

MACHINE DRAWING WITH AUTOCAD*

Course Name: B.Tech-ME

Semester: 3rd

Prepared by: Dr. Talwinder Singh Bedi

UNIT: II

Topic: FASTENERS

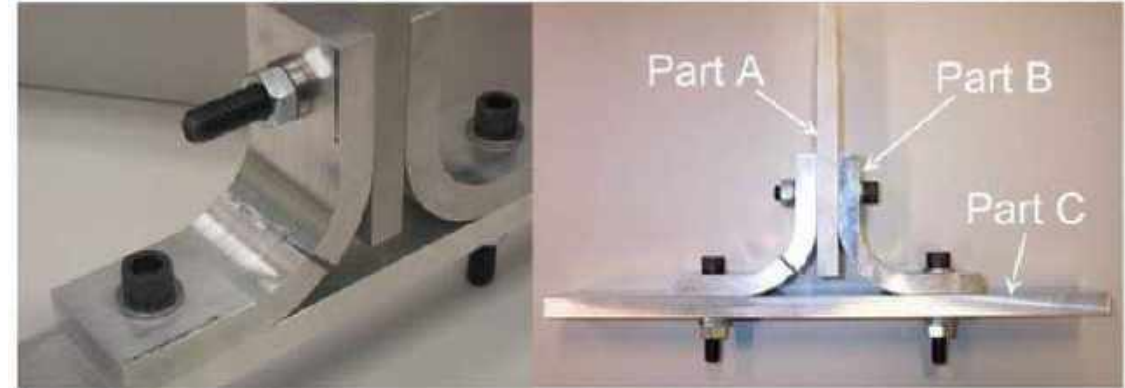
2.1 Threaded fastener

- bolts
- studs
- screws



2.2 Non-threaded fastener

- keys
- pin



External (male) thread

A thread cut on the **outside** of a cylindrical body.

Internal (female) thread

A thread cut on the **inside** of a cylindrical body.

UNIT: II



Right-hand thread

Thread that will **assemble** when turned **clockwise**.

Left-hand thread

Thread that will **assemble** when turned **counter-clockwise**.

Crest

The **peak edge** of a thread.

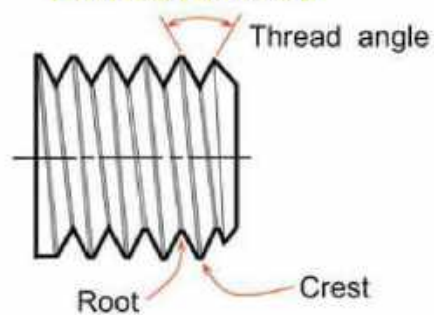
Root

The **bottom** of the thread cut into a cylindrical body.

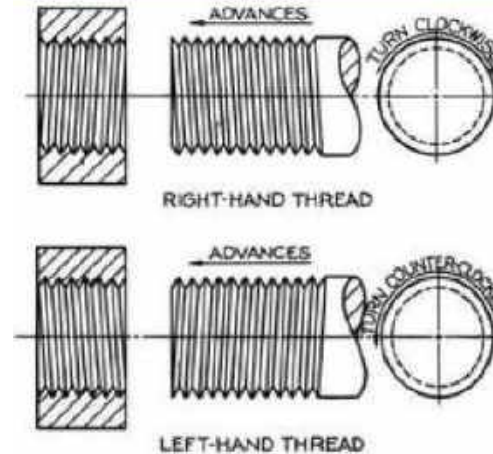
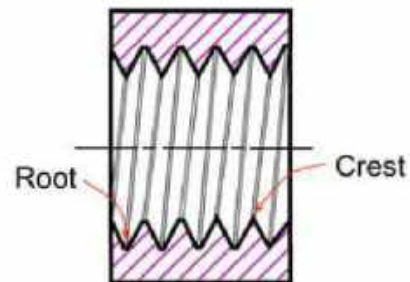
Thread angle

The angle between threads faces.

External Thread



Internal Thread

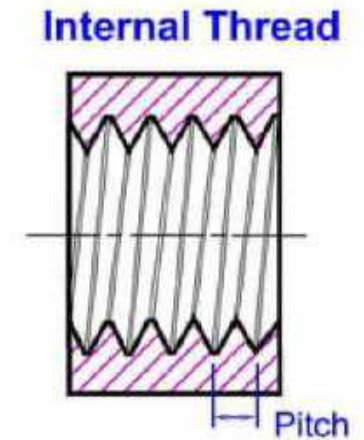
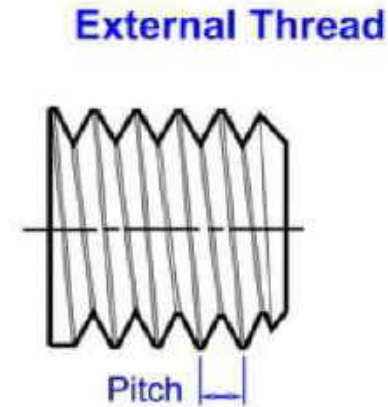
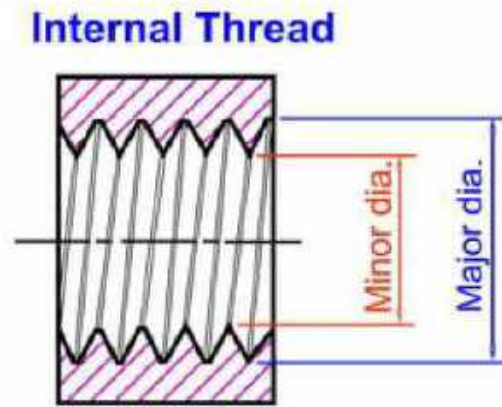
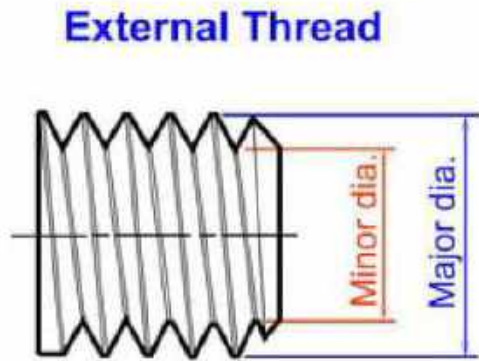


Turnbuckle use RH and LH thread at each end to double displacement.

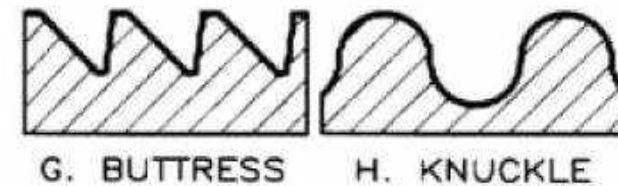
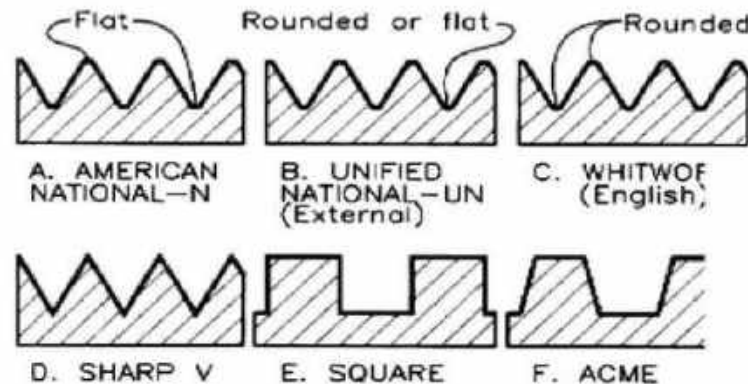
UNIT: II

Major diameter	The largest diameter on an internal or external thread.
Minor diameter	The smallest diameter on an internal or external thread.

Pitch	The distance between crests of threads.
Lead	The distance a screw will advance when turned 360°.



Thread type →



UNIT: II

Tools

- Threading Die



- Die stock



Operation



Tools

- Twist drill



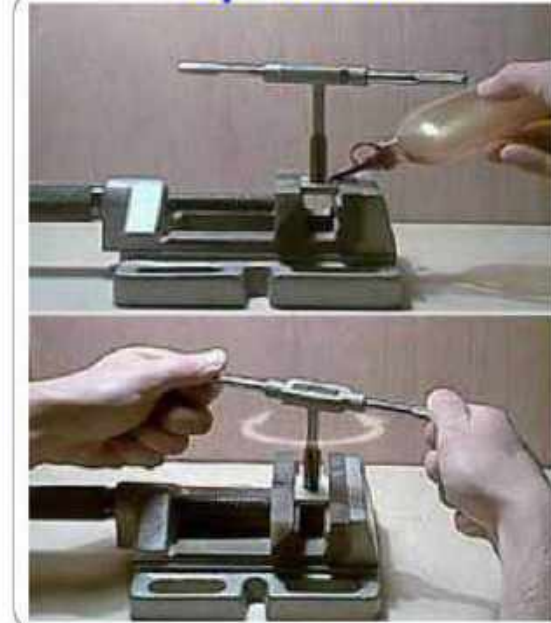
- Tap



- Tap wrench



Operation



UNIT: II

Tools

- Threading Die



- Die stock



Operation



Tools

- Twist drill



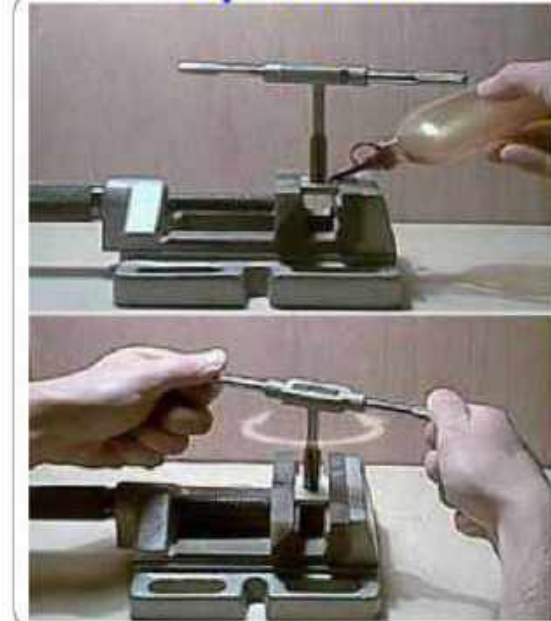
- Tap



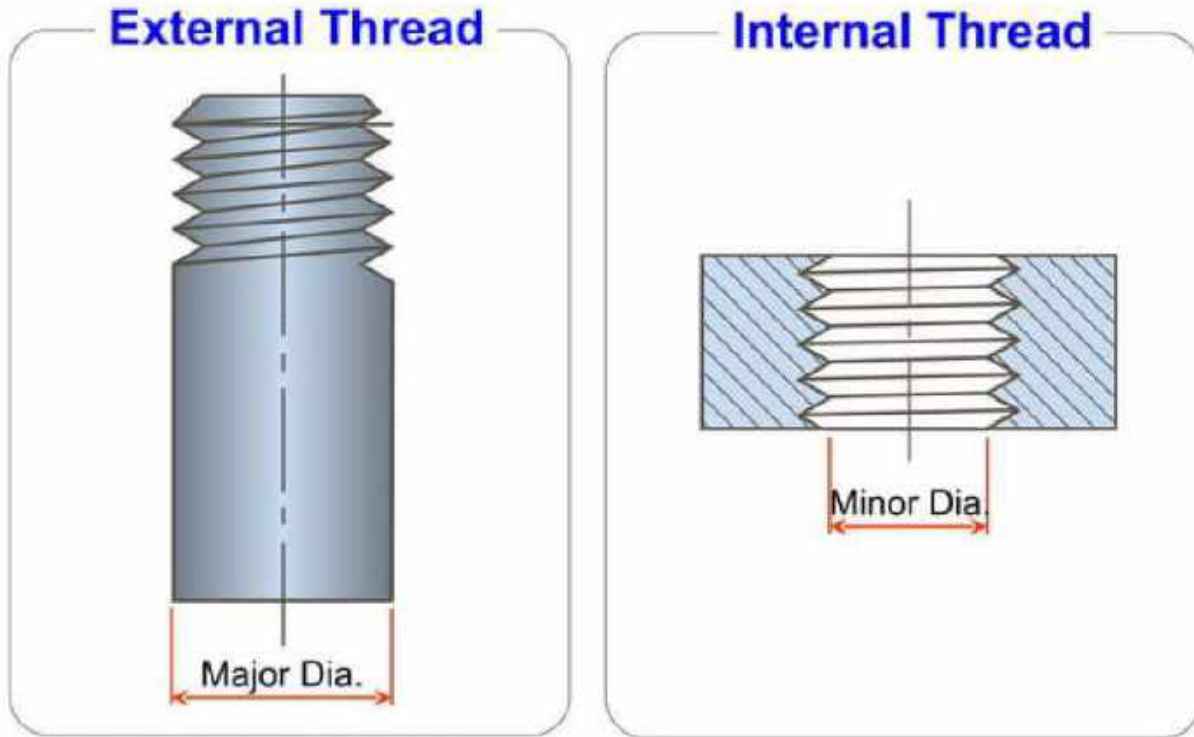
- Tap wrench



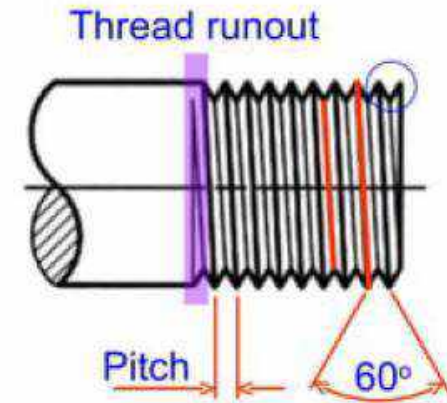
Operation



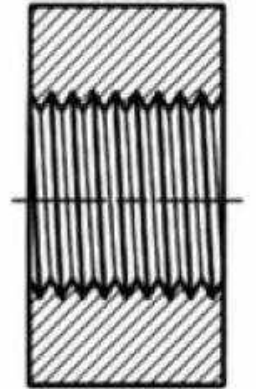
UNIT: II



External thread

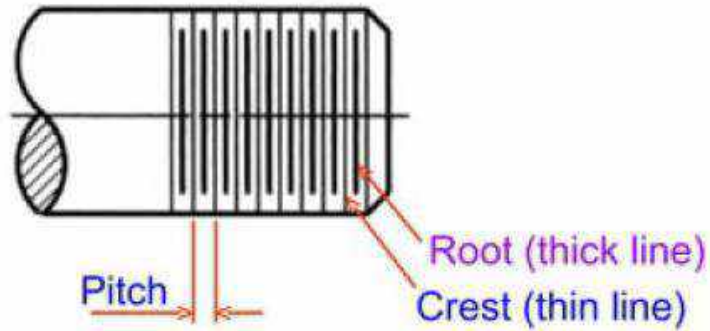


Internal thread

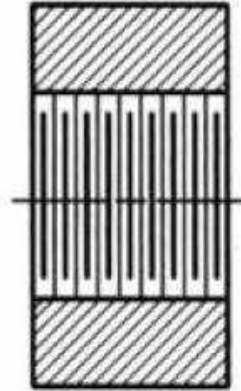


UNIT: II

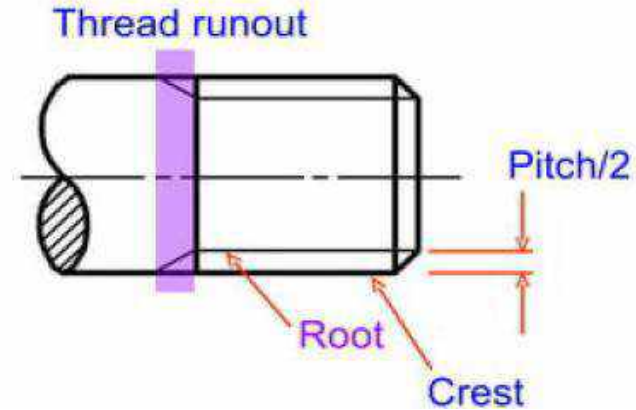
External thread



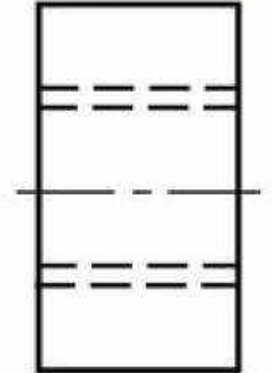
Internal thread



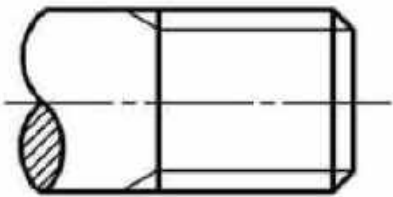
External thread



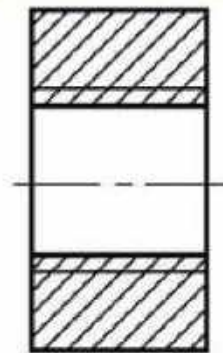
Internal thread



External thread

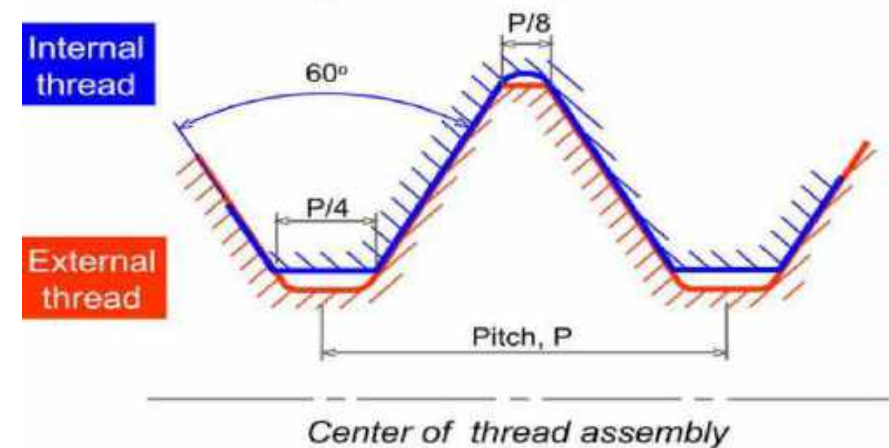


Internal thread



Sectional view

ISO (METRIC) THREAD



UNIT: II

METRIC COARSE THREAD

Nominal size	Major diameter	Pitch	Minor diameter	Tap drill size
M6	6.00	1.00	4.92	5.00
M8	8.00	1.25	6.65	6.75
M10	10.00	1.50	8.38	8.50
M12	12.00	1.75	10.11	10.00

Metric thread

Minor diameter \approx Tap drill size

In thread *drawing*, the following relationship is used.

$$\text{Minor diameter} = \text{Major diameter} - \text{Pitch}$$

METRIC FINE THREAD

Nominal size	Major diameter	Pitch	Minor diameter	Tap drill size
M8	8.00	0.75	7.188	7.25
		1.00	6.917	7.00
M10	10.00	0.75	9.188	9.25
		1.00	8.917	9.00
		1.25	8.647	8.75

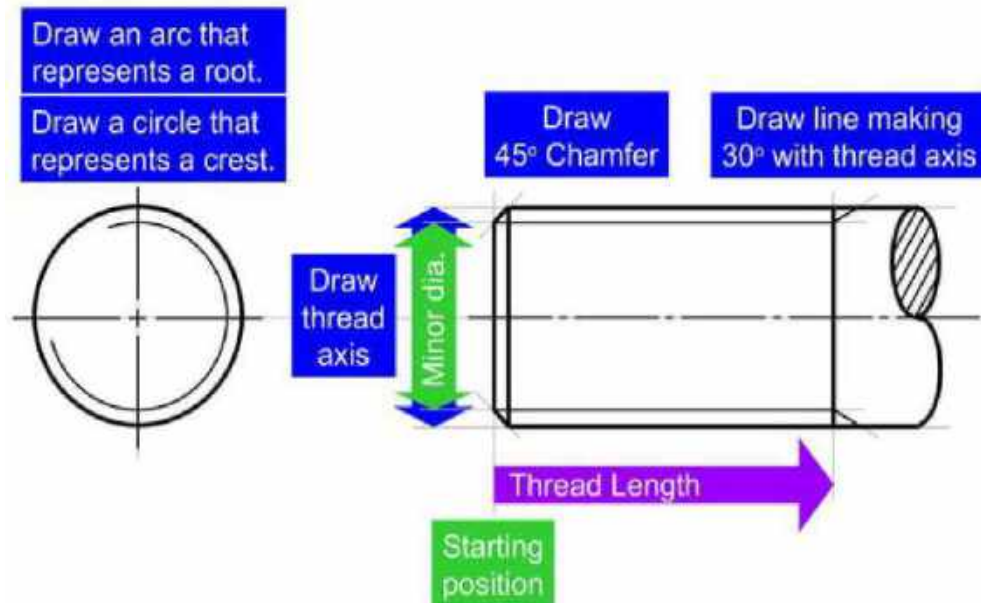
Minor diameter \approx Tap drill size

In thread *drawing*, the following relationship is used.

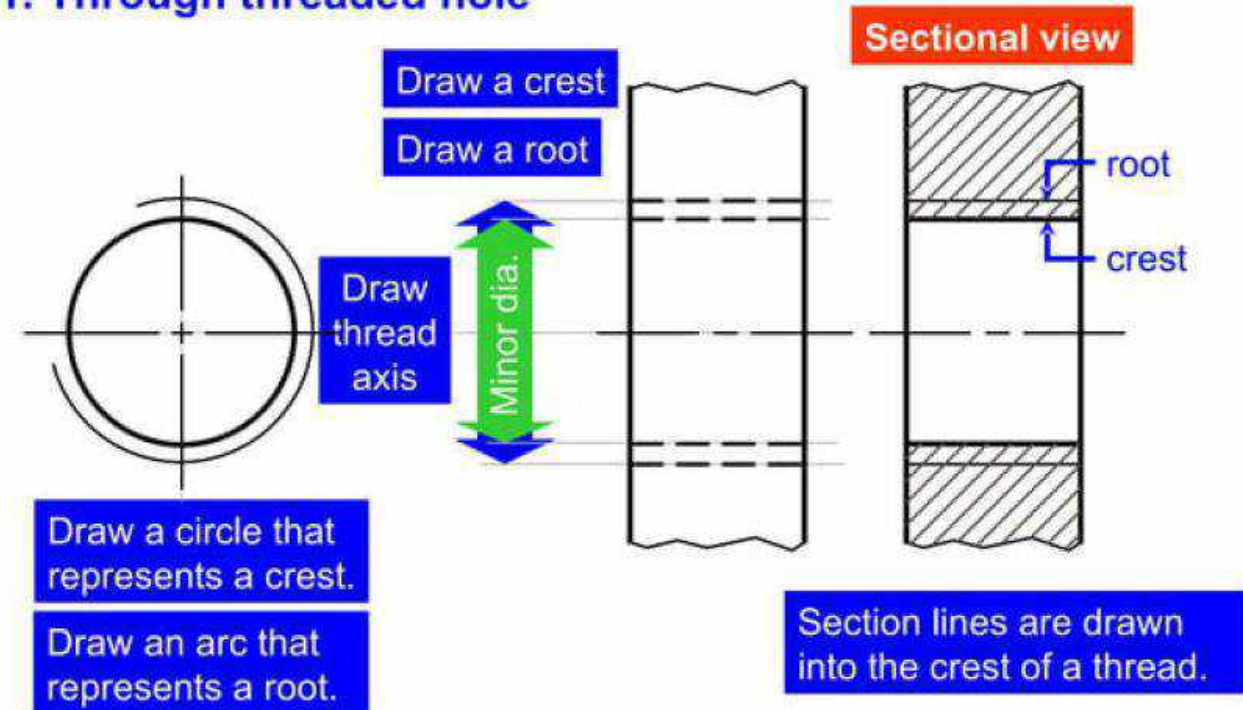
$$\text{Minor diameter} = \text{Major diameter} - \text{Pitch}$$

THREADED HOLE

EXTERNAL THREAD

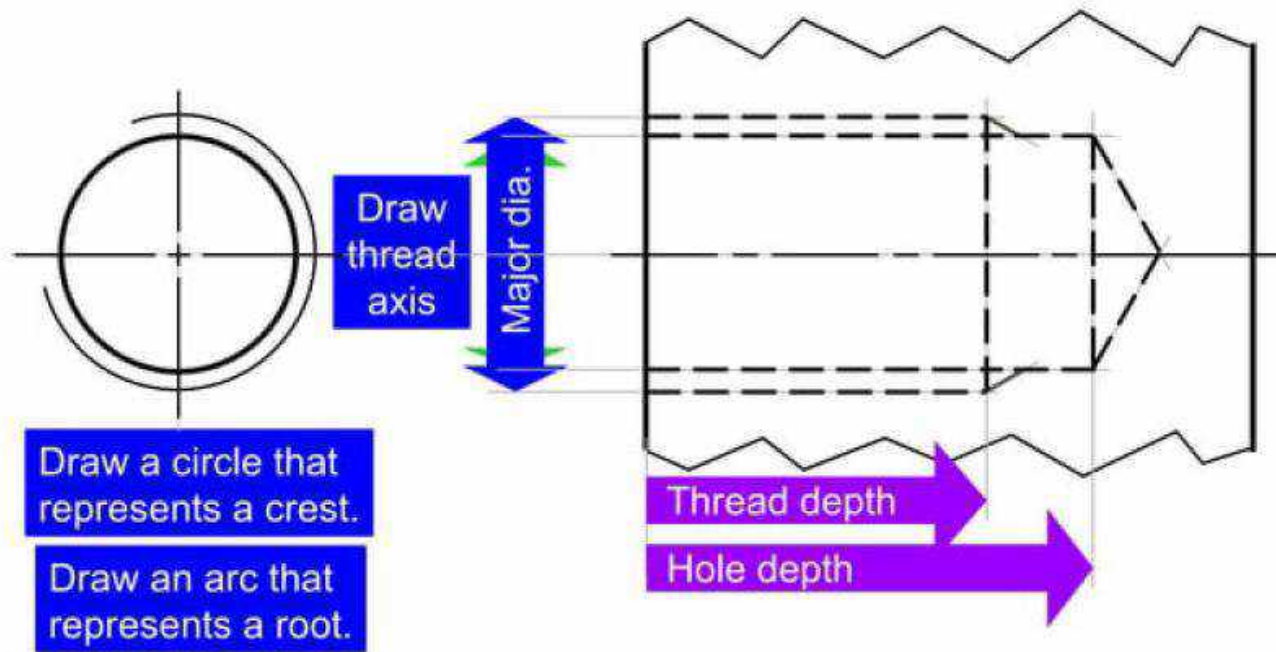


1. Through threaded hole



UNIT: II

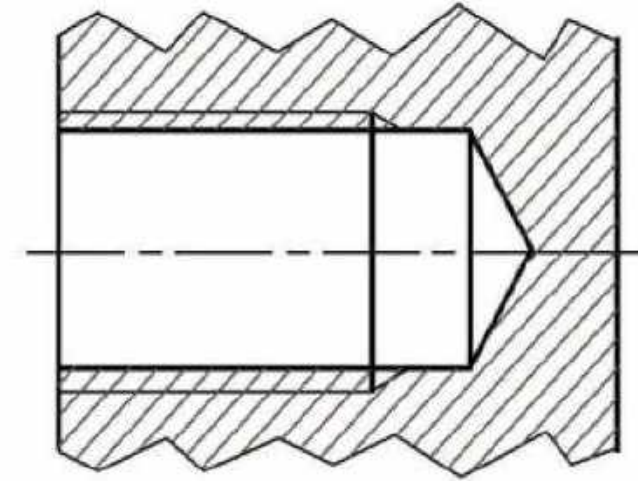
2. Blinded threaded hole



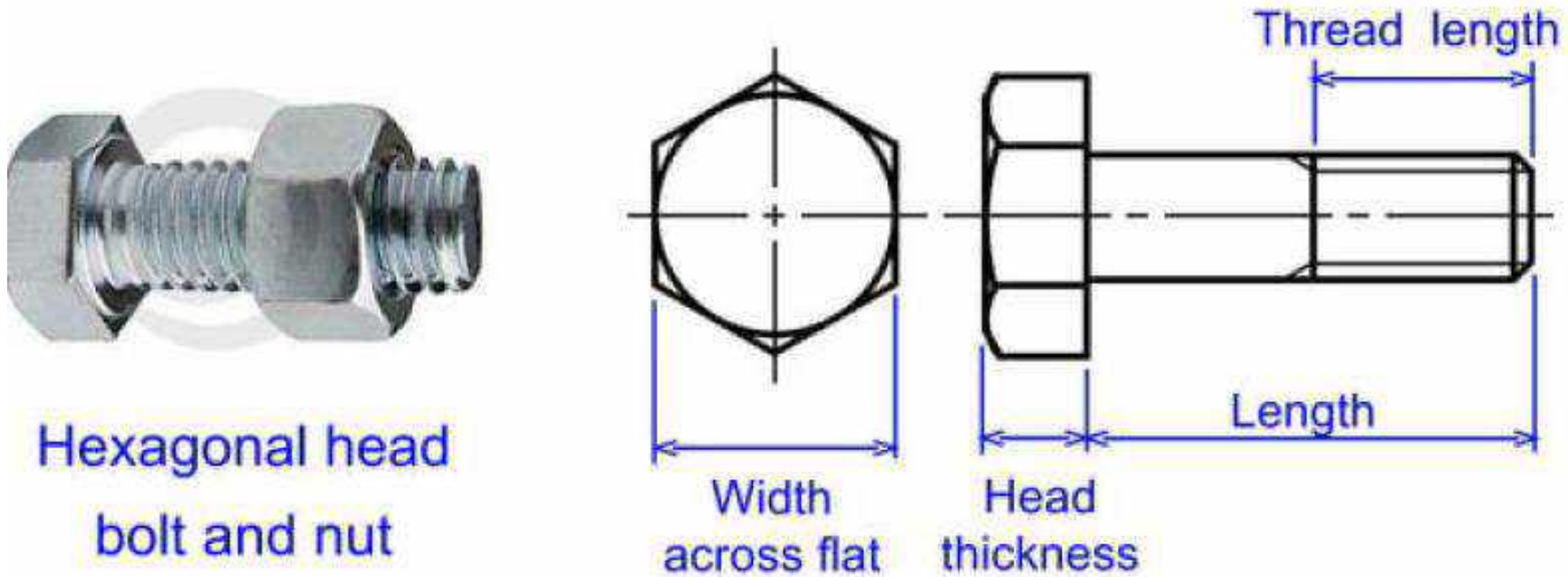
2. Blinded threaded hole



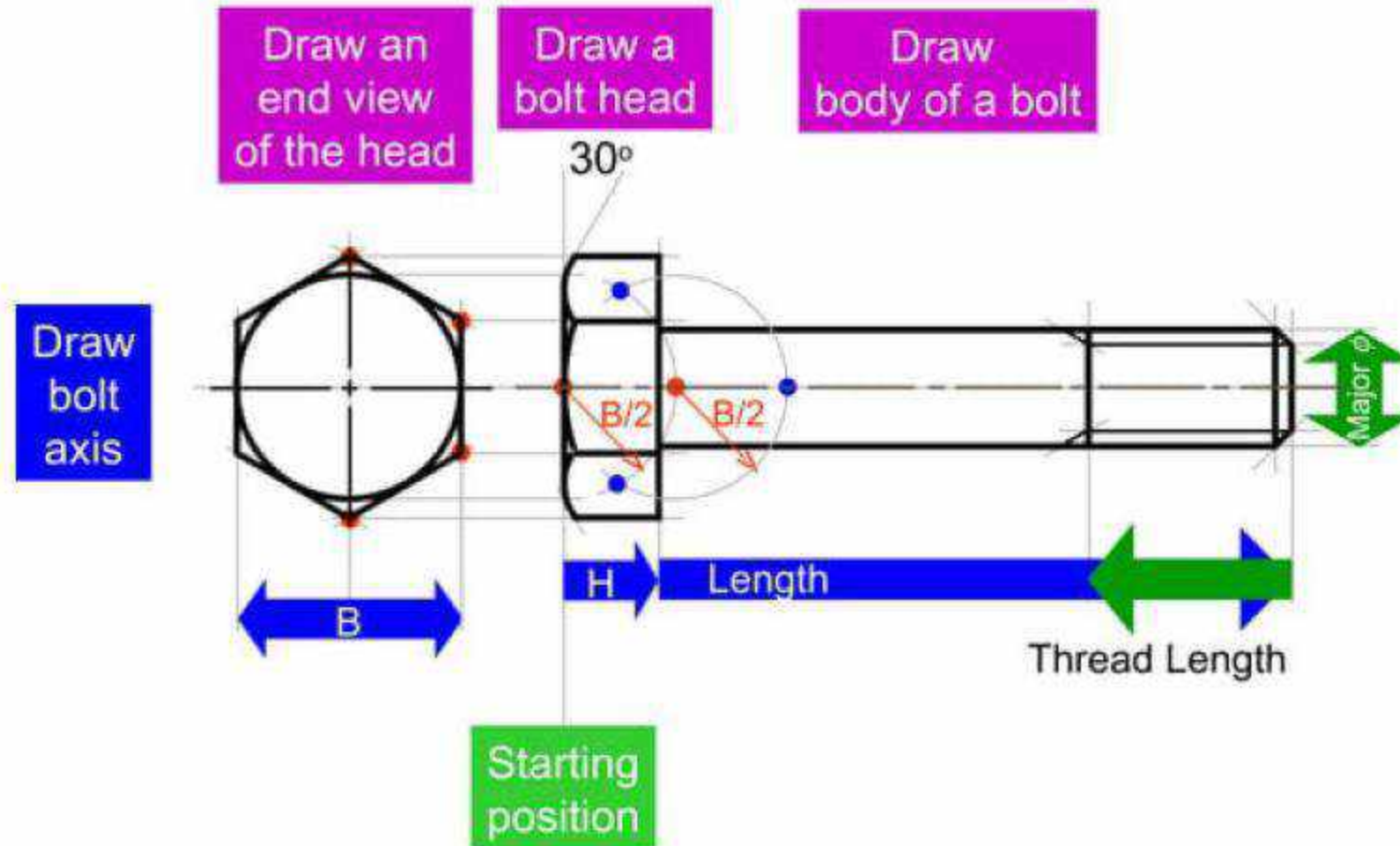
Sectional view



Bolt is a threaded cylinder with a head.

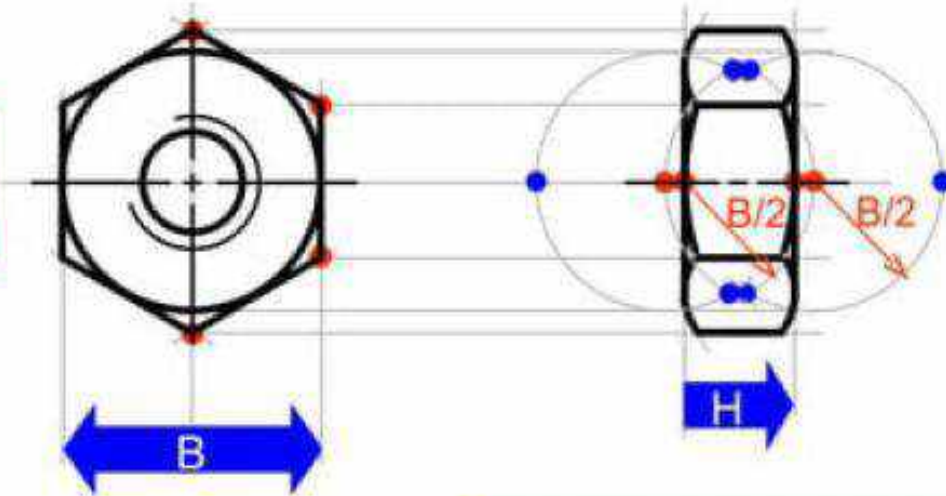


BOLT : Drawing steps



UNIT: II

Draw an end view
of the nut



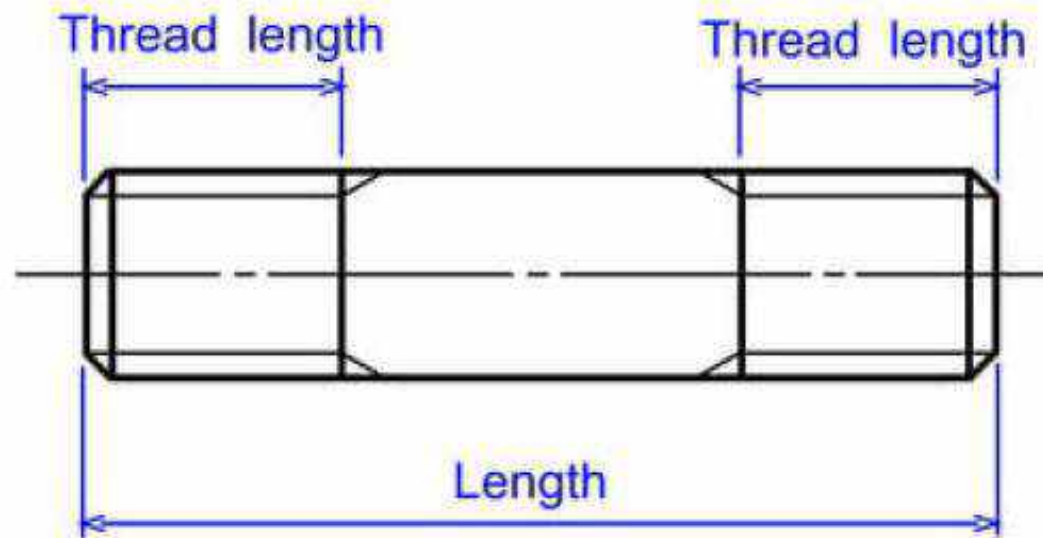
Dash lines represent
a threaded hole are
omitted for clarity.

UNIT: II

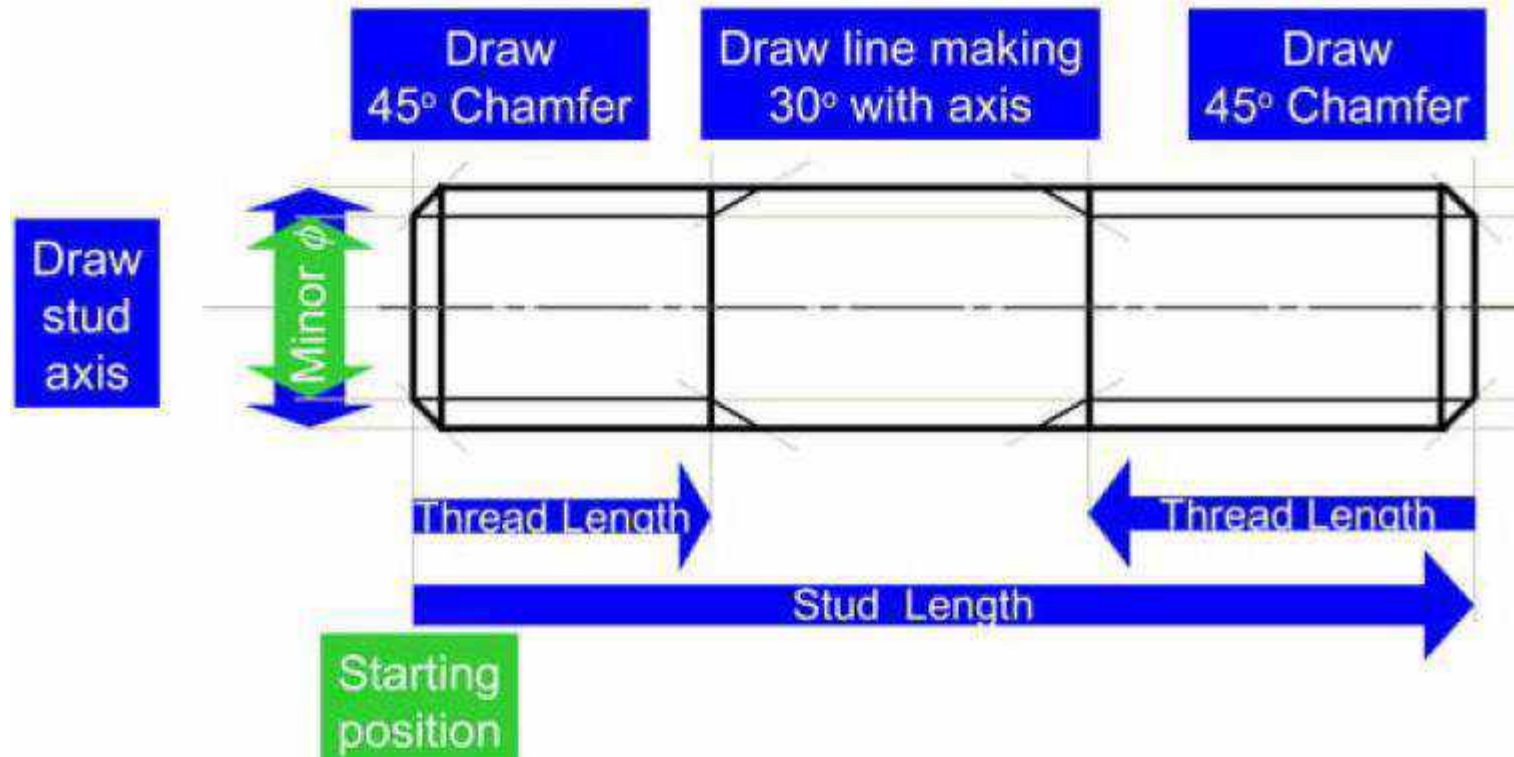
Stud is a *headless* bolt, threaded at both ends.



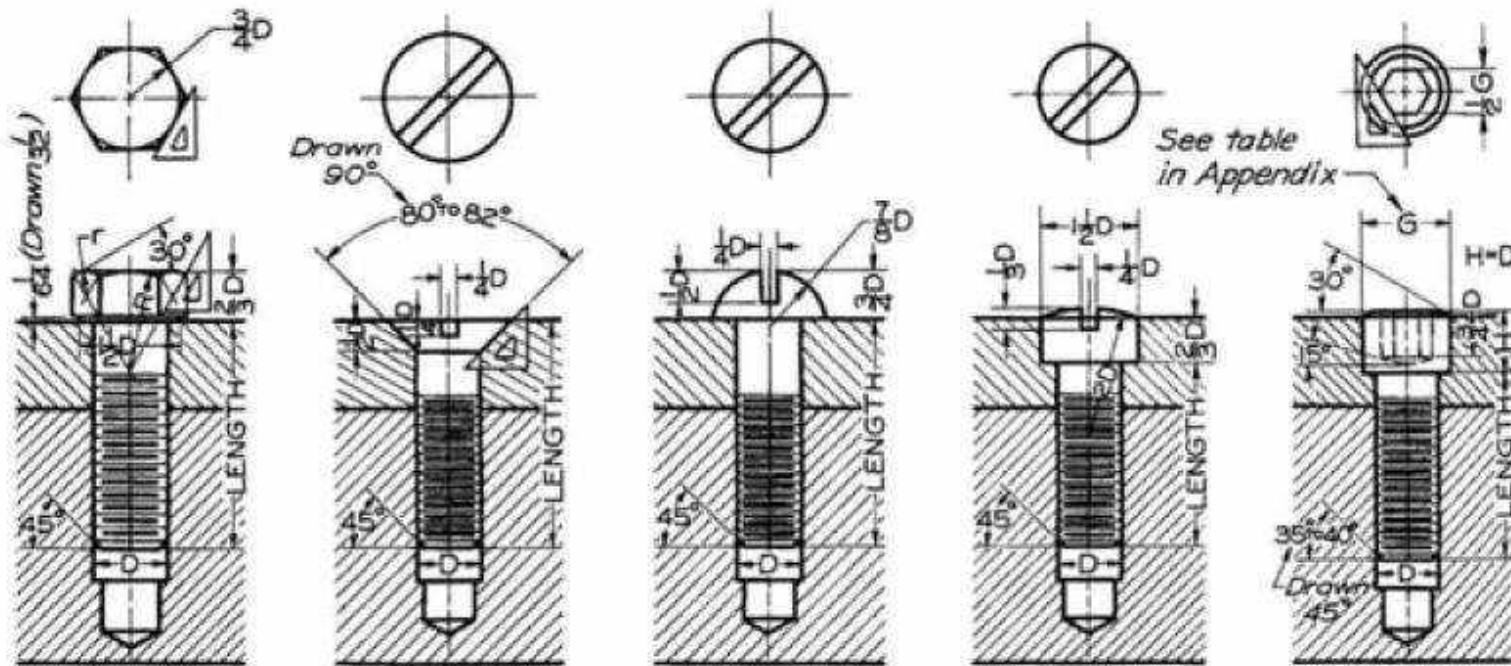
*Drawing
representation*



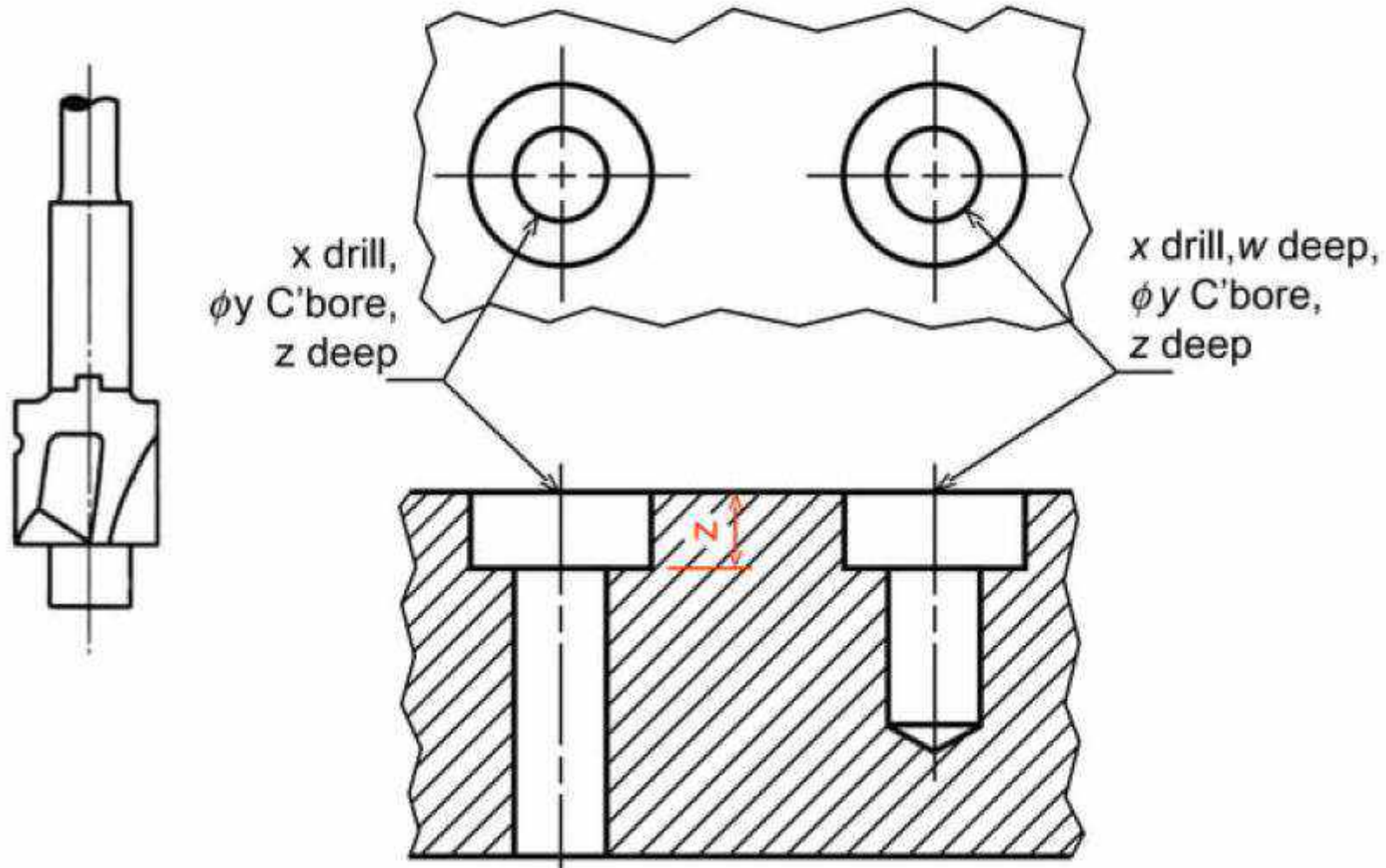
STUD : Drawing steps



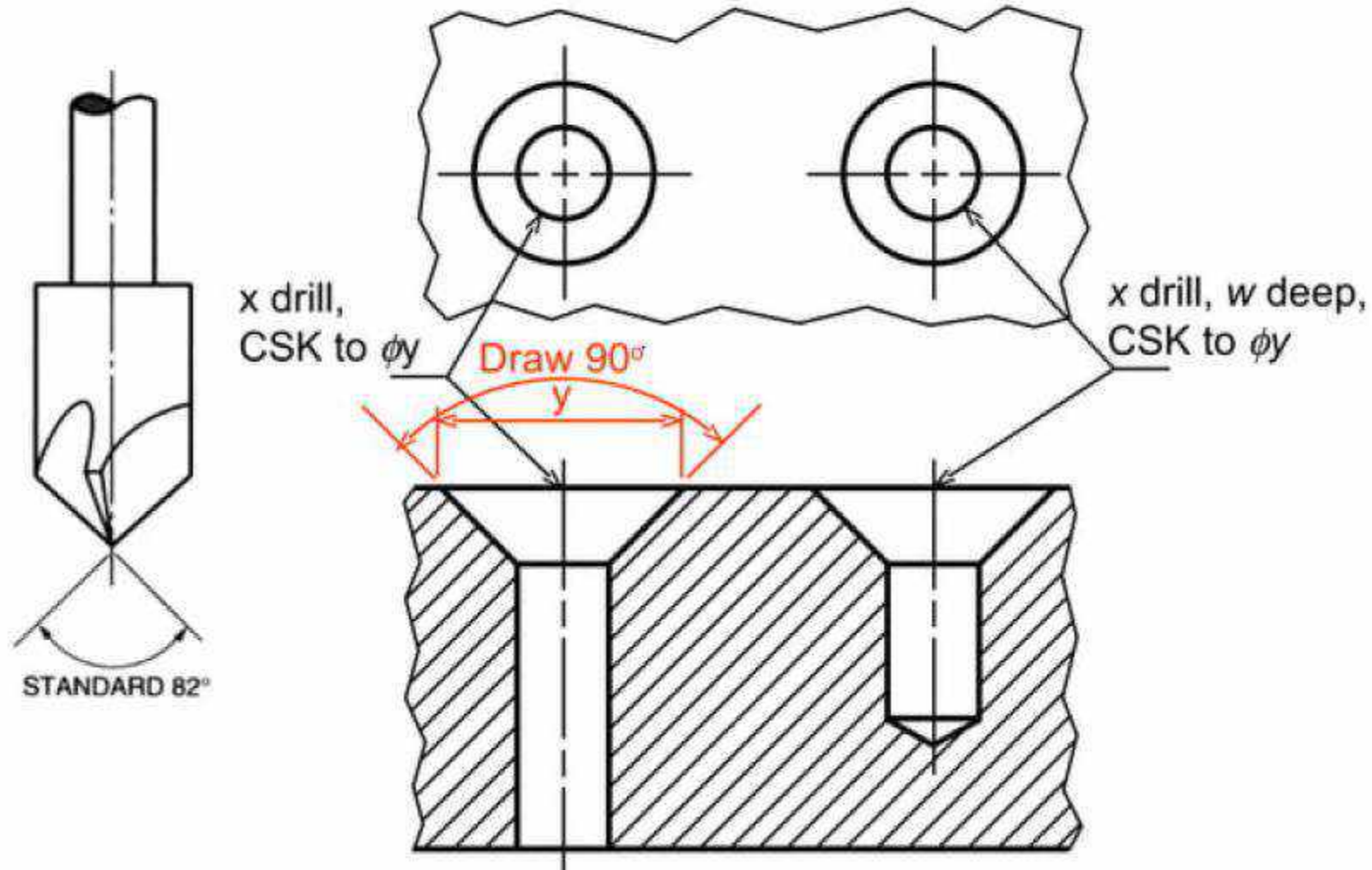
Cap screw is similar to bolt, but has a longer thread than a bolt.



CAP SCREW : Counterbore hole



CAP SCREW : Countersink hole



Set screw is a threaded cylinder used to prevent rotation or movement between parts.



Slotted



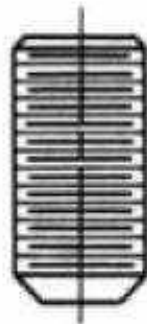
*Hexagonal
Socket*



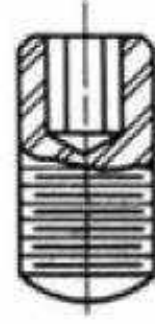
*Fluted
Socket*



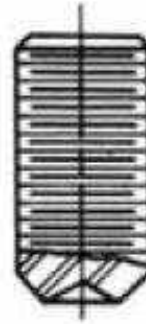
*Cone
Point*



*Flat
Point*



*Oval
Point*



*Cup
Point*



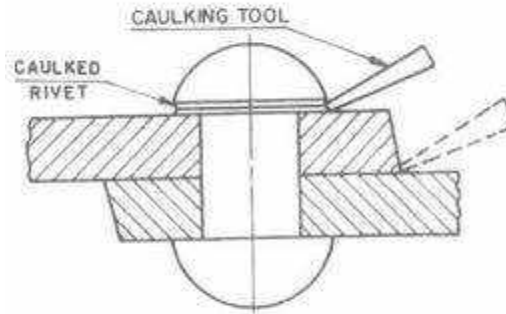
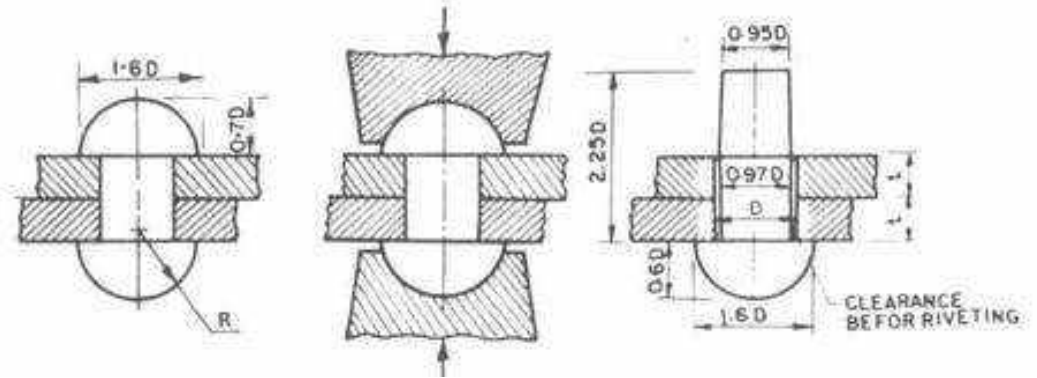
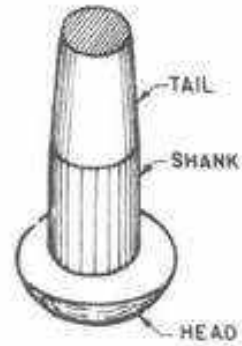
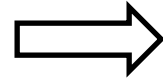
*Full Dog
Point*



*Half Dog
Point*

UNIT: II

Riveted joints



Caulking: Operation of burring down the edges of the plates and heads of the rivets to form a metal to metal joint

Fullering is a better option

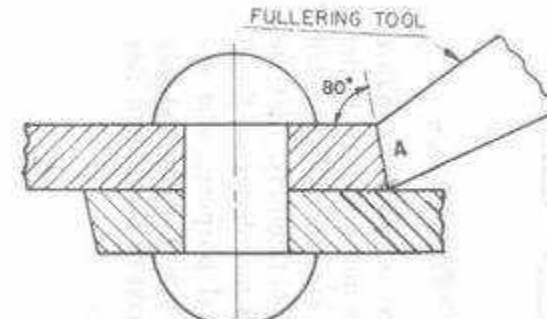
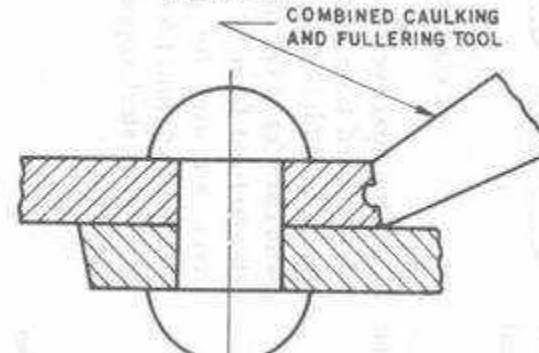
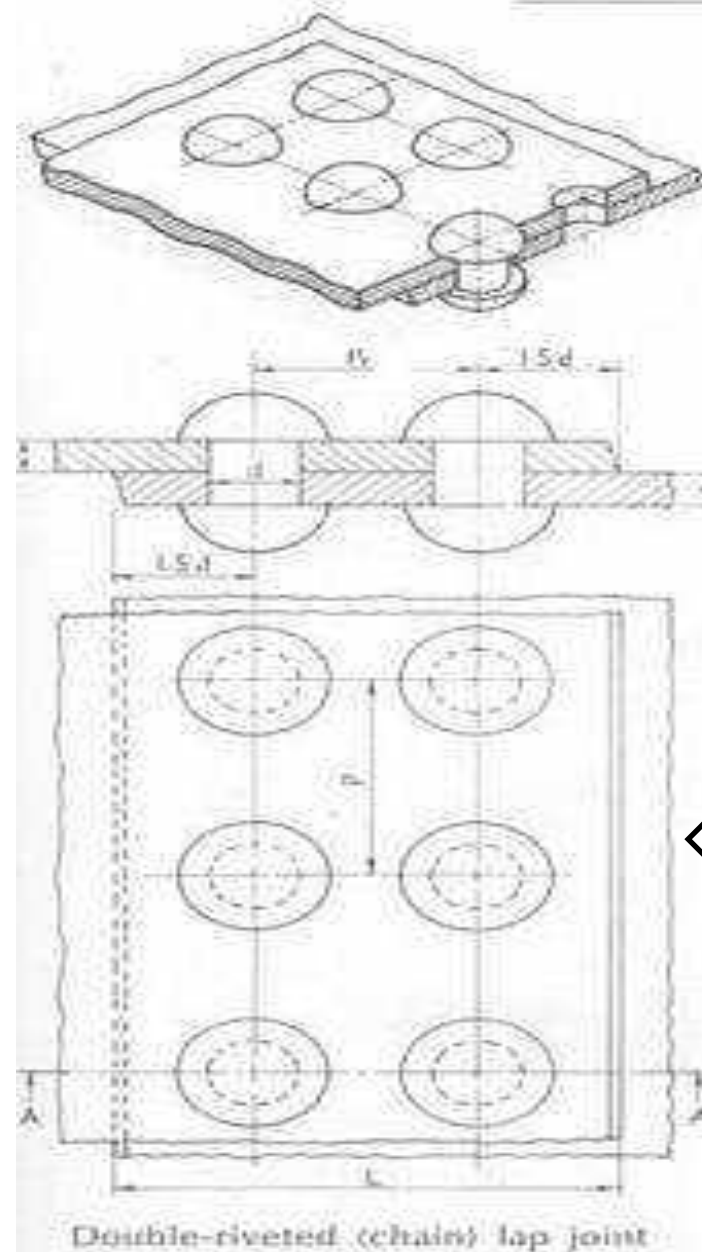
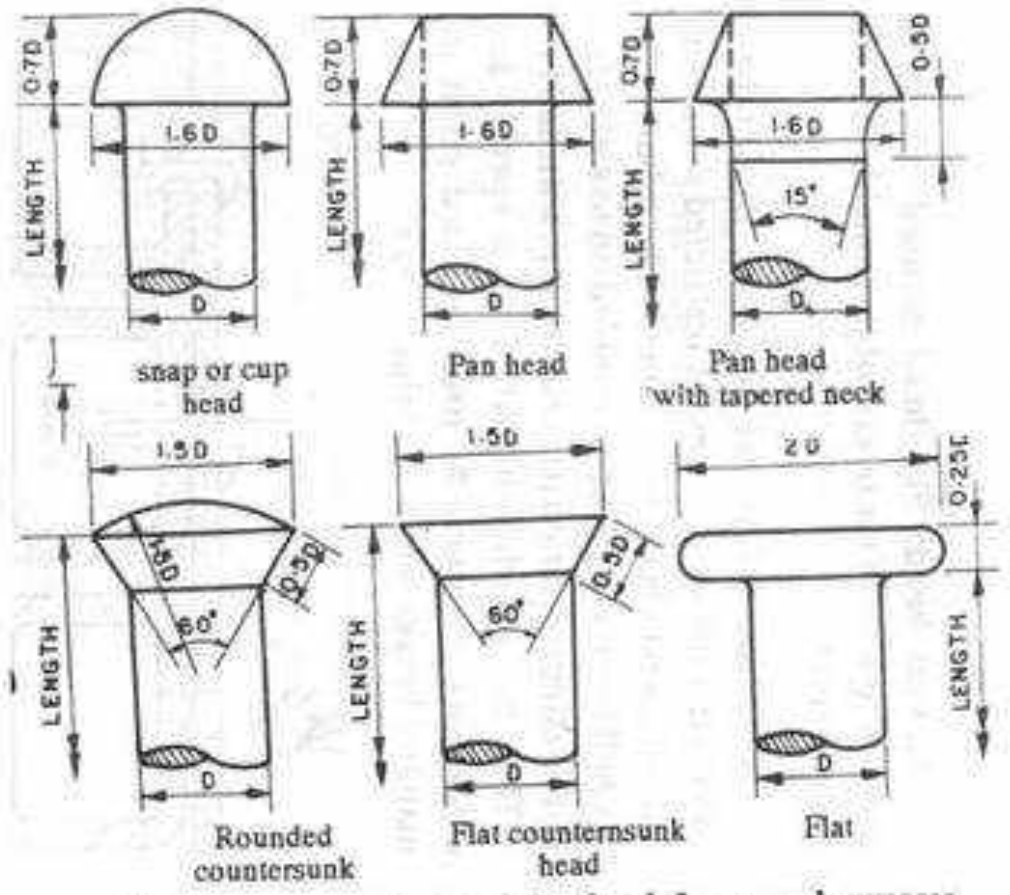


Fig. 13.4 Fullering



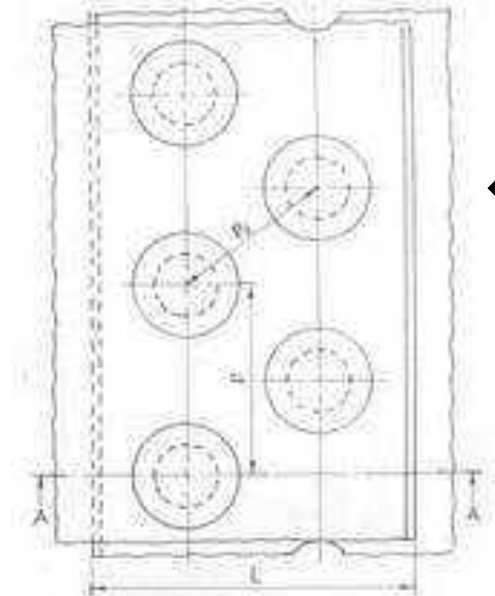
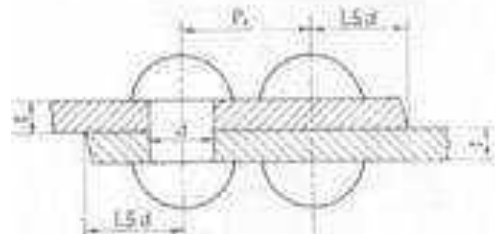
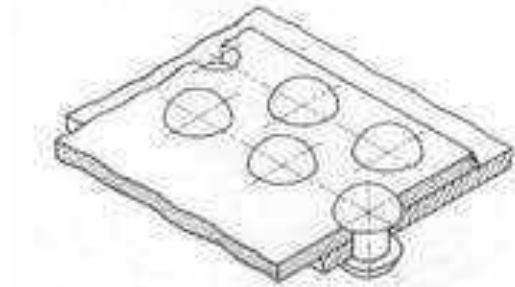
UNIT: II

Riveted heads

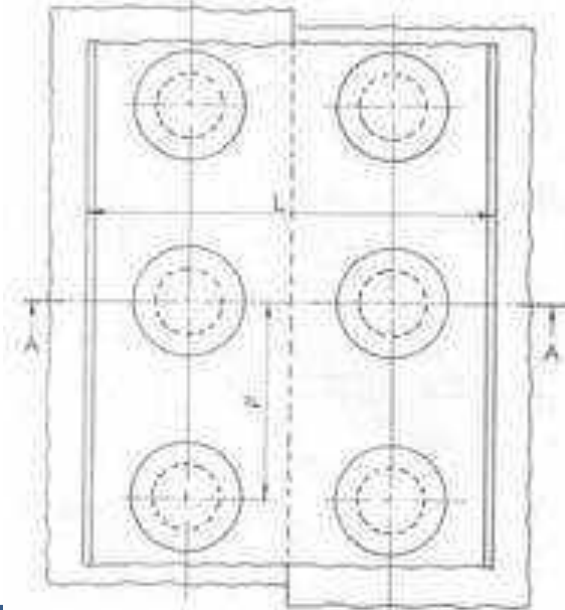
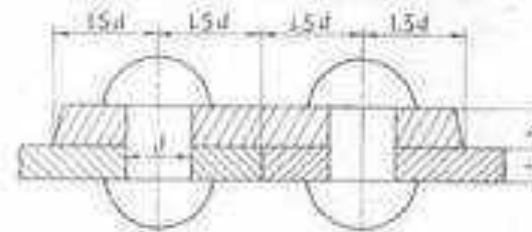
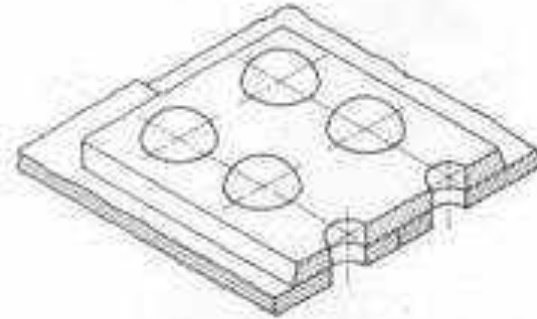


← **Double riveted
(chain lap joint)**

UNIT: II

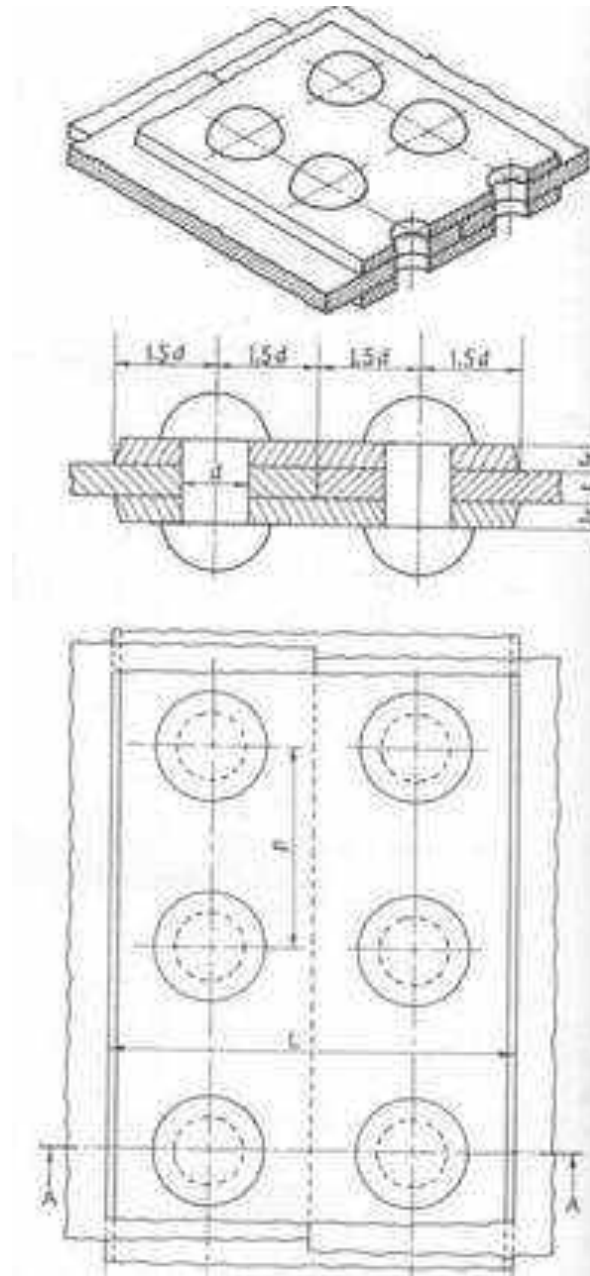


← **Double riveted
(zig-zag lap joint)**



← **Single riveted
single strap butt
joint**

UNIT: II



← Single riveted
double strap butt
joint