ASAMBLARI NEDEMONTABILE

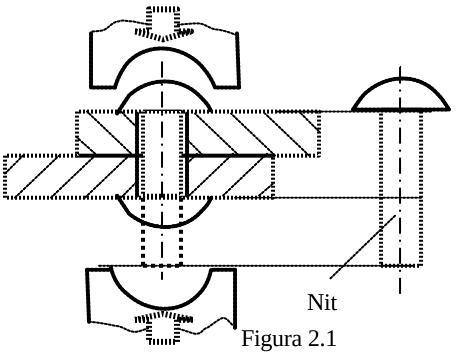

Figura 2.1

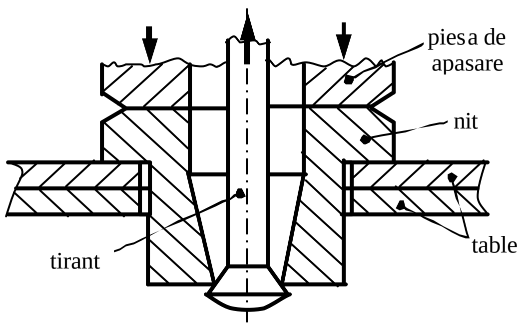

Figura 2.2.a

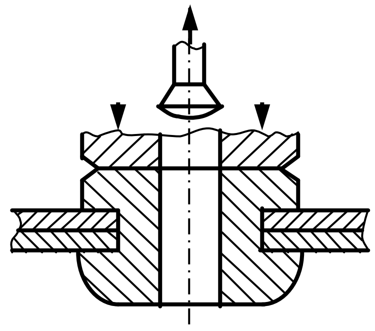
Figura 2.2.b

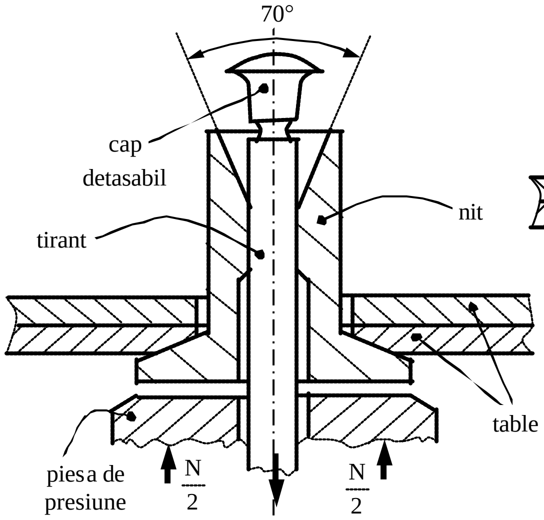

Figura 2.3.a

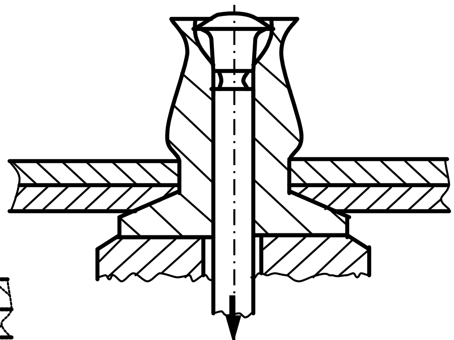
Figura 2.3.b

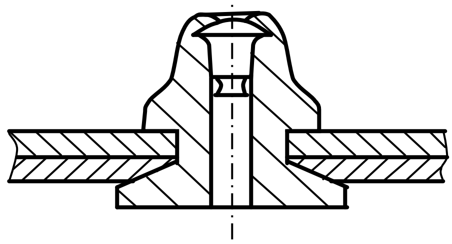
Figura 2.3.c

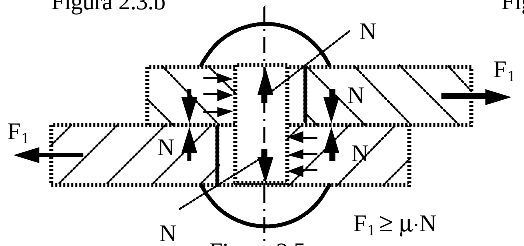

Figura 2.5

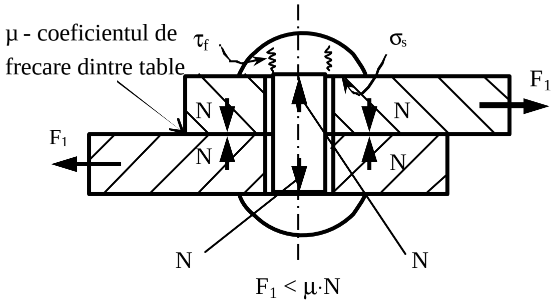

Figura 2.4

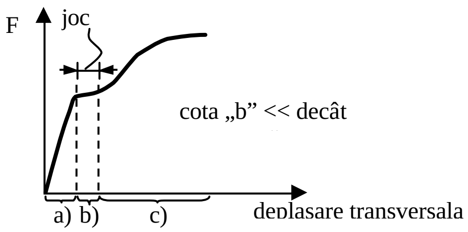

Figura 2.7

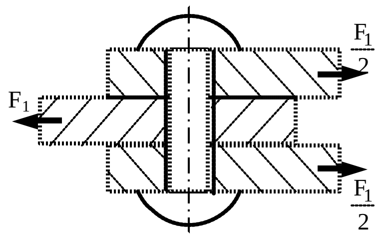

Figura 2.6.a

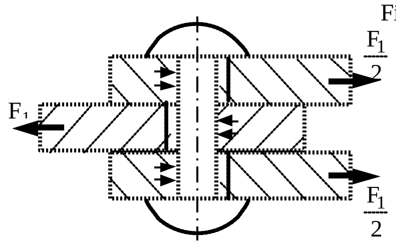

Figura 2.6.b

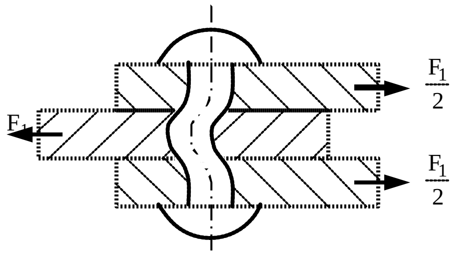

Figura 2.6 c)

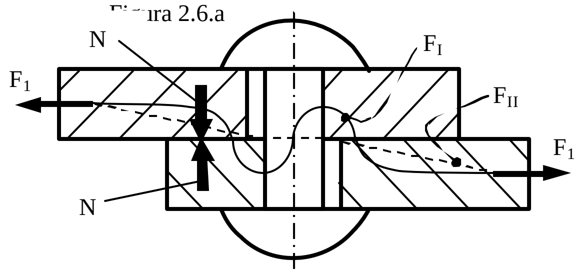

Figura 2.8

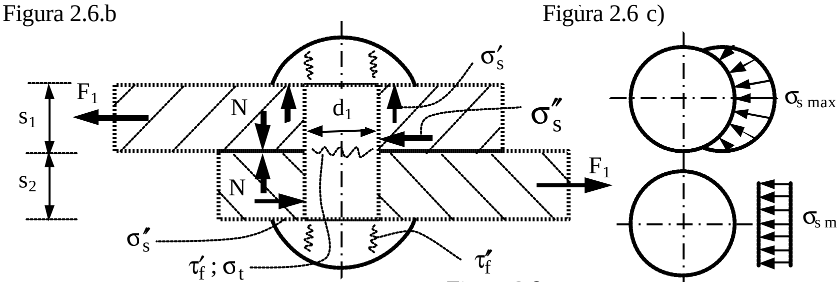

Figura 2.9

$$\tau_f = \frac{F_1}{\frac{\pi \cdot d_1^2}{4}} \le \tau_{af} \qquad (2.1)$$

$$\sigma_s = \frac{F_1}{s_{min} \cdot d_1} \le \sigma_{as};$$ σ_{as} pentru materialul cel mai putin rezistent (nit sau tabla). (2.2)

$$F_1 = 2 \cdot \left(e - \frac{d_1}{2}\right) \cdot s_{min} \cdot \tau_f^{*)}$$ *) tensiune de forfecare în table (2.3)

$$\tau_f^{*)} \leq \tau_{af}^{*)}$$

$$F_1 = (t - d_1) \cdot s_{min} \cdot \sigma_t^{*)}$$ *) tensiune de tractiune în table (2.4)

$$\sigma_t^{*)} \leq \sigma_{at}^{*)}$$

$$F_1 = 2 \cdot (e_1 - d_1) \cdot s_{min} \cdot \tau_f^{**)}$$ **) – tensiunea de forfecare longitudinala a tablelor (2.5)

$$\tau_f^{**)} \leq \tau_{af}^{*)}$$

$$F_0 = \frac{F}{i} \tag{2.6}$$

$$FL = \sum_{x=1}^{n} i_x \cdot F_x \cdot r_x ; \qquad n = 2$$

$$\frac{F_1}{r_1} = \frac{F_2}{r_2}; \qquad F_2 = F_{max}$$

$$FL = i_1 \cdot F_1 \cdot r_1 + i_2 \cdot F_2 \cdot r_2 = i_1 \cdot \frac{r_1}{r_2} \cdot F_2 \cdot r_1 + i_2 \cdot F_2 \cdot r_2 \tag{2.7}$$

$$FL = F_2 \cdot (i_1 \cdot \frac{r_1^2}{r_2} + i_2 \cdot r_2) \Rightarrow F_2 \text{, respectiv } F_1$$

$$F_{max} = \sqrt{F_0^2 + F_2^2 + 2 \cdot F_0 \cdot F_2 \cdot \cos(F_0, F_2)} \tag{2.8}$$

$$\tau_{af} = (0{,}6...0{,}7) \cdot \sigma_{at}$$
$$\sigma_{as} = (2...2{,}5) \cdot \tau_{af} \tag{2.9}$$

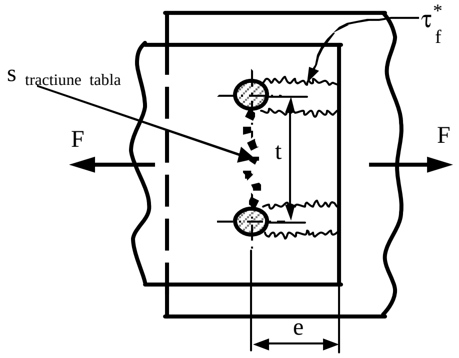

Figura 2.10

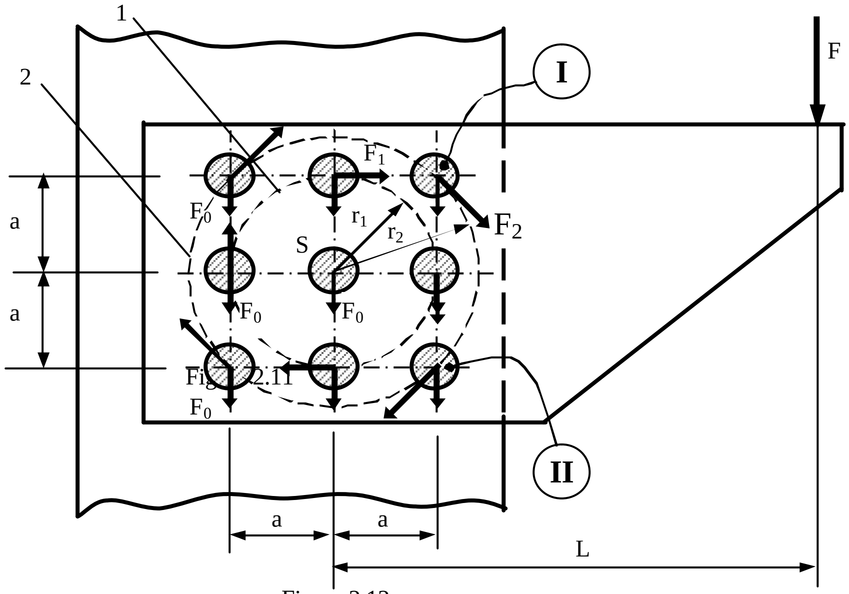

Figura 2.12

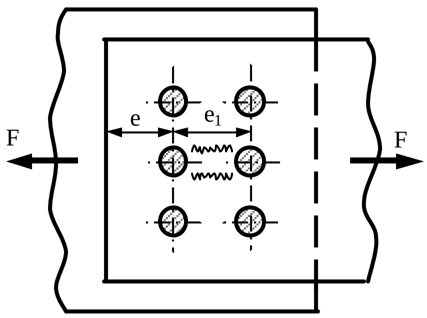

Figura 2.11

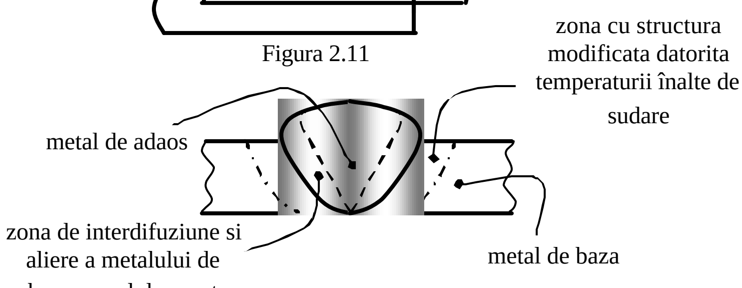

Figura 2.13

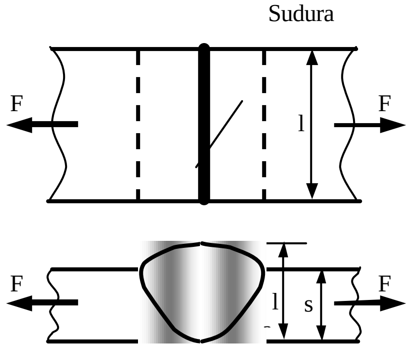

Figura 2.14

$$\sigma_{ts} = \frac{F}{l_s \cdot a} \leq \sigma_{as}$$
$$l_s = l - 2 \cdot s \tag{2.10}$$

$$\sigma_i = \frac{M}{\frac{a \cdot l^2}{6}} \le \sigma_{a\,i} \qquad (2.11)$$

$$F = l \cdot a \cdot \sigma_{a\,sudura} = l \cdot a \cdot \varphi \cdot \sigma_{a\ tabla} = l \cdot s \cdot \sigma_{a\,tabla}$$

$$\Rightarrow a = \frac{s}{\varphi},\ \ \text{deci}\ \ a \ge s \qquad (2.12)$$

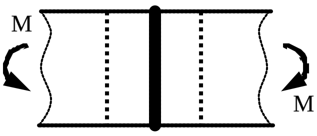

Figura 2.15

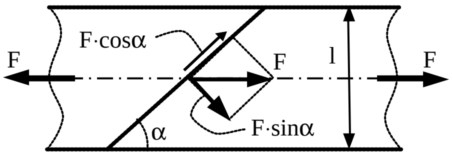

Figura 2.16

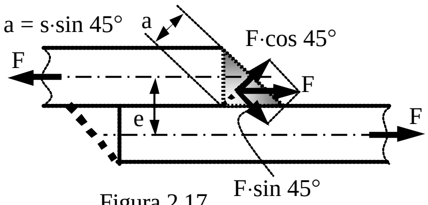

Figura 2.17

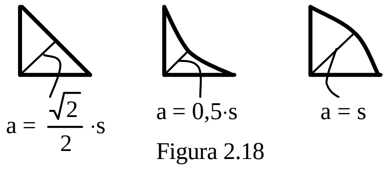

Figura 2.18

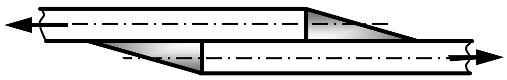
Figura 2.19

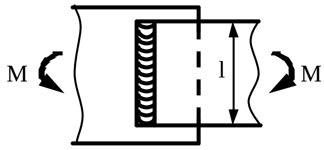

Figura 2.20

$$\left.\begin{aligned} \sigma_{ts} &= \frac{F \cdot \sin\alpha}{l_s \cdot s} \\ \tau_{fs} &= \frac{F \cdot \cos\alpha}{l_s \cdot s} \end{aligned}\right\} \quad l_s = \frac{l}{\sin\alpha} - 2 \cdot s \qquad (2.13)$$

$$\sigma_{echs} = \sqrt{\sigma_{ts}^2 + 3 \cdot \tau_{fs}^2} \le \sigma_{as} \qquad (2.14)$$

$$\sigma_{ts} = \frac{F}{l_s \cdot a} \cdot \sin 45° = \frac{\sqrt{2}}{2} \cdot \frac{F}{l_s \cdot a}$$

$$\tau_{fs} = \frac{F}{l_s \cdot a} \cdot \cos 45° = \frac{\sqrt{2}}{2} \cdot \frac{F}{l_s \cdot a} \qquad (2.15)$$

$$\sigma_{ech} = \sqrt{\sigma_{ts}^2 + \tau_{fs}^2} = \frac{F}{l_s \cdot a} \le \sigma_{as}$$

$$\sigma_{ts} = \frac{\sqrt{2}}{4} \cdot \frac{F}{l_s \cdot a}$$

$$\tau_{fs} = \frac{\sqrt{2}}{4} \cdot \frac{F}{l_s \cdot a} \qquad (2.16)$$

$$\sigma_{ech} = \frac{1}{2} \cdot \frac{F}{l_s \cdot a} \le \sigma_{as}$$

$$\tau_{fs} = \frac{F}{l_s \cdot a} \le \tau_{afs}\ \text{pentru sudura monofrontala} \qquad (2.17)$$

$$\tau_{fs} = \frac{1}{2} \cdot \frac{F}{l_s \cdot a} \le \tau_{afs}\ \text{pentru sudura bifrontala} \qquad (2.18)$$

$$\sigma_{is} = \frac{M}{W_s} \le \sigma_{ais} \qquad (2.19)$$

$$W_s = \frac{a \cdot l_s^2}{6} \quad \text{pentru sudura monofrontala} \qquad (2.20)$$

$$W_s = 2 \cdot \frac{a \cdot l_s^2}{6} \quad \text{pentru sudura bifrontala} \qquad (2.21)$$

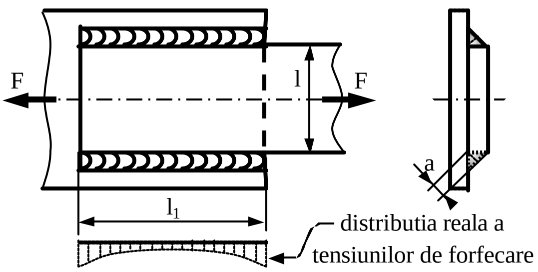

Figura 2.21

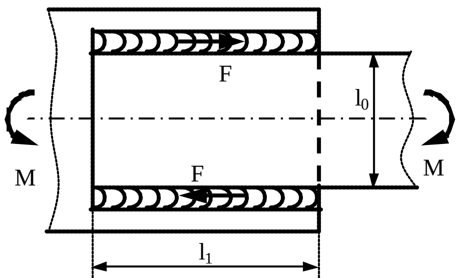

Figura 2.22

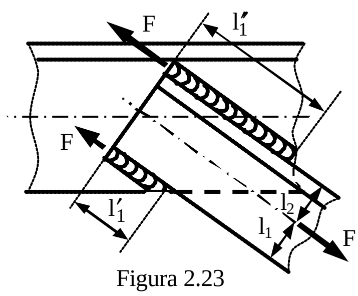

Figura 2.23

$$\tau_{fs} = \frac{F}{2 \cdot l_{s1} \cdot a} \le \tau_{afs}$$
$$l_{s1} = l_1 - 2 \cdot s \qquad (2.22)$$
$$a = 0{,}7 \cdot s$$

$$F \cdot l_0 = M \Rightarrow F = \frac{M}{l_0}$$
$$\tau_{fs} = \frac{F}{l_{s1} \cdot a} \le \tau_{afs} \qquad (2.23)$$
$$l_{s1} = l_1 - 2 \cdot s$$

$$\begin{cases} F_1 + F_2 = F \\ F_1 \cdot l_1 = F_2 \cdot l_2 \end{cases} \Rightarrow \begin{cases} F_1 = F \cdot \dfrac{l_2}{l_1 + l_2} \\ F_2 = F \cdot \dfrac{l_1}{l_1 + l_2} \end{cases} \qquad (2.24)$$

$$l'_{1s} = \frac{F_1}{0{,}7 \cdot s \cdot \tau_{afs}} \qquad (2.25)$$

$$l''_{1s} = \frac{F_2}{0{,}7 \cdot s \cdot \tau_{afs}} \qquad (2.26)$$

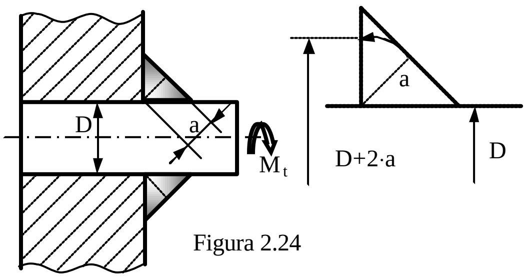

Figura 2.24

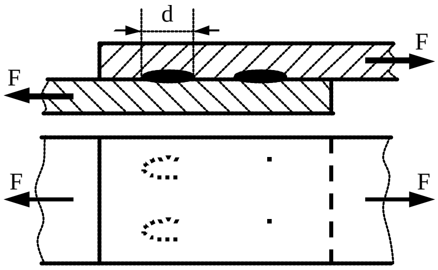

Figura 2.25

$$\tau_{ts} = \frac{M_t}{W_{ps}} \le \tau_{ats} \qquad (2.27)$$

$$W_{ps} = \frac{\pi \cdot \left[(D + 2 \cdot a)^4 - D^4\right]}{16 \cdot (D + 2 \cdot a)} \qquad (2.28)$$

$$\tau_{fs} = \frac{F}{n \cdot \dfrac{\pi \cdot d^2}{4}} \le \tau_{afs} \qquad (2.29)$$

$F_c = \beta_1 \cdot \beta_2 \cdot \beta_3 \cdot F;$

$M_c = \beta_1 \cdot \beta_2 \cdot \beta_3 \cdot M;$

$\beta_1 = 1 \cdots 1{,}3$ - dat de gradul de cunoastere a eforturilor;

$\beta_2 = 1 \cdots 3$ - tine cont de prezenta socurilor;

$\beta_3 = 1{,}2 \cdots 1{,}5$ - coeficient de importanta a asamblarii.

$\sigma_{as} = k_0 \cdot k_1 \cdot \sigma_a$;

σ_a - rezistenta admisibila a materialului de baza;

k_0 - coeficient de calitate;

k_1 - coeficient care tine cont de forma sectiunii si de solicitare (Tabelul 2.1).

Tabelul 2.1

Tipul îmbinarii	**Solicitarea**	**k_1**
Cap la cap	- tractiune - compresiune - încovoiere - forfecare	0,75 0,85 ... 0,9 0,8 0,65
De colt	Orice tip de solicitare	0,65

Tabelul 2.2

Modul de executare	**Caracteristici**	**Domenii de aplicare**
Cu ciocanul de lipit	Ciocanul se încalzeste la o temperatura mai mare decât cea la care se topeste aliajul de lipit.	Lipituri moi (unicate, electrotehnica).
Cu flacara (lampa de mâna)	Lampa de mâna sau flacara oxiacetilenica.	Otel, cupru sau aliaje. Piese mari, serie mare.
Cu rezistente electrice (efect Joule)	Electrozi de Cu, pentru a se evita supraîncalzirile locale. Timp redus de încalzire.	Lipituri moi sau tari.
Cufundarea în baie de sare topita	Încalzirea baii se face cu electrozi de grafit. Piesele de	Cu si aliajele sale (unicate sau serie).

Modul de executare	Caracteristici	Domenii de aplicare
(baie de aliaj de lipit)	asamblat se introduc în baie în zona de lipire.	Productivitate mare.
Prin inductie	Locul de lipit este încalzit prin curent electric variabil.	Productie în flux continuu (serie mare). Pentru materiale feromagnetice.
Încalzire în cuptor	Se introduce toata piesa dupa ce, în prealabil, s-a depus materialul de adaos. În cuptor exista atmosfera protectoare de gaz.	Lipituri moi sau tari, serie mare
Cu ultrasunete	Aliajul topit difuzeaza mai usor.	Pentru Al, Cu, Ag, Mg, Ge.
Cu raze laser	Laser YAG, rubin sau CO_2. Proces automatizat.	Electronica
Cu flux reactiv de lipire	Fluxul contine clorura de zinc încalzita la 345÷380°C. Aceasta reactioneaza cu Al (material de baza) si depune Zn pe rost.	Aluminiu (metoda unica de lipire a aluminiului).

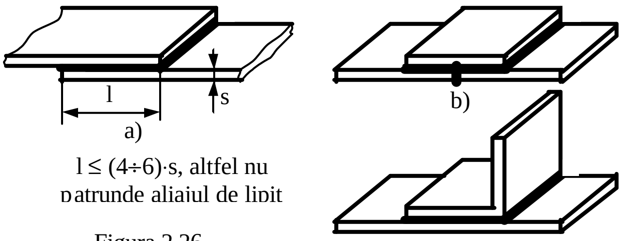

Figura 2.26

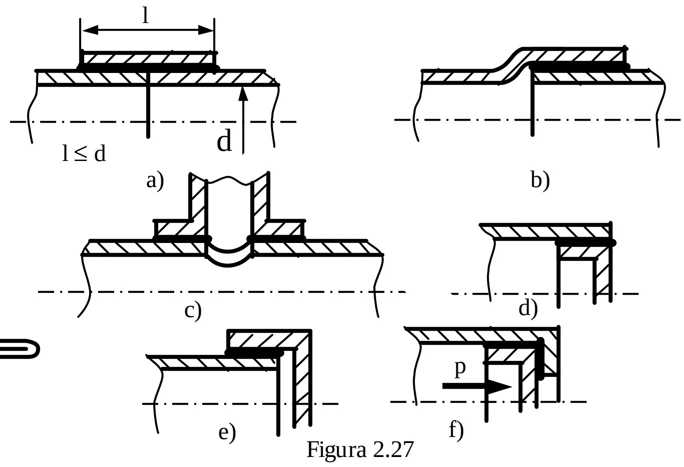

Figura 2.27

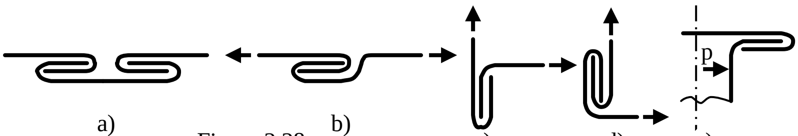

Figura 2.28

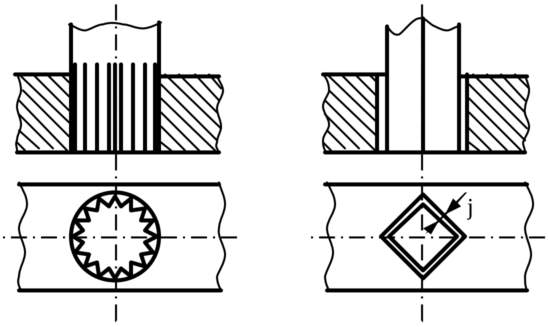

Figura 2.29

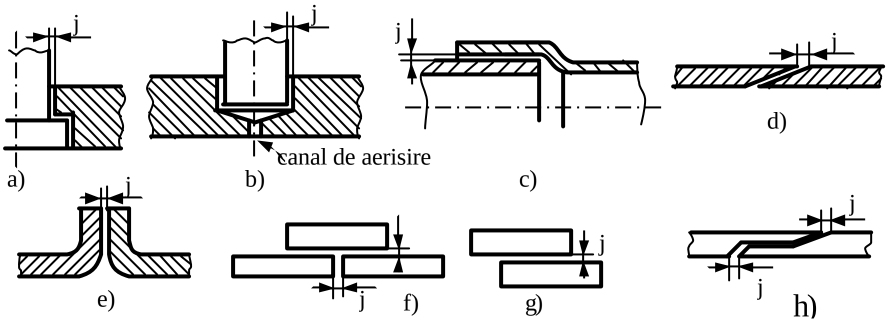

Figura 2.30

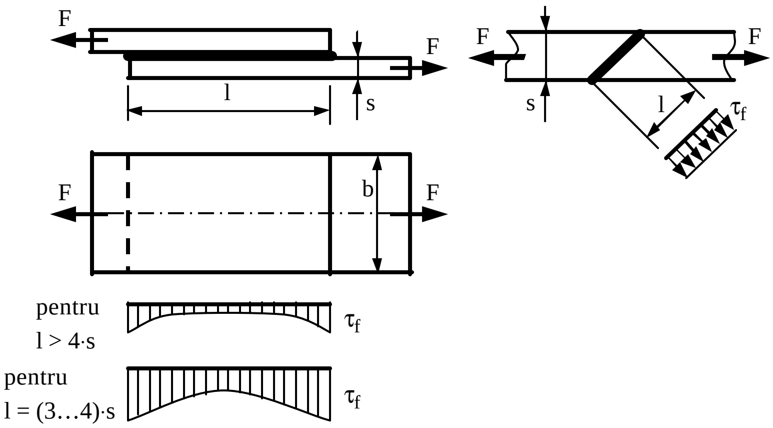

Figura 2.31

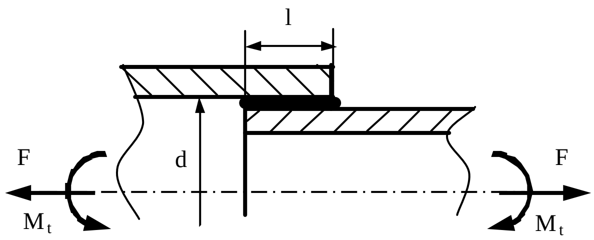

Figura 2.32

$$\tau_f = \frac{F}{b \cdot l} \le \tau_{af}\text{ ; } \tau_{af} \text{ determinat experimental} \qquad (2.30)$$

$$\tau_f' = \frac{F}{\pi \cdot d \cdot l} \le \tau_{af}$$

$$\tau_f'' = \frac{2 \cdot M_t}{d} \cdot \frac{1}{\pi \cdot d \cdot l} \le \tau_{af} \qquad (2.31)$$

$$\tau_{af} = \frac{\tau_r}{c}; \qquad c = 2...3$$

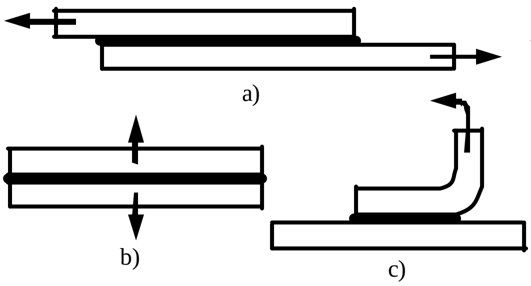

Figura 2.33

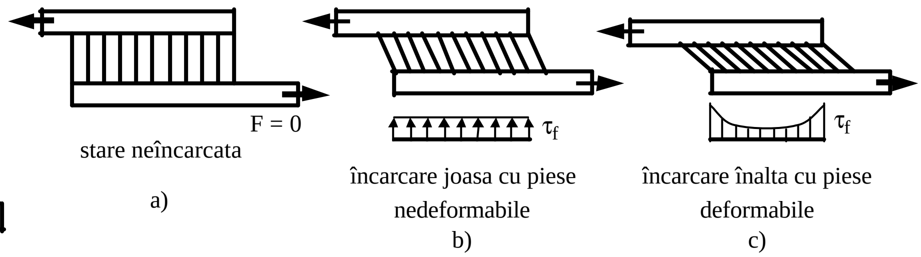

Figura 2.34

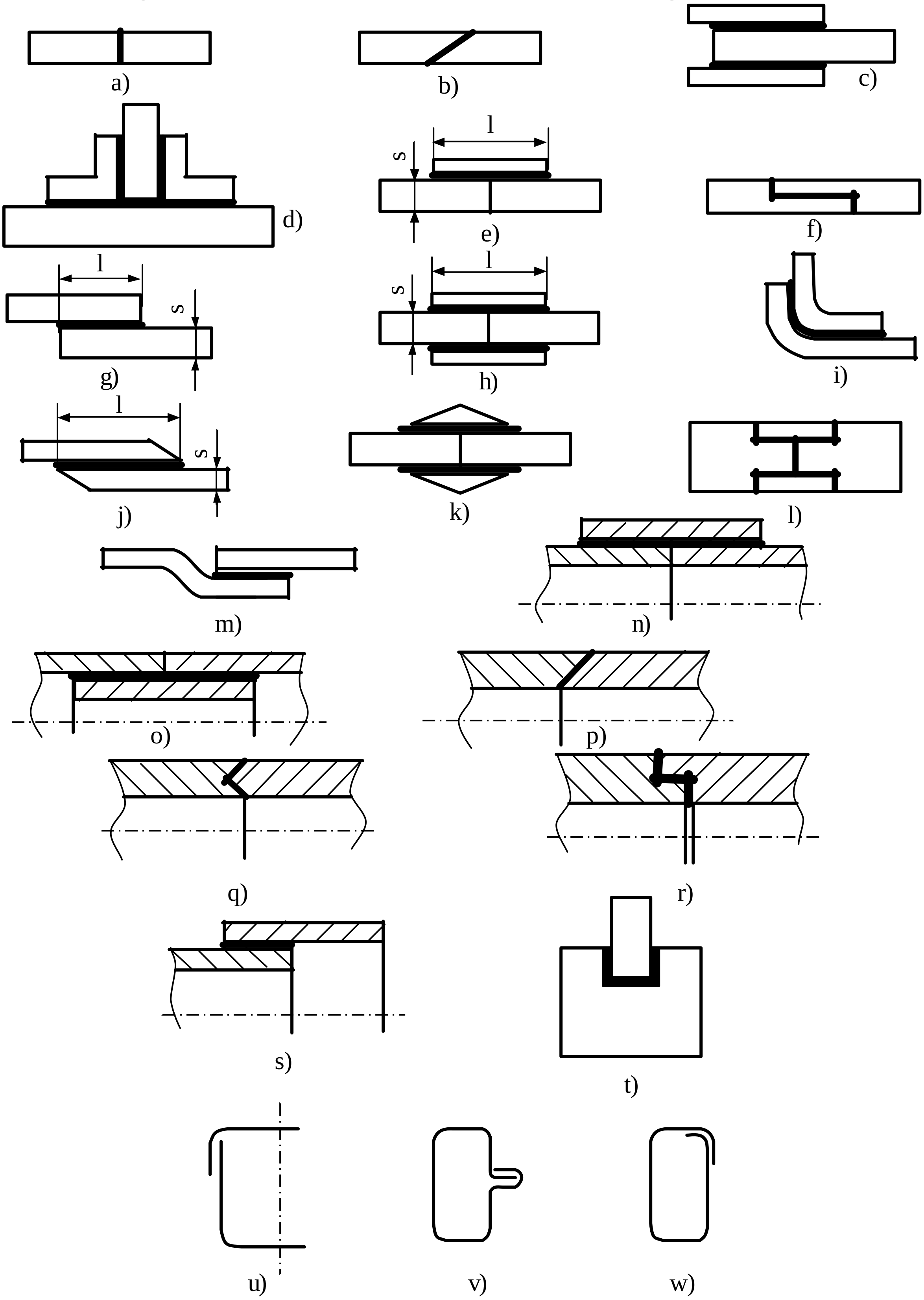

Figura 2.35