8 TERMS AND EMPIRICAL PROPORTIONS OF RIVETED JOINTS

Following terms are used in connection with the riveted joints :

1. **Pitch** : It is the distance from the centre of one rivet to the center of the next rivet in the same row. It is denoted by p. The empirical formula for pitch, in terms of revet diameter, d is:

   Minimum pitch, $p = d + 30$ mm

   Maximum pitch, $p = 3d$

2. **Diagonal Pitch** : It is the distance between the centers of the two rivets in the adjacent rows as measured along the diagonal path. It is generally denoted by $p\ d$.

3. **Back Pitch** : It is the perpendicular distance between consecutive rows of rivets. It is generally denoted by $p\ b$ and is giver as:

   (i) Chain type riveting = $2d + 6$ mm

   (ii) zig-zag riveting = $2d$

4. **Diameter of Rivets** : The Imperical proportion used for finding the diameter 'd' when the thickness 'ℓ' of the plate is given in mm and vice-versa, is

$$d = 6\sqrt{t}$$

5. **Thickness of Cover Plates of Straps** : The thickness of the cover plate is generally denoted by t_1. It is given as:

   $t_1 = 1.125\ t$ in case of single cover butt joint.

   $t_1 = 0.625\ t$ in case of double cover butt joint.

   Where t = thickness of main plates.

6. **Margin** : It is the distance from the centre of the rivet hole to the nearest edge of the plate. It is denoted by 'm' and is given as $m = 1.5\ d$.

7. **Nominal Diameter** : It is the diameter of the shank of a rivet before riveting.

9 RIVETED JOINTS

Riveted joints in common use can be classified as structural joint and boiler joint. Each joint is further classified into two main groups depending upon the manner in which the plates are held in relation to each other.

1. Lap Joint
2. Butt Joint

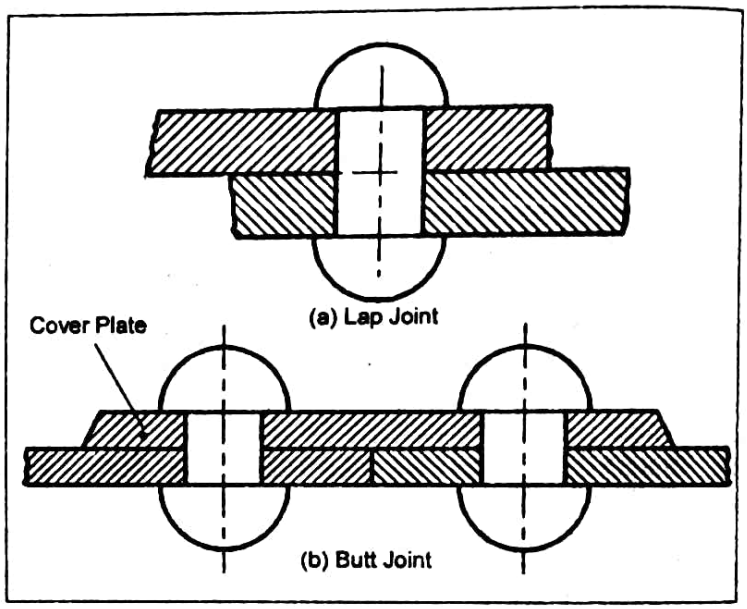

Fig.6 : Rivet Joint

The classification of riveted joints can be understood from the following figure.

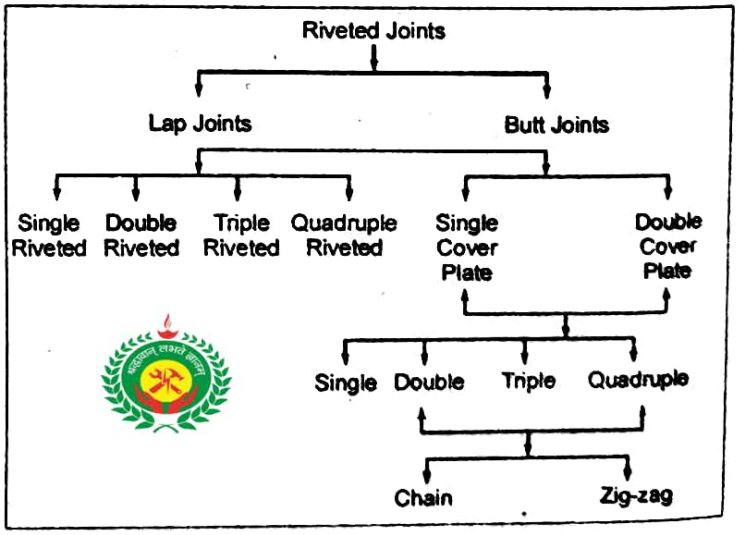

Fig.7 : Types of Riveted Joints

1. Lap Joint

In a lap joint the plates to be connected overlap each other. When the joint is made with only one row of rivets it is called a single riveted lap joint, see figure 8.

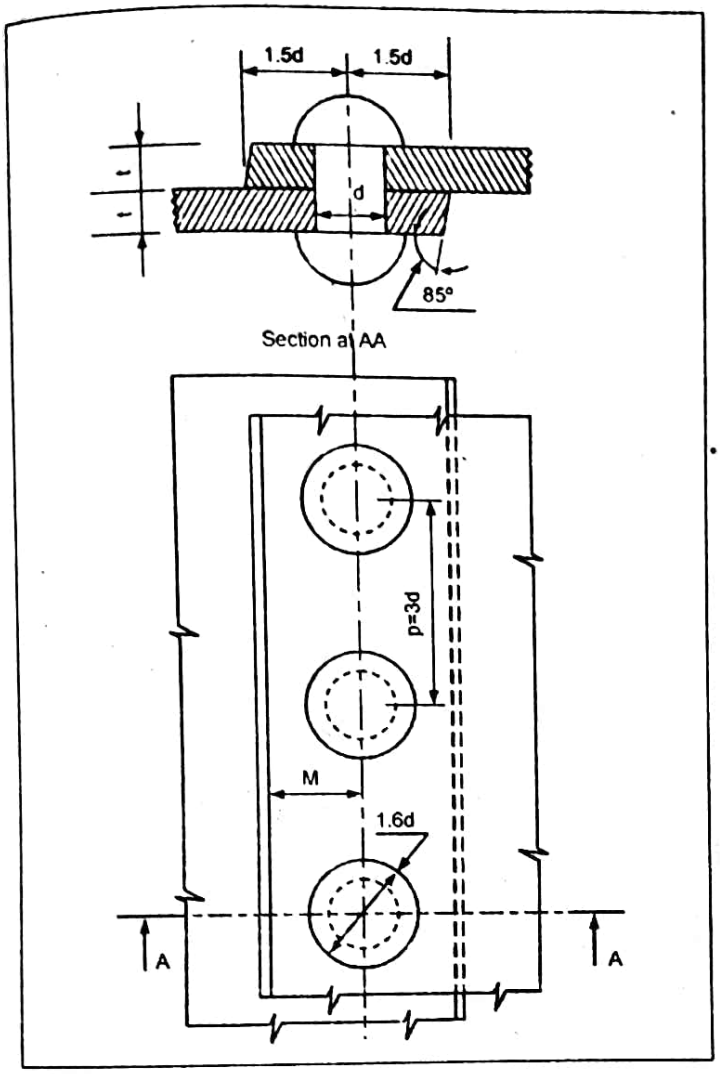

Fig.8 : Single Riveted Lap Joint

A joint is said to be double riveted, triple riveted etc. according to the number of rows of rivets in it. When two or more rows of rivets are required then they may be arranged in one of following formations.

(a) Zig-zag formation

(b) Chain formation

In zig-zag formation they are staggered as shown in figure 9. The distance between the row of rivets, is called the row pitch.

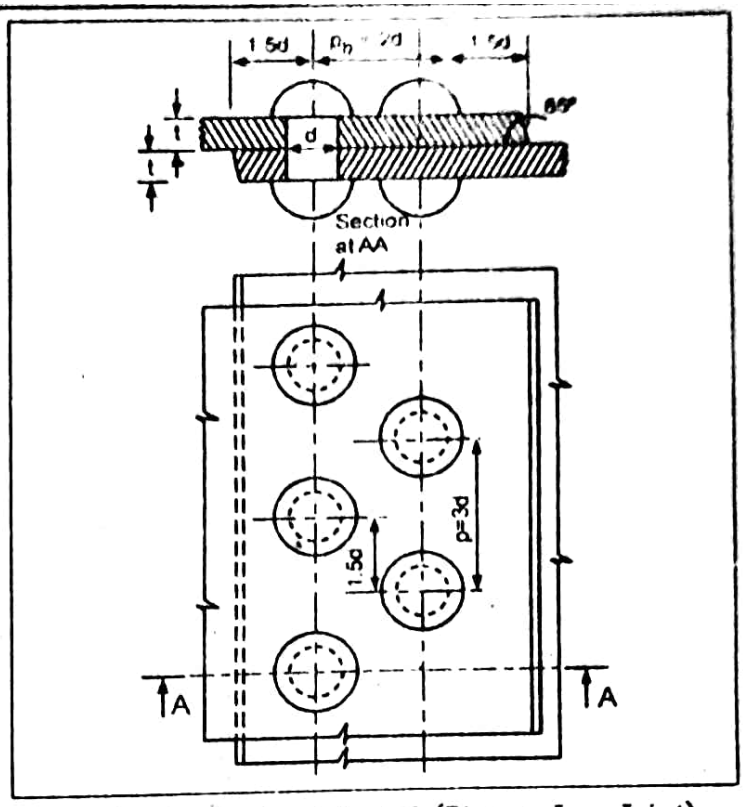

Fig.9 : Double Riveted (Zig-zag Lap Joint)

In double riveted lap joint (figure 10), rivets in the adjoining rows are placed directly opposite to each other.

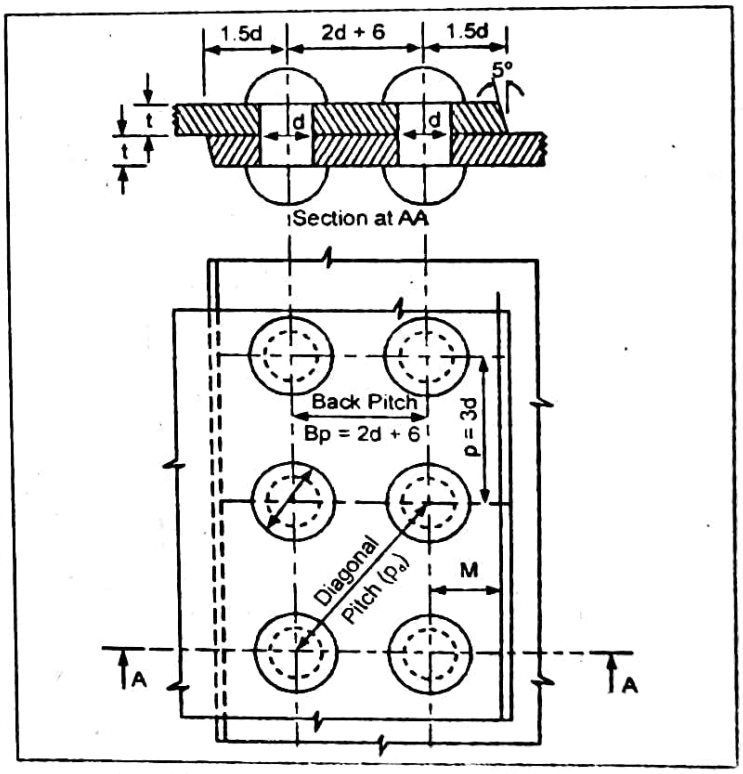

Fig.10 : Double Riveted (Chain Lap Joint)

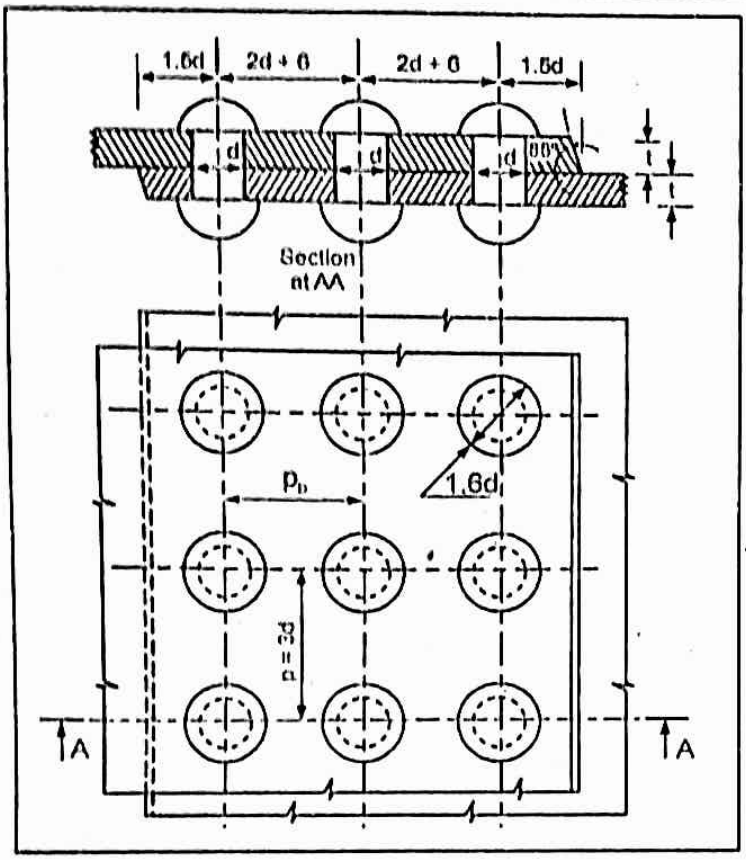

Fig.11 : Triplo Riveted (Chain Lap Joint)

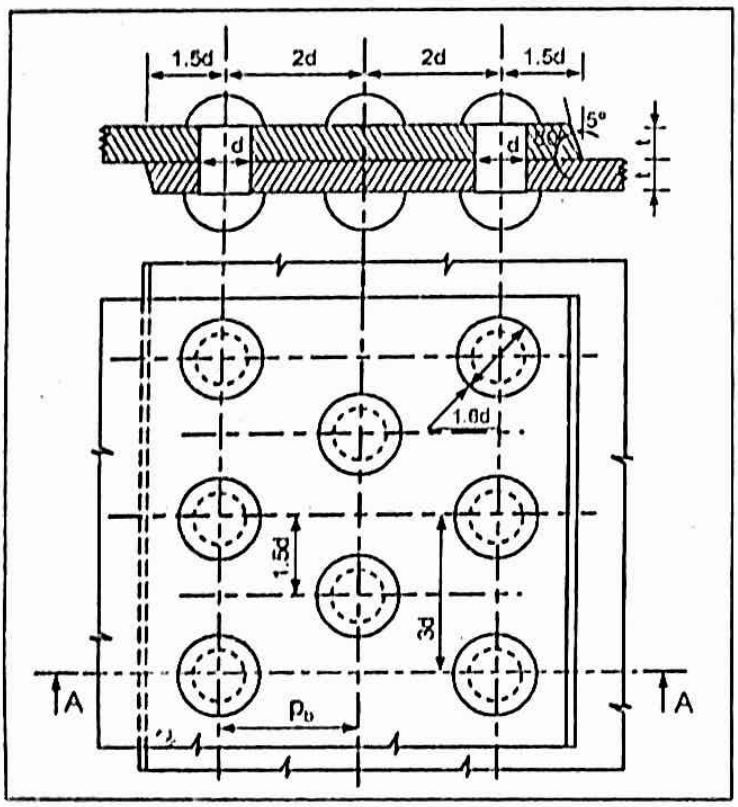

Fig.12 : Triplo Riveted (Zig-Zag Lap Joint)

Diameter of rivet (d) = $6\sqrt{t}$ (unwinds formula)

Maximum pitch (h) = $3d$

Margin (m) = $1.5d$

Minimum pitch = d+30mm

Row pitch for chain riveting (Pr) = 0.8P

Row pitch for zig-zag riveting (Pr) = 0.6P

Diagonal pitch (Pd) = $\frac{2p+d}{3}$

Length of rivet = thickness of plate (plate grip) + 1.25 d or 1.7 d

2. Butt Joint

In a butt joint, edges of the plates to be connected against each other and the joint between them is covered by butt-plates or butt straps (also called cover plates or cover straps) on one or both sides. At least two rows of rivets, one in each connected plate, are necessary to make the joint. Different types of butt joints are shown in figures.

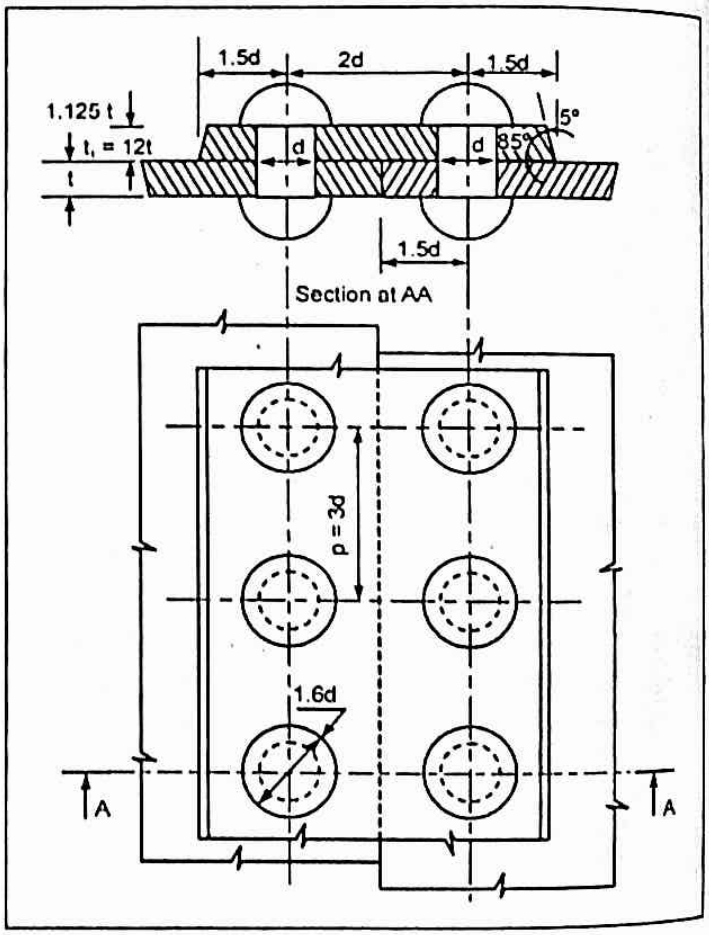

Fig.13 : Single Riveted Single Cover Plate (Chain Butt Joint)

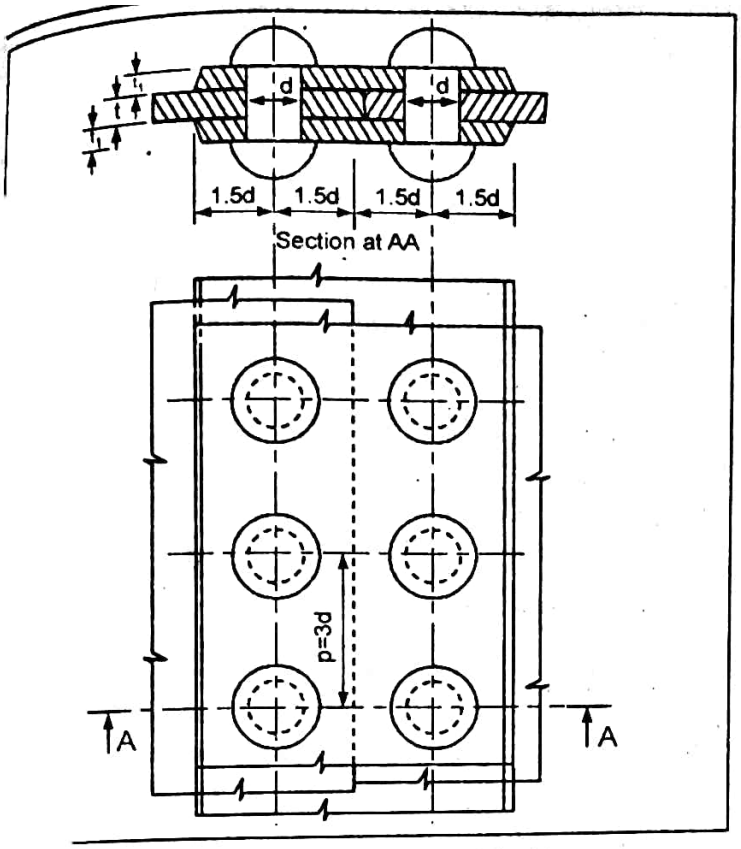

Fig.14 : Single Riveted Double Cover Plate (Chain Butt Joint)

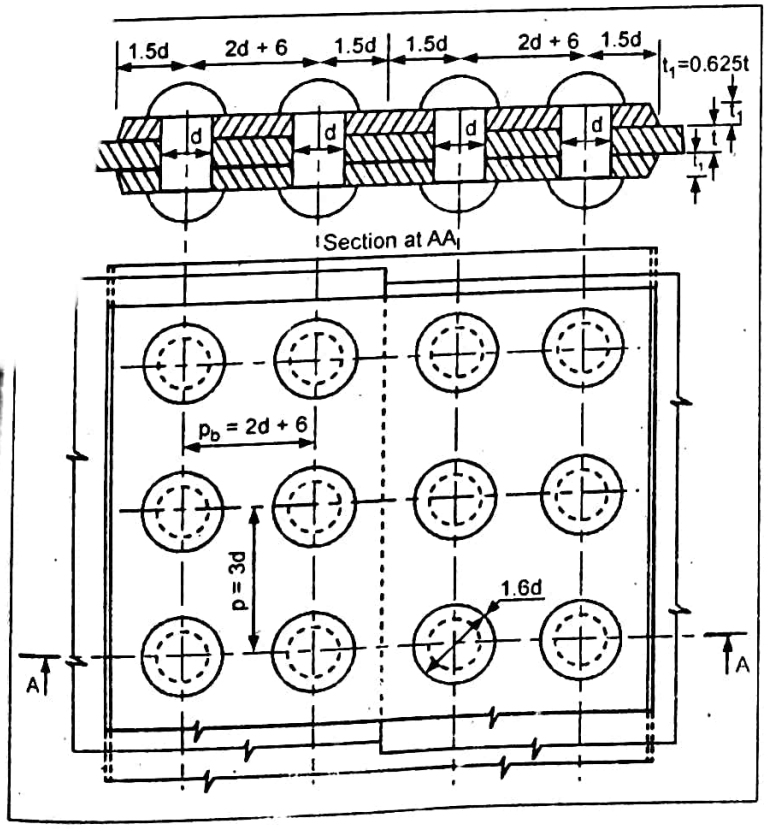

Fig.15 : Double Riveted Double Cover Plate (Chain Butt Joint)

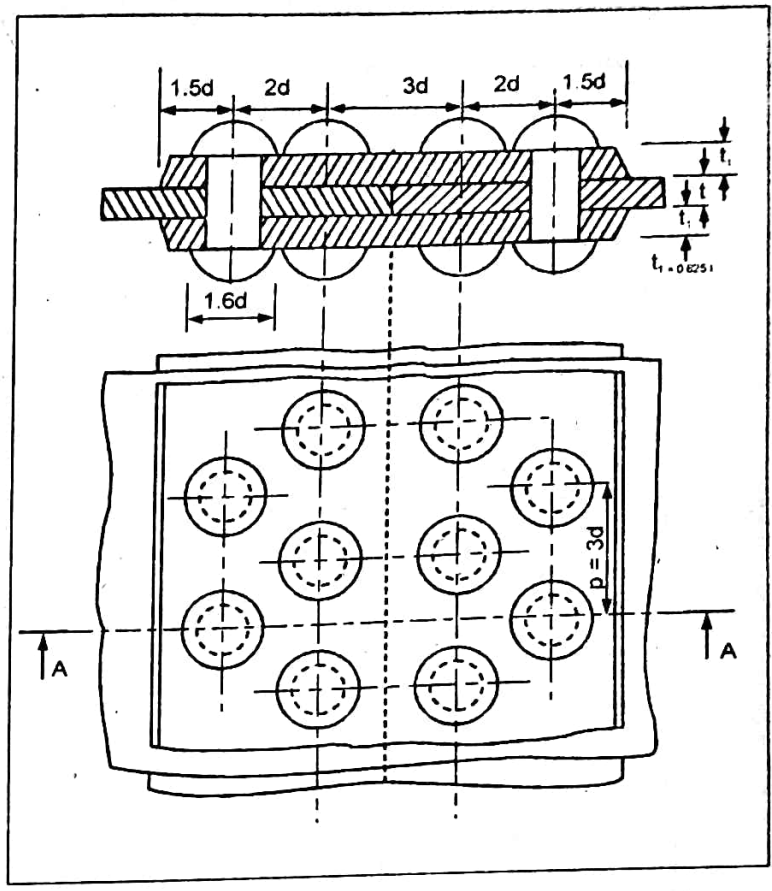

Fig.16 : Double Riveted Double Cover Plate (Zig-Zag Butt Joint)

In large structures, zig-zag riveting are used in form of diamond riveting.

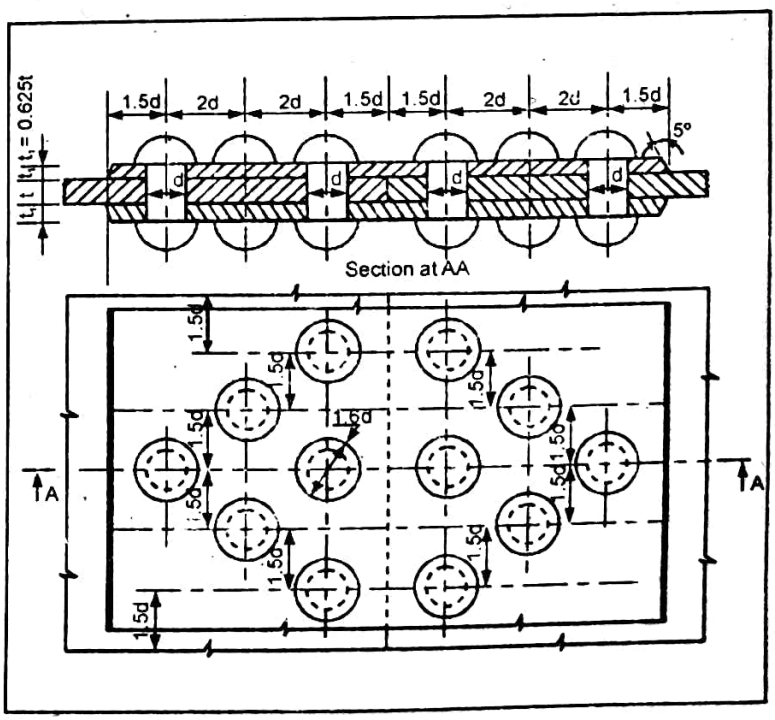

Fig.17