Tabelul 3.1

Criterii de clasificare	Categorii
Dupa forma axei geometrice	Arbori si osii cu axa dreapta
	Arbori si osii cu axa curba
	Arbori si osii cu axa frânta (arbori cotiti)
Dupa variatia sectiunii	Arbori si osii de sectiune constanta
	Arbori si osii de sectiune variabila (cazul cel mai frecvent)
Dupa forma sectiunii	Arbori si osii cu sectiune circulara plina
	Arbori si osii cu sectiune inelara

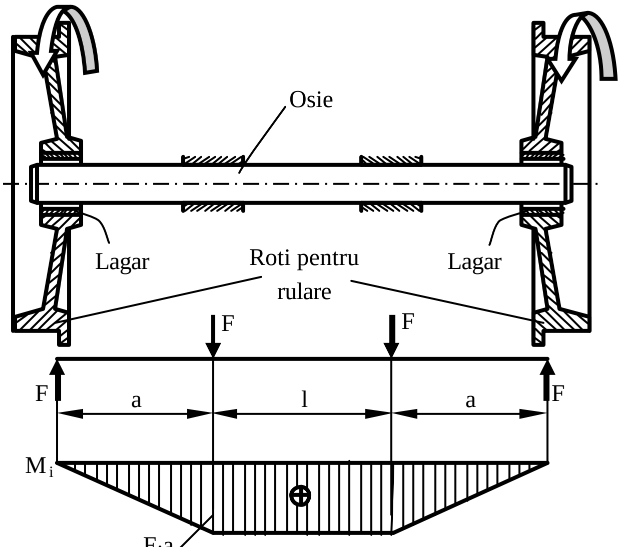


Figura 3.1

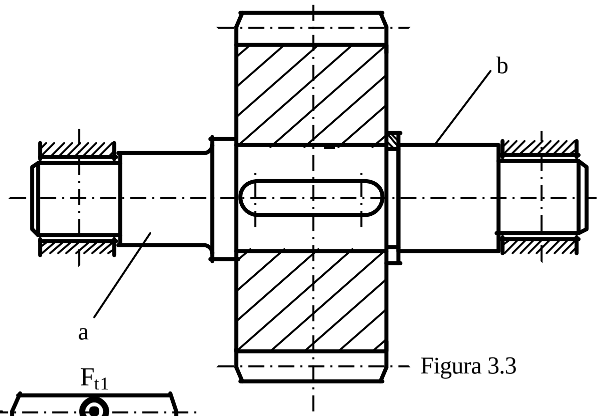


Figura 3.3

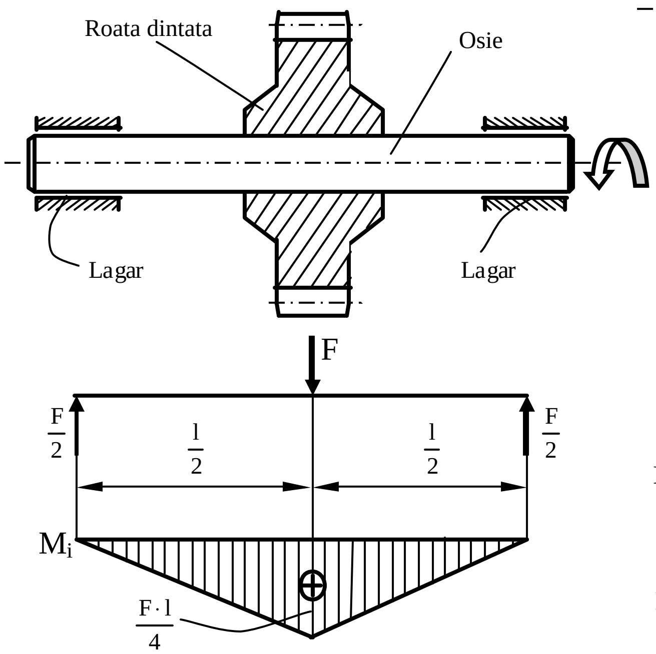


Figura 3.2

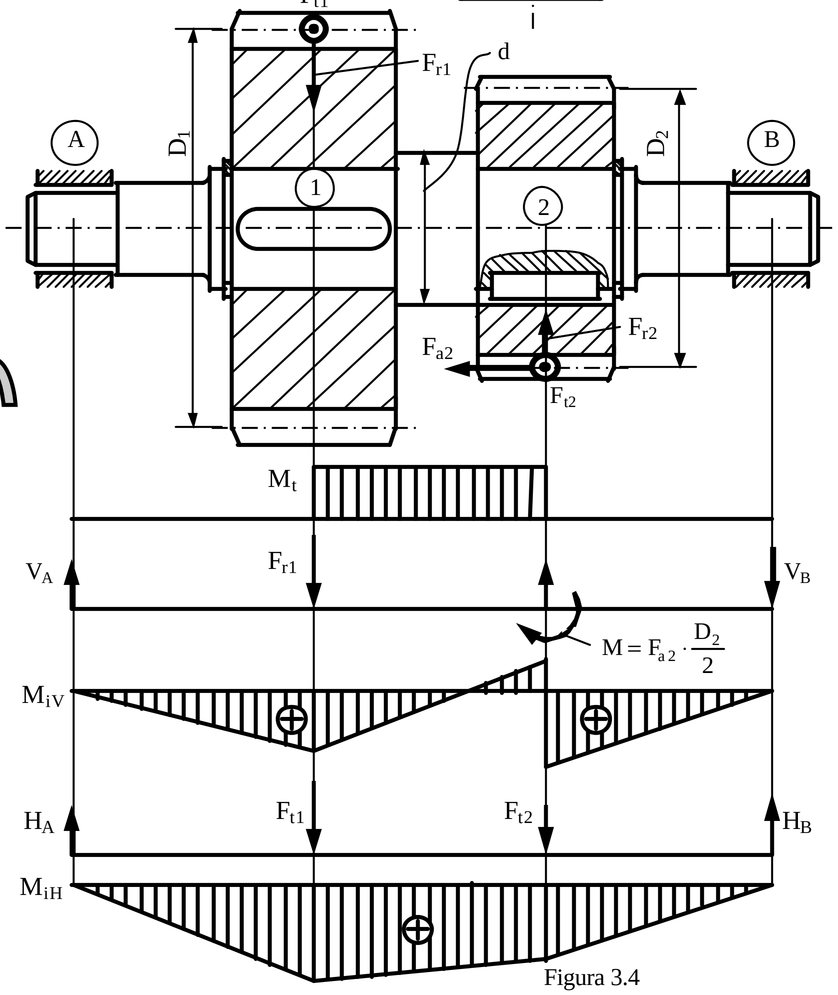


Figura 3.4

$$\sigma = \frac{\frac{F}{2} \cdot \frac{l}{2}}{\frac{\pi \cdot d^3}{32}} \le \sigma_{a\,i} \qquad (3.1)$$

$$\frac{\pi \cdot d^3}{32} \cdot \frac{F}{2} \cdot l = \frac{\pi \cdot d_x^3}{32} \cdot \frac{F}{2} \cdot x \qquad (3.2)$$

$$d_x = d \cdot \sqrt[3]{\frac{l}{x}} \qquad (3.3)$$

$$M_t = F_{t1} \cdot \frac{D_1}{2};\; M_t = F_{t2} \cdot \frac{D_2}{2}$$

$$M_t = 9{,}55 \cdot 10^6 \cdot \frac{P}{n} \qquad (3.4)$$

$$d \geq \sqrt[3]{\frac{16 \cdot M_t}{\pi \cdot \tau_{at}}} \tag{3.5}$$

$$d \geq \sqrt[4]{\frac{32 \cdot M_t \cdot l}{\pi \cdot G \cdot \theta_a}},\ \theta_a = \left(\frac{1}{4} \ldots \frac{1}{2}\right)^{\circ}\!/_{m} \text{ pentru arbori obisnuiti si } \theta_a = 5\ '/_{m} \text{ pentru arbori de masini-unelte.} \tag{3.6}$$

$$M_{ech} = \sqrt{M_{i\,tot}^2 + (\alpha \cdot M_t)^2};\quad M_{i\,tot} = \sqrt{M_{iV}^2 + M_{iH}^2} \tag{3.7}$$

$$\alpha = \frac{\sigma_{ai\,III} \leftarrow \text{Ciclul încovoierii}}{\sigma_{ai\,I,\,II} \leftarrow \text{Ciclul torsiunii}} \tag{3.8}$$

$$\sigma_{ech} = \frac{32 \cdot M_{ech}}{\pi \cdot d^3} \leq \sigma_{ai\,III} \tag{3.9}$$

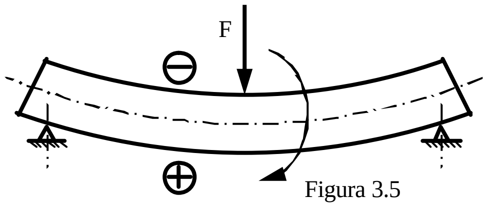


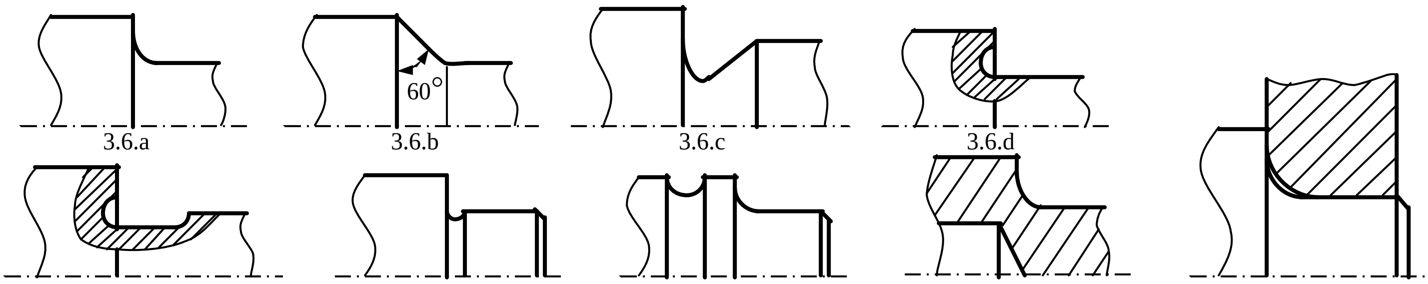
Figura 3.5

$$\sigma_V = \sigma_{i\,max} = \frac{32 \cdot M_{i\,max(total)}}{\pi \cdot d^3};\quad \sigma_m = 0 \tag{3.10}$$

$$\tau_V = \tau_m = \frac{\tau_{max}}{2};\quad \tau_{max} = \frac{16 \cdot M_t}{\pi \cdot d^3} \tag{3.11}$$

$$c_\sigma = \frac{\sigma_{-1}}{\frac{\beta_{K\sigma}}{\varepsilon_\sigma \cdot \gamma} \cdot \sigma_V};\qquad c_\tau = \frac{1}{\frac{\beta_{K\tau}}{\varepsilon_\tau \cdot \gamma} \cdot \frac{\tau_V}{\tau_{-1}} + \frac{\tau_m}{\tau_c}} \tag{3.12}$$

$$c = \frac{c_\sigma \cdot c_\tau}{\sqrt{c_\sigma^2 + c_\tau^2}} \geq c_a \qquad (1{,}5 \ldots 2{,}5) \tag{3.13}$$



3.6.a 3.6.b 3.6.c 3.6.d

3.6.e 3.6.f 3.6.g 3.6.h 3.6.i

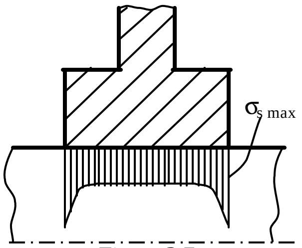


Figura 3.7

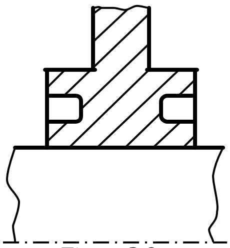


Figura 3.8

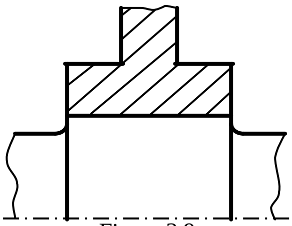


Figura 3.9

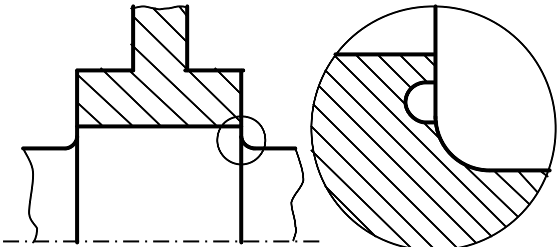


Figura 3.10

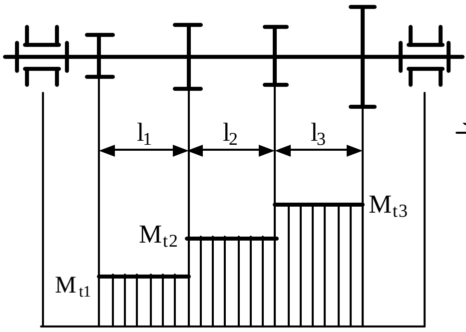


Figura 3.11

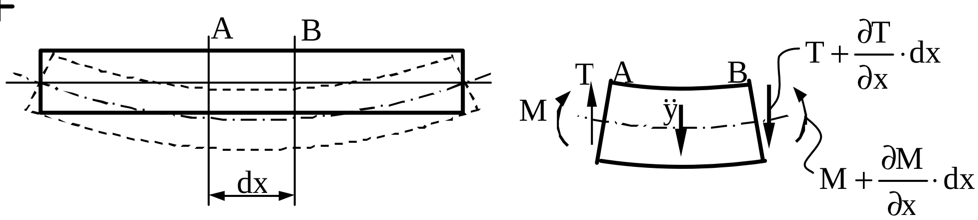


Figura 3.12

$$\theta = \frac{1}{G} \cdot \left(\frac{M_{t1} \cdot l_1}{I_{p1}} + \frac{M_{t2} \cdot l_2}{I_{p2}} + \cdots\right) \tag{3.14}$$

$$\frac{\partial T}{\partial x} \cdot dx + F_i = 0 \tag{3.15}$$

$$T = \frac{\partial M(x)}{\partial x};\quad F_i = -A \cdot dx \cdot \rho \cdot \frac{\partial^2 y}{\partial t^2} \tag{3.16}$$

$$\frac{\partial^2 M(x)}{\partial x^2} = \rho \cdot A \cdot \frac{\partial^2 y}{\partial t^2} \tag{3.17}$$

$$\frac{\partial^2 y}{\partial x^2} = -\frac{M(x)}{E \cdot I_{zz}} \tag{3.18}$$

$$M(x) = -E \cdot I_{zz} \cdot \frac{\partial^2 y}{\partial x^2} \tag{3.19}$$

$$-\frac{\partial^2}{\partial x^2} \cdot \left[E \cdot I_{zz} \cdot \frac{\partial^2 y}{\partial x^2} \right] = \rho \cdot A \cdot \frac{\partial^2 y}{\partial t^2} \tag{3.20}$$

$$\frac{d^4 X}{dx^4} = k^4 \cdot X \tag{3.21}$$

$$k^4 = \frac{\rho \cdot A}{E \cdot I_{zz}} \cdot \omega_n^2 \text{ ,cu solutia: } X = A \cdot [\cos(k \cdot x) + ch(k \cdot x)] + B \cdot [\cos(k \cdot x) - ch(k \cdot x)] + C \cdot [\sin(k \cdot x) + sh(k \cdot x)] + D \cdot [\sin(k \cdot x) - sh(k \cdot x)] \tag{3.22}$$

$$\omega_n = k^2 \cdot \sqrt{\frac{E \cdot I_{zz}}{\rho \cdot A}} \tag{3.23}$$

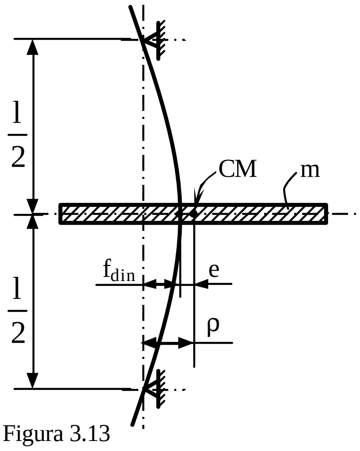


Figura 3.13

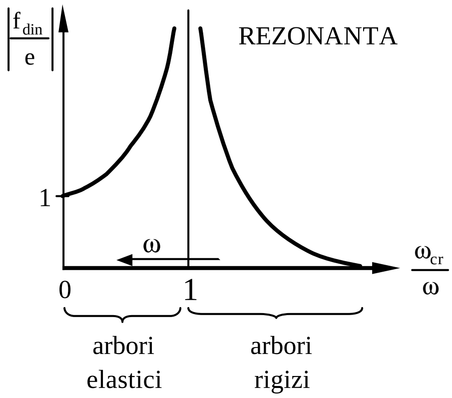


Figura 3.14

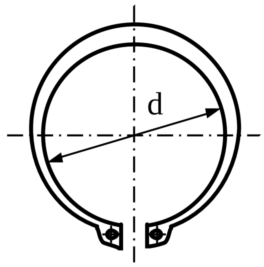


Figura 3.15

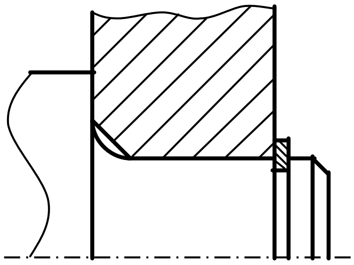


Figura 3.16

$$F_{cf} = m \cdot \omega^2 \cdot \rho = m \cdot \omega^2 \cdot (f_{din} + e) \tag{3.24}$$

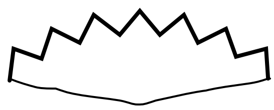
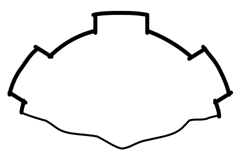
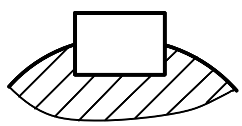
$$F_{el} = c \cdot f_{din}; \qquad c = \frac{48 \cdot E \cdot I}{l^3} \tag{3.25}$$

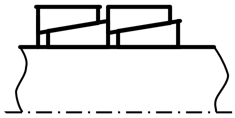
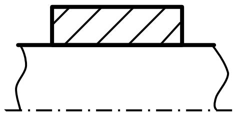
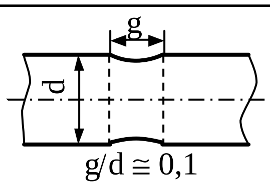
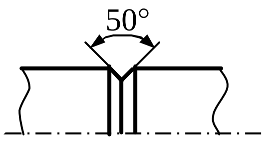
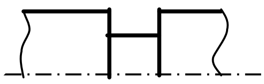
$$f_{din} = \frac{m \cdot \omega^2 \cdot e}{c - m \cdot \omega^2} \tag{3.26}$$

$$\omega_{cr} = \sqrt{\frac{c}{m}} \tag{3.27}$$

$$n_{cr} = \frac{30}{\pi} \cdot \sqrt{\frac{g}{f_{static}}} \tag{3.28}$$

Tabelul 3.2

Concentratorul de tensiuni	**Reprezentarea grafica**	b_{ks}	b_{kt}
Caneluri triunghiulare		1,4	3
Caneluri dreptunghiulare		1,3	1,5 … 2,7
Canal pentru pana paralela		1,7 (freza disc) 2,5 (freza deget)	1,9

Strângerea cu pene inelare		1,8	1,2
Butuc presat		1,7 … 2	1,5
Gaura transversala		1,7	2,5
Crestatura inelara		2,5	–
Canal inelar		2,2	1,8