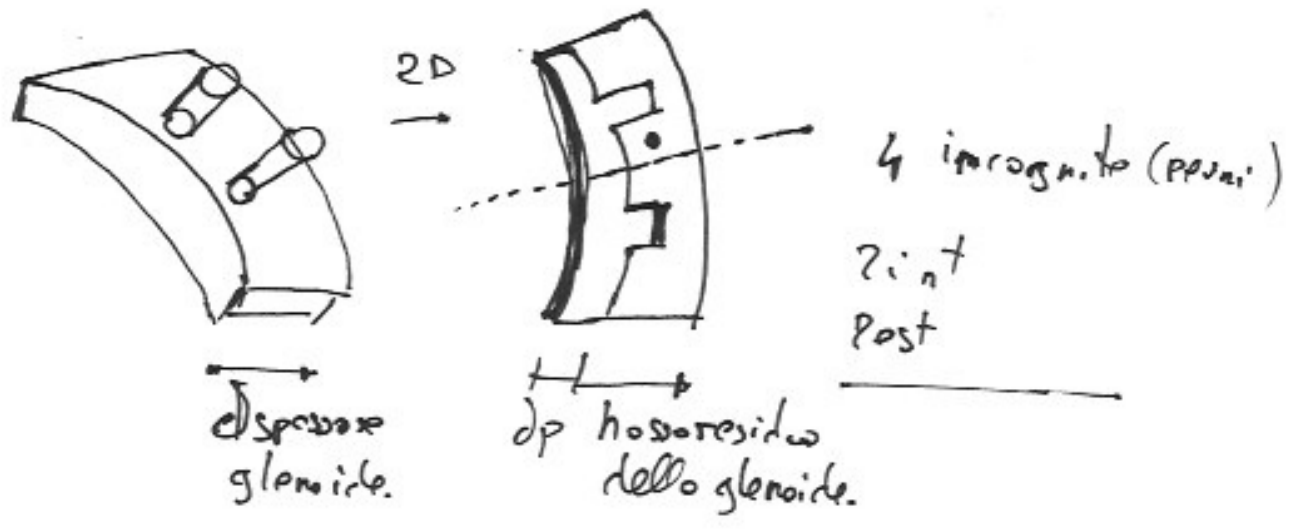
$$E_{XY} = f_P E_P + f_{OZ} E_0^{XY}$$

$$f_P + f_{OZ} = 1$$

$$\underline{r_{glen}} \leq \underline{r_{test}} \leq \underline{r_{0m}^{ep}}$$

parte glenoide

(4)



$z_p$   
 $h_p$

$z_{int. rotto} \rightarrow$  termin. nob  
 $z_{ost. rotto}$

$z_{ost. rotto} = z_{int} + \delta_p$

Tasso usura =  $\frac{10 \mu m}{ann}$

Zona glenoide = osso compatto.

Protegi
oss. residuo

$$\left\{ \begin{aligned} \frac{1}{E_z} &= \frac{f_p}{E_p} + \frac{f_{oc2}}{E_{oc2}} \\ E_{xy} &= f_p E_p + f_{oc2} E_{oc2}^{xy} \\ f_p + f_{oc2} &= 1 \end{aligned} \right.$$



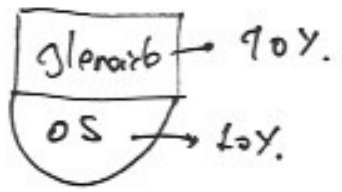
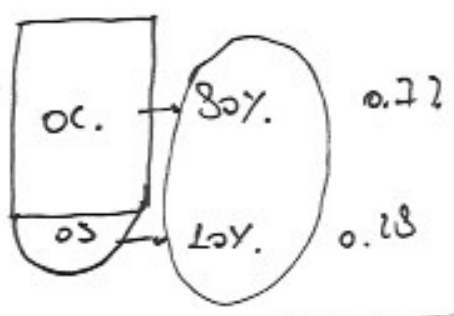
$f_{poc} : 0.8 : 0.9$

$f_{poc} : 1 = 0.8 : 0.9$

$f_{os} : 1 = 0.1 : 0.9$

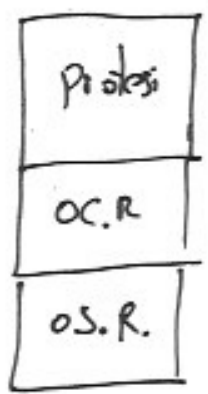
stela.

omero-glembirbo



$$E_z = \frac{E_{oc}^2 \cdot E_{os}}{0.88 E_{os}^2 + 0.12 E_{oc}^2}$$

$$E_{xy} = 0.88 E_{oc}^{xy} + 0.12 E_{os}$$



$$\left\{ \begin{aligned} \frac{1}{E_z} &= \frac{f_p}{E_p} + \frac{f_{oc.R}}{E_{oc.R}^2} + \frac{f_{os.R}}{E_{os.R}^2} \\ E_{xy} &= f_p E_p + f_{oc.R} E_{oc.R}^{xy} + f_{os.R} E_{os.R} \\ f_p + f_{oc.R} + f_{os.R} &= 1 \end{aligned} \right.$$

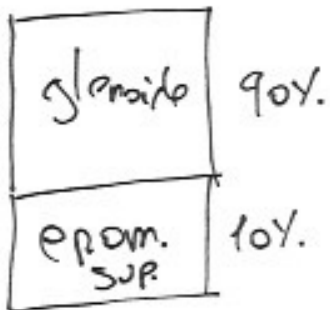
(6)



$$E_z = \frac{E_{ocra}^z \bar{E}_p}{f_p E_{ocra}^z + f_{ocra}^z E_{os}}$$

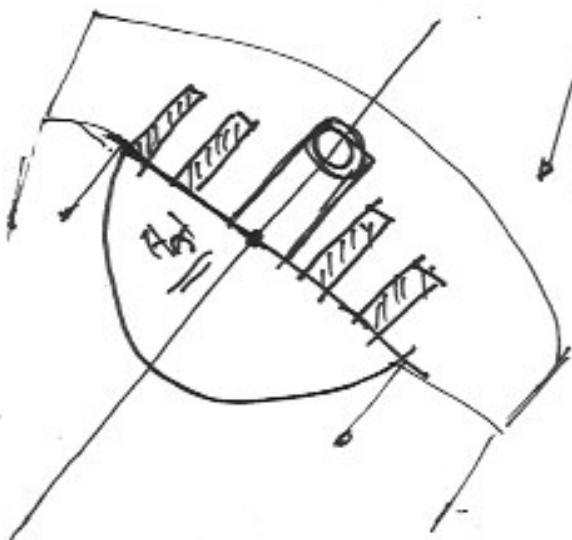
$$E_{xy} = f_p \bar{E}_p + f_{ocra} E_{ocra}^{xy}$$

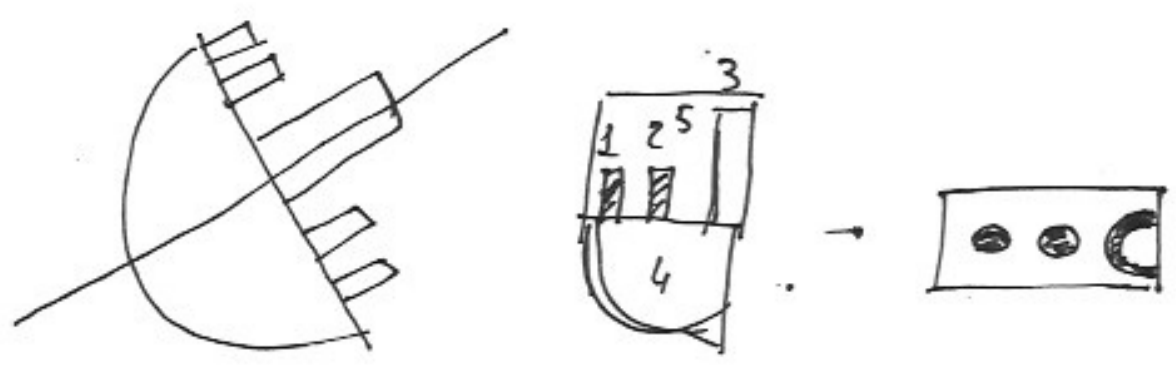
$$f_p + f_{ocra} = 1$$



$$\bar{E}_z^0 = \frac{\bar{E}_g^z E_{os}}{0.9 E_{os} + 0.1 \bar{E}_g^z}$$

$$E_{xy}^0 = 0.9 \bar{E}_g^{xy} + 0.1 \bar{E}_{os}$$

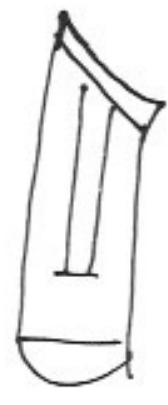




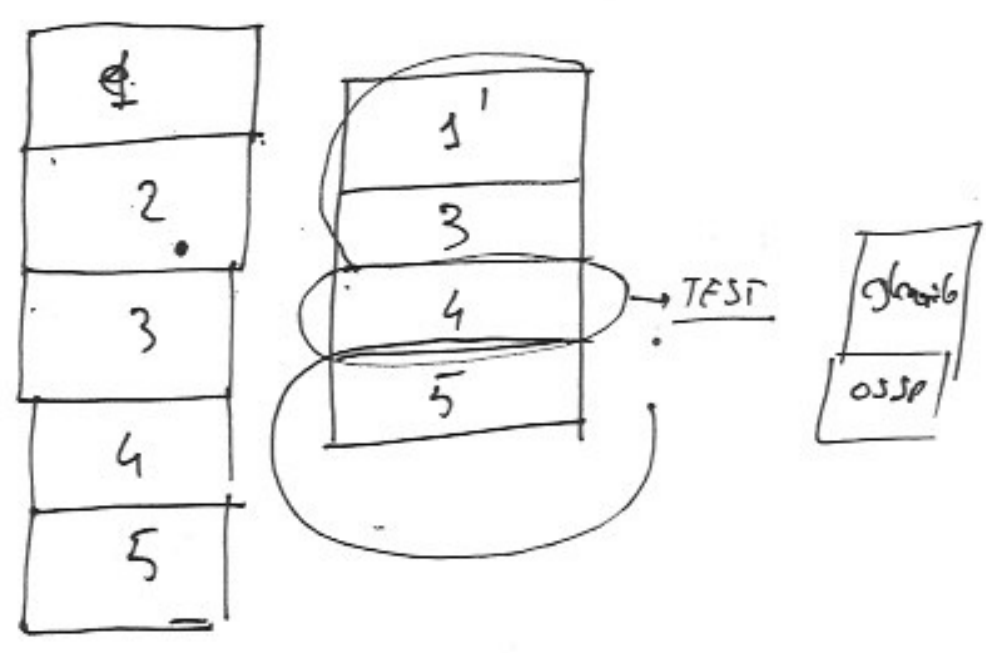
$\left\{ \begin{array}{l} 2 p.p., h.p.p \\ 2 int.p.v., 2 est.p.v., h.p.v \\ 2 test \rightarrow \end{array} \right.$

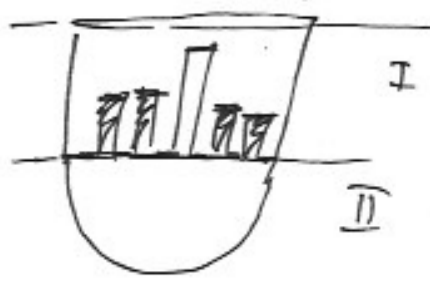
6 equazioni

$$2 glenab \leq 2 test \leq 2 om$$

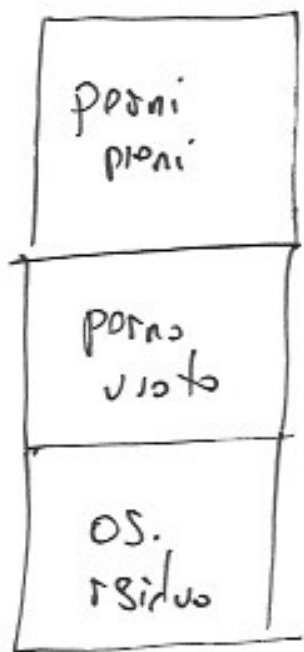


$$E_p^R = E_{op} (1-p)^d$$





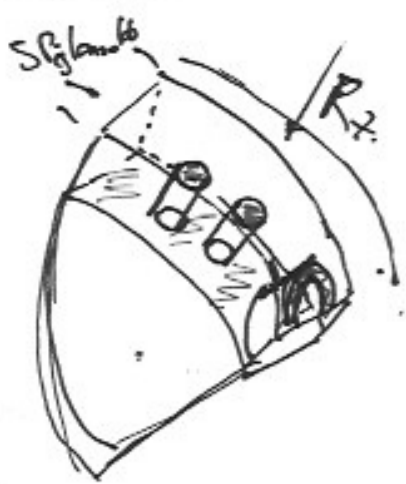
$$E_{pv} = E_0^p (1-p)^2$$



$$\frac{1}{E_z} = \frac{k_{p.p}}{E_{p.p}} + \frac{k_{p.v}}{E_{p.v}} + \frac{k_{oc.n}}{E_{oc.n}}$$

$$E_{xy} = k_{pp} E_{pp} + k_{pv} E_{pv} + k_{oc.n} E_{oc.n}^{xy}$$

$$k_{pp} + k_{pv} + k_{oc.n} = 1$$



$$\frac{R_z}{SP.gl \cdot R_{test}} = \frac{R_{xy}}{4\pi^2 p p h_{pp} + \pi^2 z_{ost} p v h_{pv} + \pi^2 z_{int} p v h_{pv}}$$

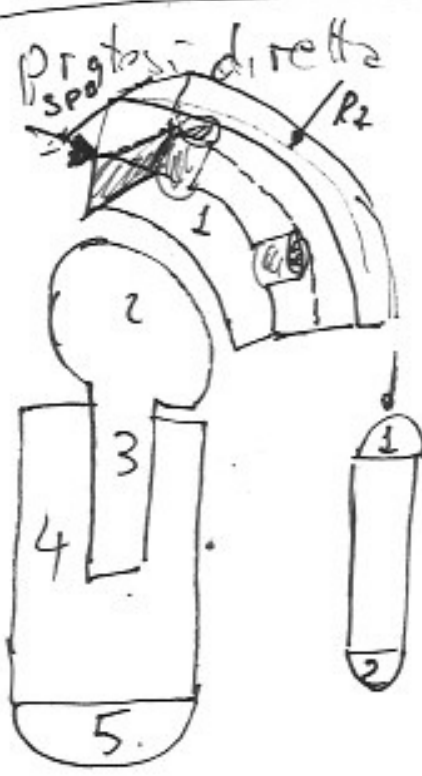
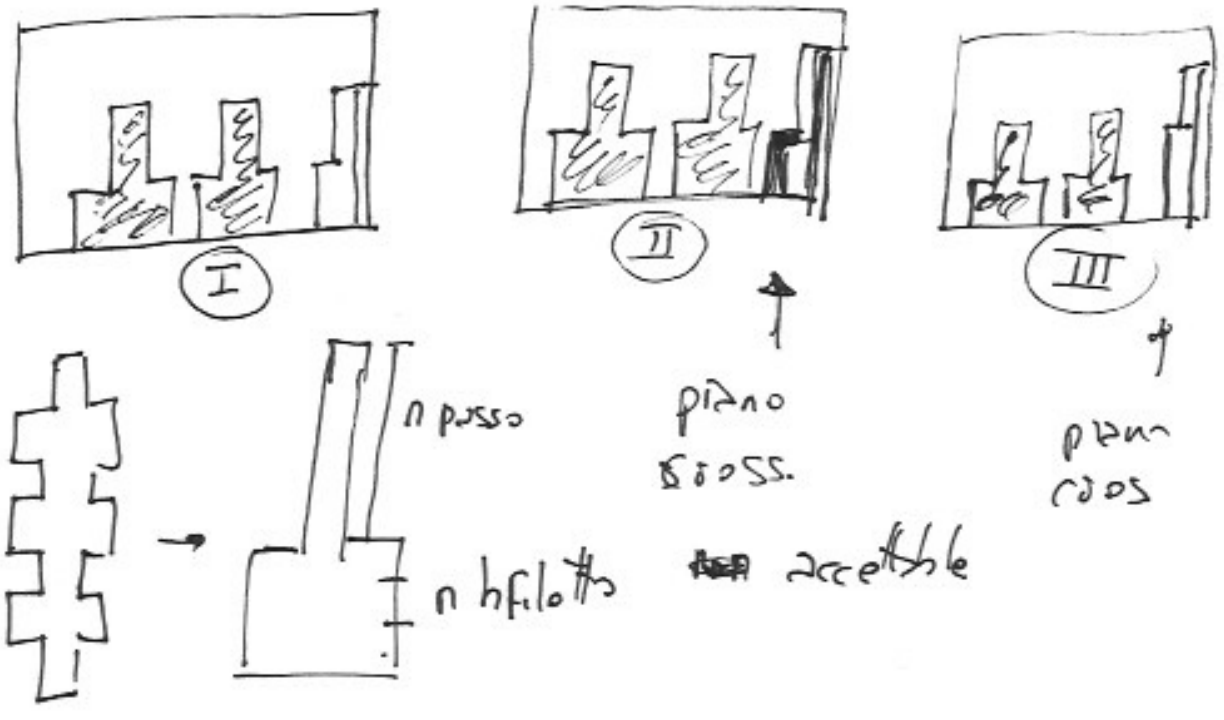
$$\frac{\pi}{\pi_{vs}} = \frac{P_T \cdot OB}{OA}$$

$$G_{ben} = \frac{\pi_{ben} \cdot z_{test}}{I_{ben}}$$

$$I = \frac{\pi}{4} (R_{ost}^4 - R_{int}^4)$$

$$\pi_{ben} = R_z \cdot z_{test}$$





$$E_{OSS. SANO} = E_{OSS. PROTASI}$$

$$E_{OSS. SANO}^z = \frac{Rz}{2\pi r_{epz}^2} \frac{1}{E_{OS}} + \frac{Rz}{\pi r_{om}^2} \frac{1}{E_{OS}} + \frac{Rz}{2\pi r_{epz}^2} \frac{1}{E_{OS}}$$

$$E_{OSS. SANO}^{xy} = \frac{Rxy}{\frac{2}{3} \pi r_{epz}^3 \frac{E_{OS}}{h_{epz}}} + \frac{Rxy}{2\pi r_{om} h_{om} \frac{E_{OS}}{h_{om}}} + \frac{Rxy}{\frac{2}{3} \pi r_{epz}^3 \frac{E_{OS}}{h_{epz}}}$$

$$E_z = \frac{Rz}{2 \cdot SP \cdot r_{test}^2 E_1} + \frac{Rz}{2\pi r_{test}^2} \cdot \frac{1}{E_2} + \frac{Rz}{\pi r_{st}^2} \cdot \frac{1}{E_3} + \frac{Rz}{\pi (r_{om}^2 - r_{st}^2)}$$

$$\cdot \frac{1}{E_{OCR}^z} + \frac{Rz}{2\pi r_{epz}^2} \cdot \frac{1}{E_{OSA}}$$

$$E_{xy} = \frac{R_{xy}}{S_{pgl.} \cdot l_{gl} + 4\pi r_p h_p} \cdot \frac{1}{E_1} + \frac{R_{xy}}{\frac{2}{3} \pi R_{test}^3} \cdot \frac{1}{E_2} + \frac{R_{xy}}{2\pi r_{st} h_{st}} \cdot \frac{1}{E_3} +$$

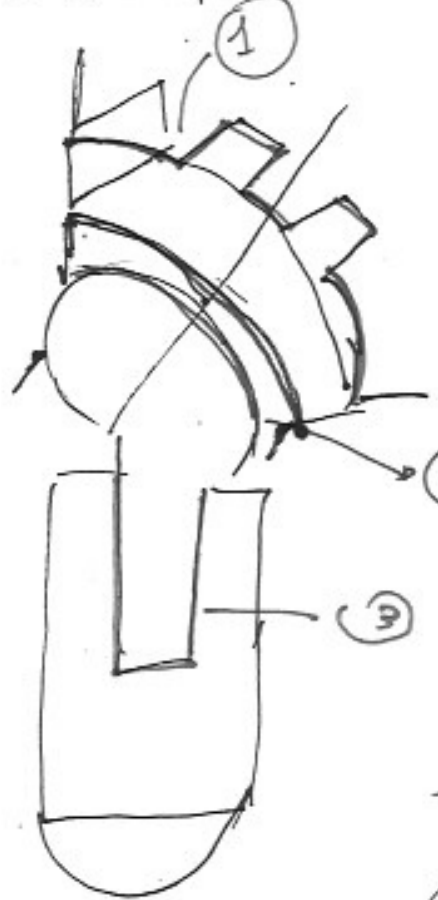
$$\frac{R_{xy}}{2\pi r_{om} h_{om}} \cdot \frac{1}{E_{oc?}} + \frac{R_{xy}}{\frac{2}{3} \pi \frac{R_{ep}^3}{h_{ep}}} \cdot \frac{1}{E_{os?}}$$

$R_p, h_p, J_{glan}$   
 2 test  
 2 stela,  $h_{stela}$

①  $\frac{R_z}{r \cdot S_{p \text{ test}}} = \frac{R_{xy}}{(S_{pgl.} \cdot l_{gl} + 4\pi r_p h_p)}$

②  $\frac{R_z}{2\pi r_{test}^2} = \frac{R_{xy}}{\frac{2}{3} \pi \frac{r_{test}^3}{h_{test}}}$

③  $\frac{R_z}{\pi r_{st}^2} = \frac{R_{xy}}{2\pi r_{st} h_{st}}$



---


$$\sigma_T = \frac{M_{tor.} \cdot braccio}{J} = \frac{R_z}{2\pi R_{test}^2}$$

$$\sigma_b = \frac{M_b \cdot braccio}{I} = \frac{M_x}{S_{pgl.} \cdot R_{test}}$$

$$G_{ben} = \frac{M_{ben} \cdot r_{test}}{I_{ben}}$$

$$I_{ben} = \frac{\pi}{4} (R_{est}^4 - R_{int}^4)$$

$$M_{ben} = R \cdot r_{test}$$

$$G_{ben} = \frac{R \cdot r_{test}}{\frac{\pi}{4} (R_{est}^4 - R_{int}^4)} = \frac{4 R r_{test}}{\pi (R_{est}^4 - R_{int}^4)}$$



poznipani:  
4 incognite

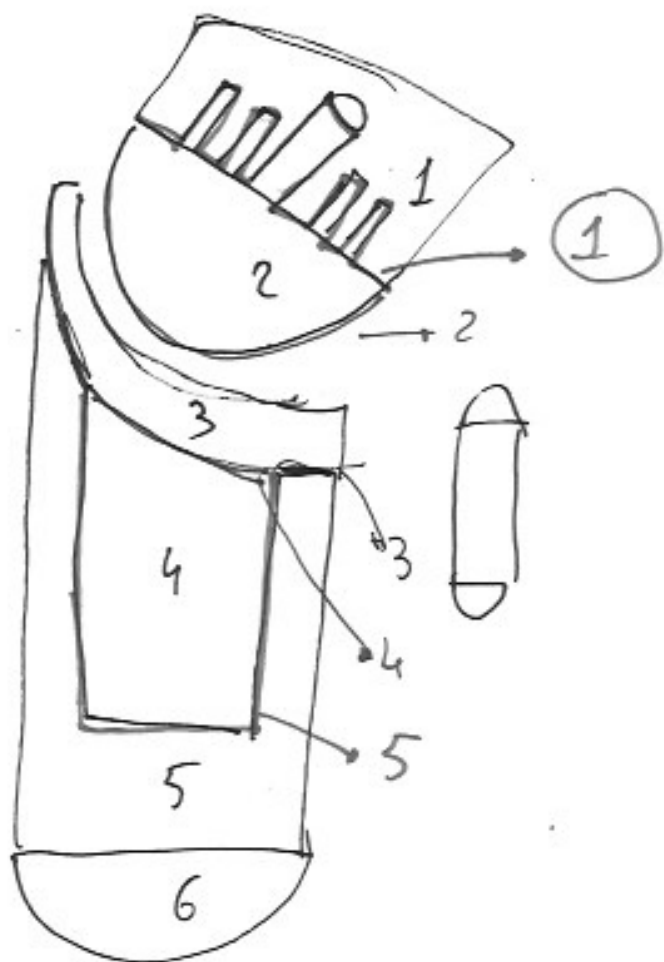
poznovob  
5 incognite

2 incognite

3 incognite



huite = n pass + n hf. b/b



- 1)  $z_{pp}, h_{pp}, z_{int_{pv}}, z_{est_{pv}}, h_{pv}$
- 2)  $z_{test}$  → 1
- 3)  $z_3$  → 1
- 4)  $z_{st}, h_{st}$

9  
 8