RIVETING

Fastening in engineering practical are classified under

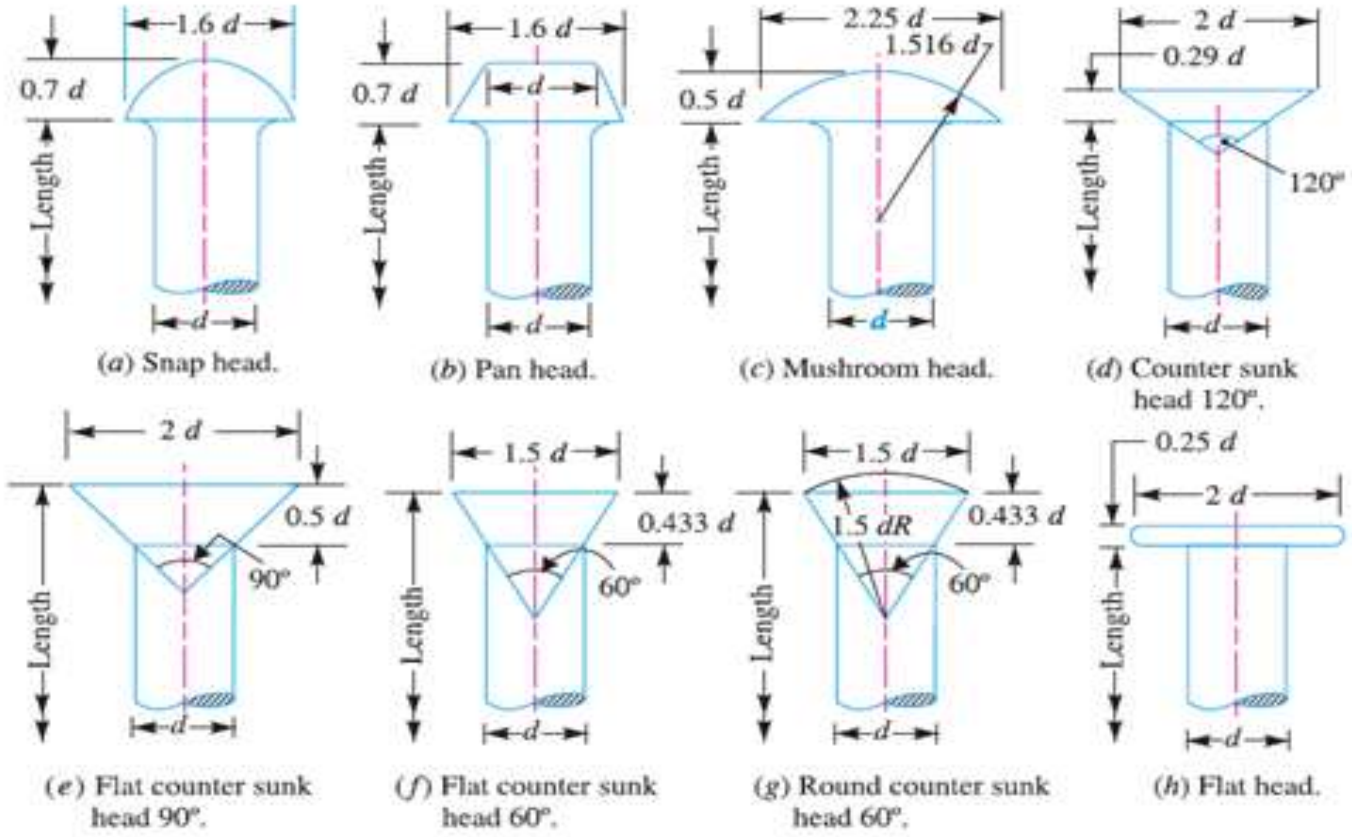
Two heads :-

1-Temporary fastening (Can easily be separated
Bolts-nuts- key----).

2-Permanent fastening (soldering –welding-&rivet).

TYPES OF RIVETS:-

Rivets are usually used and made of (mild steel-
Copper-and aluminum).There are different types
Of rivets.



Types of riveted joints;-

1-Lap joint

2- Butt joint

Lap joint;-

In lap joint .The plates to joint together lying in parallel
Planes and they to be riveted.

Butt joint:-

In Butt joint .The plates butt against each other lying The same plane and with the plan of cover strap and Riveted joint tog ethers.

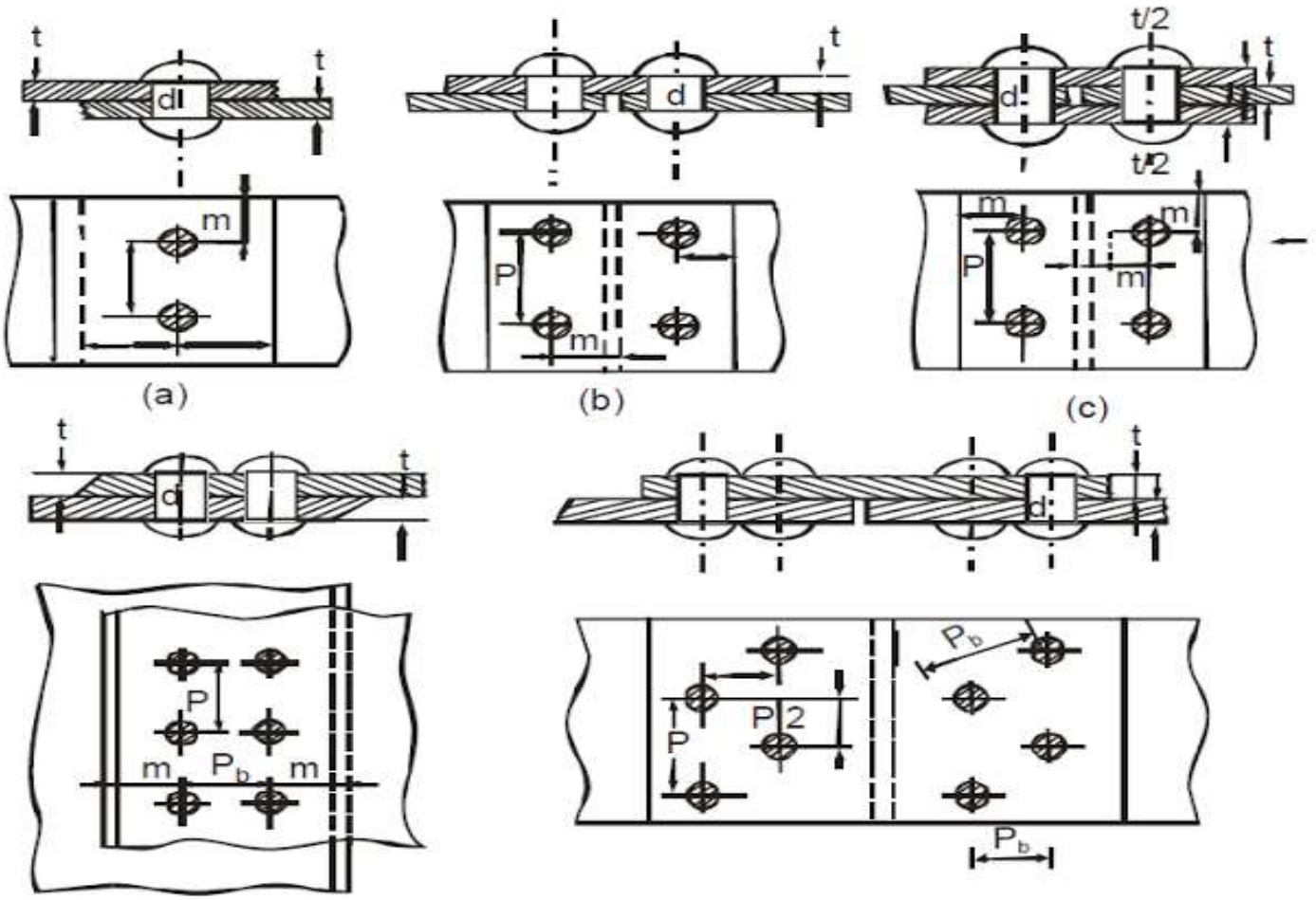


Figure Types of Riveted Joints : (a) Single Riveted Lap Joint; (b) Single Riveted-single Cover Butt Joint; (c) Single Riveted Double Cover Butt Joint; (d) Double Riveted Lap Joint; (e) Double Riveted Single Cover Butt Joint; and (f) Double Riveted Double Cover Butt Joint

Efficiency of a riveted joint ;-

$$\text{efficiency } (\eta = \frac{(p-d)}{p} \quad \text{----------(2)}$$

where p=pitch

d=diameter of rivet

Strength of riveted joint;-

1- Strength in shearing is given;-

Fs= $\frac{\pi d2}{4}$ x fs (single shear one strap)--------(1)

= $\frac{\pi d^2}{2a}$ x fs(2)(double shear –two strap)(2)

Where d= diameter of rivet.

Fs=shearing stress.

2-strengh in crushing is given by:-

Fc= d. t. fc ----------(3)

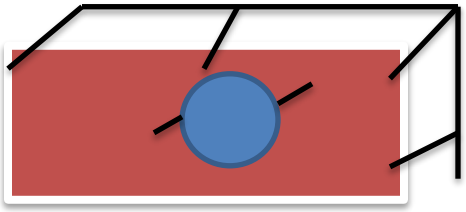
Where d=diameter of rivet (plate).

T=Thickness of plate

Fc=crushing stress.

2- Strength in tearing is given by;-

FT= (p-d).t. ft.



Where(p-d)= tearing area.

Note;-usually FS=4/5 FT----------(10

FC= 2FS----------FC=2X 4/5FT

FC=8/5 FT ----------(2)

Where p=pitch diameter.

d= diameter of rivet hole.

T=thickness of plate.

Ft=tearing stress.

d= $\sqrt{t}$ ----------d.t mm

Failure of riveted joints:-

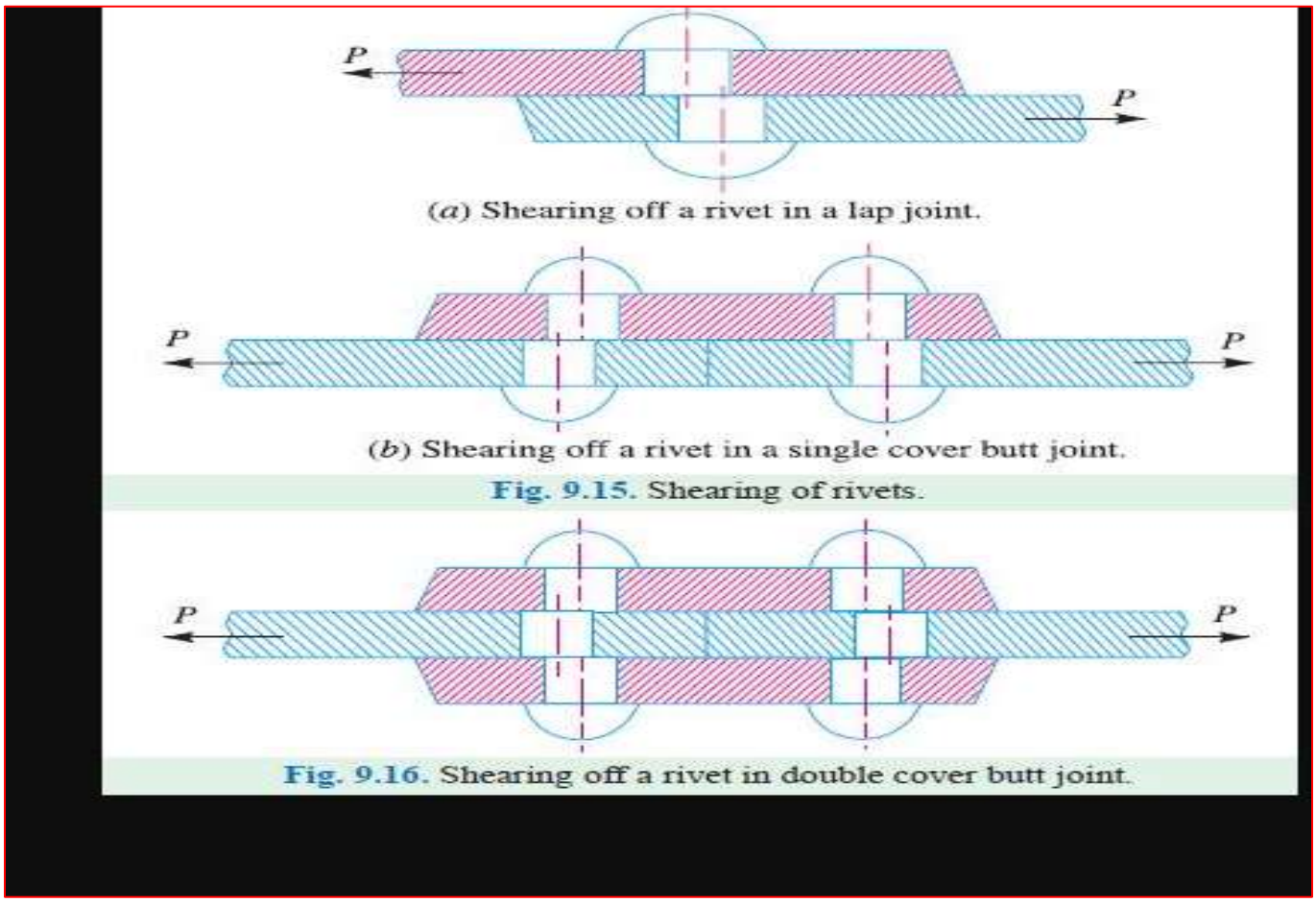


Fig. 9.15. Shearing of rivets.

Fig. 9.16. Shearing off a rivet in double cover butt joint.

Shearing of the plate:-

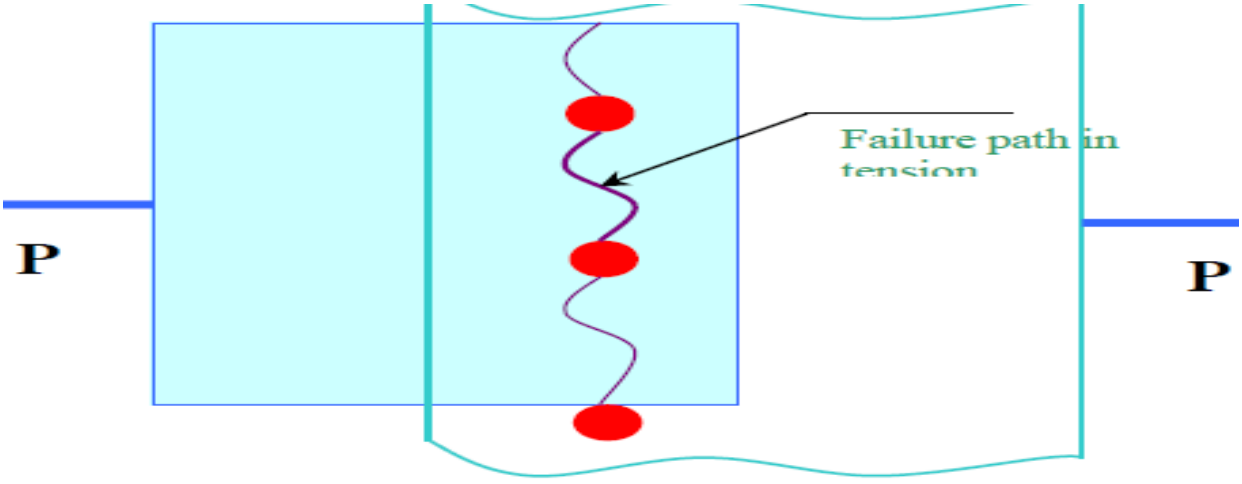
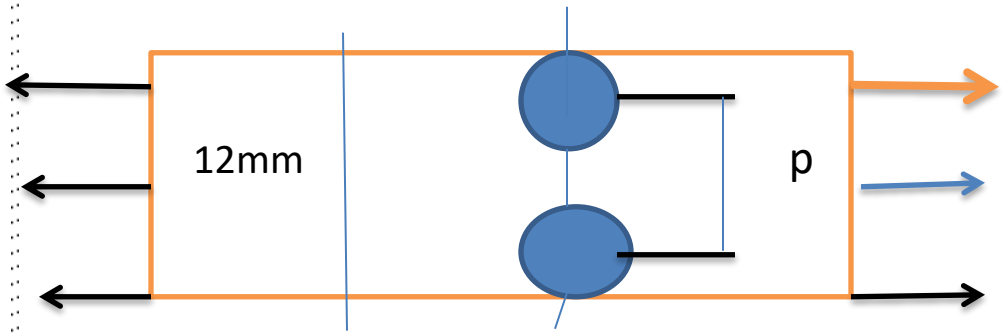


Figure 10.2.1: Failure of plate in tension (tearing)

Ex1;-

Calculate the strength and efficiency of a single riveted lap joint shown in fig.



Where;- fs=1025 kg/cm^2 rivet=20mm diameter

fc =2360 kg/cm^2 P=60 mm

ft= 1420 kg/cm^2 t=15mm

sol;-

20mm----------2cm d

6 mm----------6cm p

15mm----------1.5 t

$FS = \frac{\pi d^2}{4}$ fs----------(1)

$= \frac{\pi(2)^2}{4}$ x 1025 =321854kg/cm^2

Fc= d .t.fc =2 x 1.5 x2360 =480 kg/cm^2

FT=(p-d) t.ft =(6-2) x1.5 x1420 =8570kg/cm^2

$efficiency = \frac{p-d}{p}$ =4/8 =66 %

– –

EX2-Two plate (15mm)each thickness .Connected by butt riveted joints .If the fs(61.7 kg/cm^2)and the ft(52.4kg/cm^2)

FIND

1-Diameter of rivet

2-Pitch

3-Efficiency of joint.

If FS=FT

SoL;-

d= $6\sqrt{t}$ ----------=$6\sqrt{15}$=23mm =2.32cm

FS=FT

$\frac{\pi(2.32)^2}{4}$ fs == (p-d) t. ft

$\frac{\pi(2.32)^2}{4}$ x 61.7== (p- 2.32) x 1.5 x82.4

260- 69.3 == 12.5p-2867------p=45.5 cm

Efficiency=$\frac{45.5-2.32}{45.5}$ = 94%