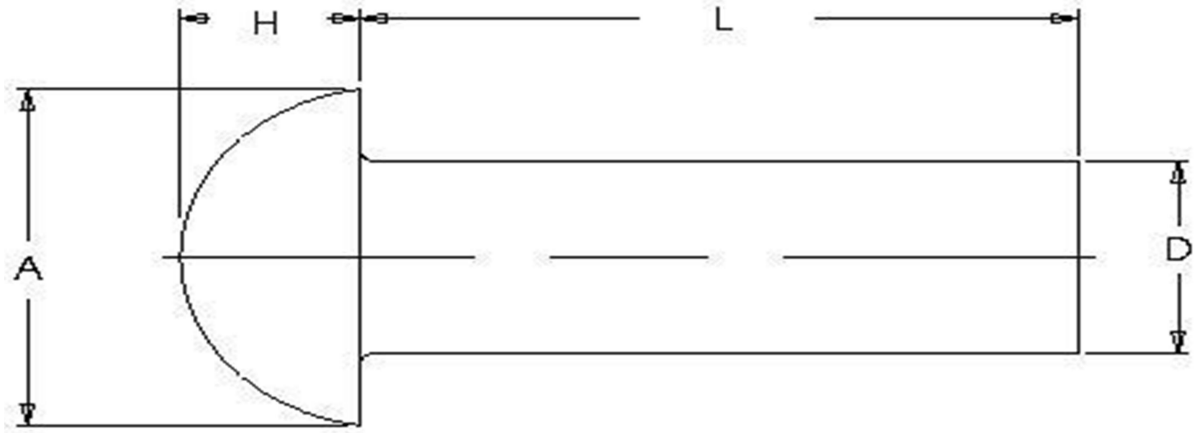
Riveted joint

Rivets as permanent joints:

Mechanical joints are broadly classified into two classes viz., nonpermanent joints and permanent joints. Non-permanent joints can be assembled and dissembled without damaging the components. Examples of such joints are threaded fasteners (like screw-joints), keys and couplings etc. Permanent joints cannot be dissembled without damaging the components. These joints can be of two kinds depending upon the nature of force that holds the two parts. The force can be of mechanical origin, for example, riveted joints, joints formed by press or interference fit etc, where two components are joined by applying mechanical force. The components can also be joined by molecular force, for example, welded joints, brazed joints, joints with adhesives etc.

Riveted joints were very often used to join structural members permanently. However, significant improvement in welding and bolted joints has curtained the use of these joints. Even then, rivets are used in structures, ship body, bridge, tanks and shells, where high joint strength is required.



Rivets and Riveting: A Rivet is a short cylindrical rod having a head and a tapered tail. The main body of the rivet is called shank (see figure 10.1.1). According to Indian standard specifications rivet heads are of various types. Rivets heads for general purposes are specified by Indian standards IS: 2155-1982 (below 12 mm diameter) and IS: 1929-1982 (from 12 mm to 48 mm diameter). Rivet heads used for boiler works are specified by IS: 1928-1978. To get dimensions of the heads see any machine design handbook.

Riveting operation can be of two types:

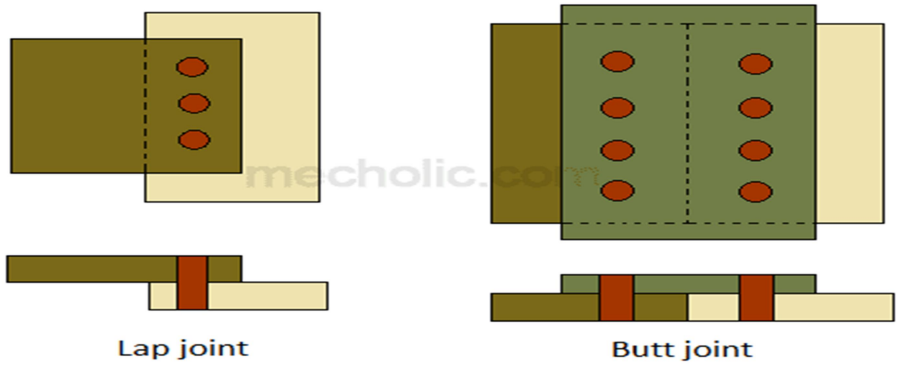
(a) Cold riveting (is done at ambient temperature)

(b) Hot riveting

Rivets are initially heated before applying force. After riveting is done, the joint is heat-treated by quenching and tempering. Ensure leak-proofness of the joints, when it is required, additional operation like caulking is done.

Riveted joints are mainly of two types

1. Lap joints (The plates that are to be joined are brought face to face such that an overlap exists)



Lap joint Butt joint

2. Butt joints (the plates are brought to each other without forming any overlap. Riveted joints are formed between each of the plates and one or two cover plates).

Based on number of cover plates used,

Butt joint again divided into two, Single strap butt joint and double strapped but joint.

Single strap butt joint: Type of but joint in which only one cover plate is placed on the main plate.

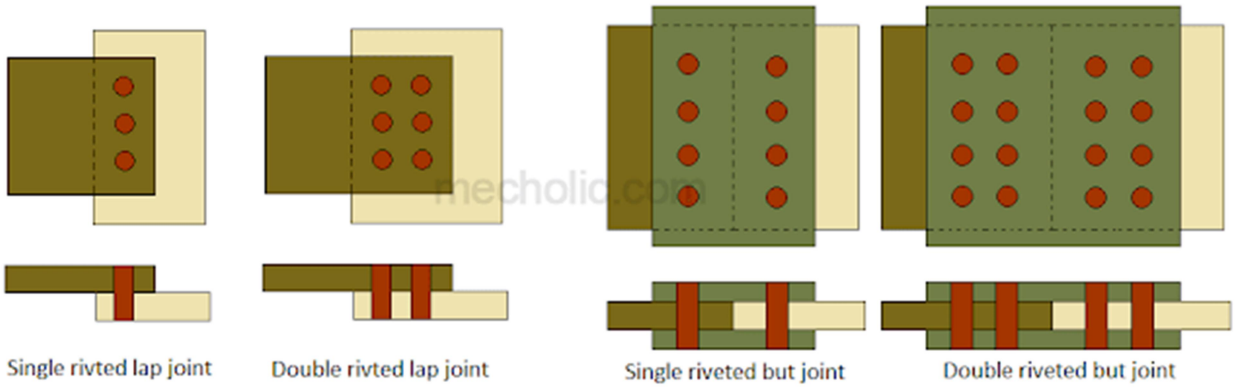
Double strapped but joint: Type of but joint which uses two cover plates. One cover plate is placed both sides of the main plates then riveted.

Based on how many rows of rivets in joint

Single riveted joint: The riveted joint has one row of the rivet in a lap joint or when there is only one row of the rivet on each plate of butt joint

Double riveted joint: Two rows of rivets are used in a lap joint or two rows of rivet are used in each main plate of but joint.

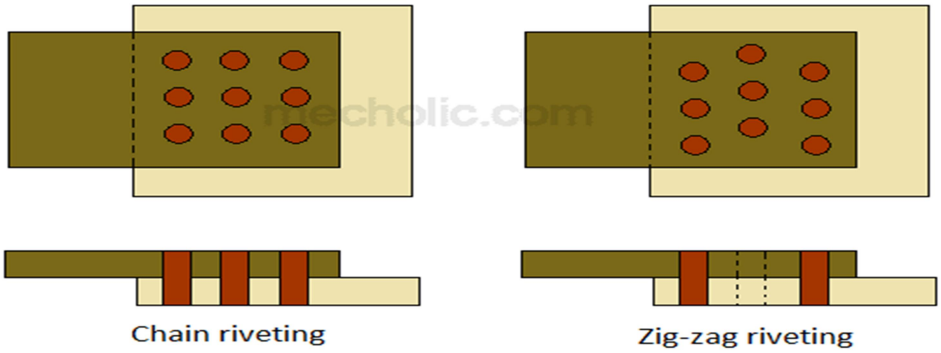
Similarly, there are triple riveted, quadruple riveted joints are there.



Based on the arrangement adjacent rows of rivet

Chain riveted: The rivets in the adjacent rows are opposite to each other (in same transverse line).

Zigzag riveted: When the rivets in adjacent rows are not in chain arrangement.



Important terms used in riveted joints-

(a) Pitch: This is the distance between two centers of the consecutive rivets in a single row. (usual symbol p)

(b) Back Pitch: This is the shortest distance between two successive rows in a multiple riveted joint. (usual symbol pt or pb)

(c)Diagonal pitch: This is the distance between the centers of rivets in adjacent rows of zigzag riveted joint. (usual symbol pd).

(d) Margin or marginal pitch: This is the distance between the centers of the rivet hole to the nearest edge of the plate. (usual symbol m)