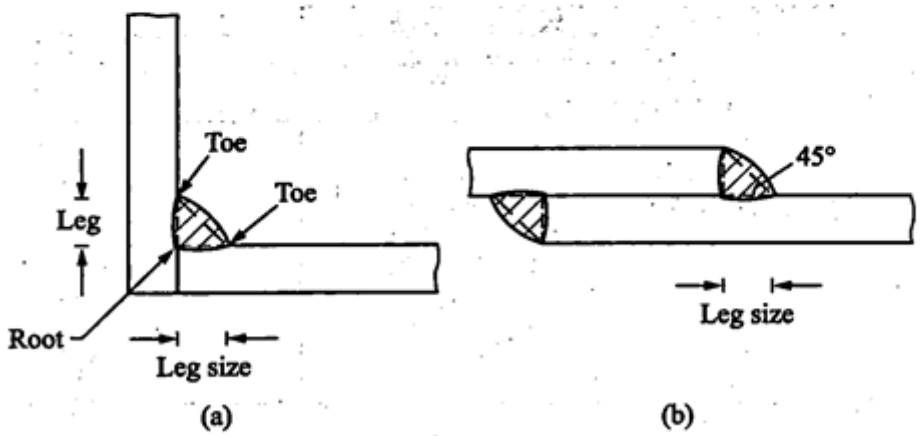
UNIT II CONNECTIONS IN STEEL STRUCTURES

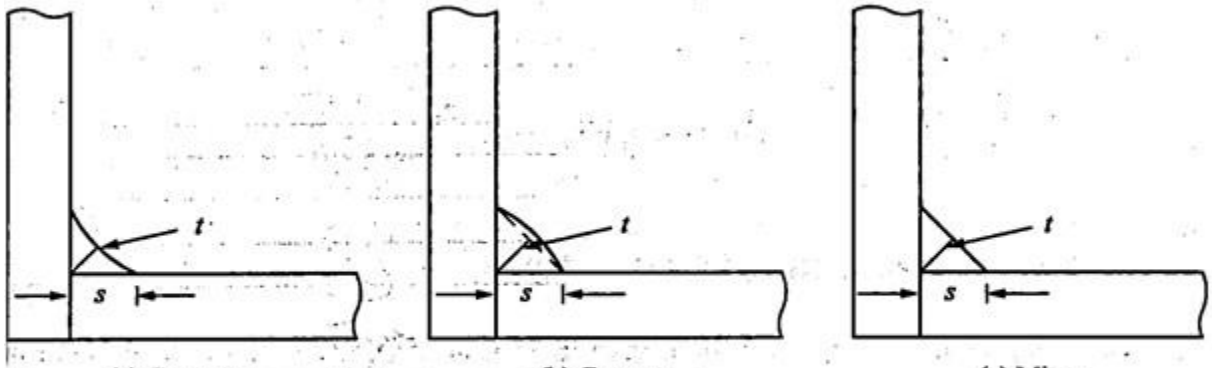
WELDED CONNECTIONS:- [IS 10.5, IS 800-2007]

Welded connections are advantageous in most of the cases, since

(i) Self wt. reduces due to absence of guest plates, connecting angles etc.
(ii) The connection is rigid.
(iii) The process is quicker
(iv) Asthetic appearance is good.
(v) Relatively lesser
(vi) Welded connections are air tight & water tight
(vii) Welded connections are preferable for trusses with circular c/s.



Typical fillet welds.



s - size *t* - throat thickness

Types of fillet welds.

DISADVANTAGES OF WELDED CONNECTIONS:-

a) Due to uneven heating & cooling members are likely to distart.
b) There is possibility of brittle fracture at the welded joint.
c) A welded connection fails earlier than a bolted connection, due to fatigue.
d) Inspection of welded its is difficult and expensive.
e) Highly skilled labour is regd. For weld.
f) Proper welding in the field condition is required.

Types of Welds:-

i) Lap weld
ii) Butt weld
iii) Slot weld
iv) Plug weld

(i) Lap weld:-

(ii) Butt weld:-

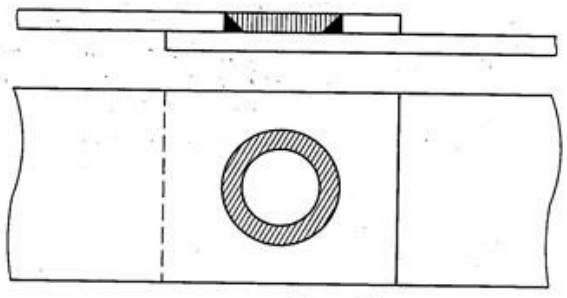
1. Single square butt weld
2. Double square butt weld
3. Single 'V' butt weld
4. Double 'V' butt weld
5. Single 'U' butt weld
6. Double 'U' butt weld
7. 'J' Butt weld

Types of butt weld

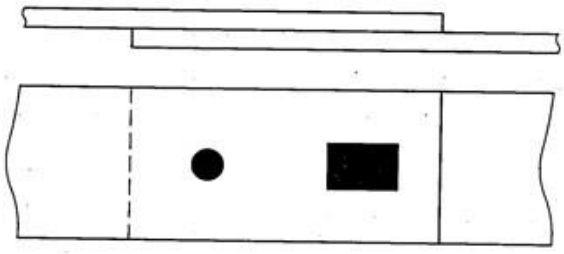
Sl. No.	Type of Butt Weld	Sketch
(a)	Square butt weld, on one side	
(b)	Square butt weld, both sides	
(c)	Single V butt joint	
(d)	Double V-butt joint	
(e)	Single U butt joint	
(f)	Single J-butt joint	
(g)	Single bevel butt joint	

Note: Similarly there can be double U, double J and double bevel butt joints.

(iii) Slot & Plug weld:-

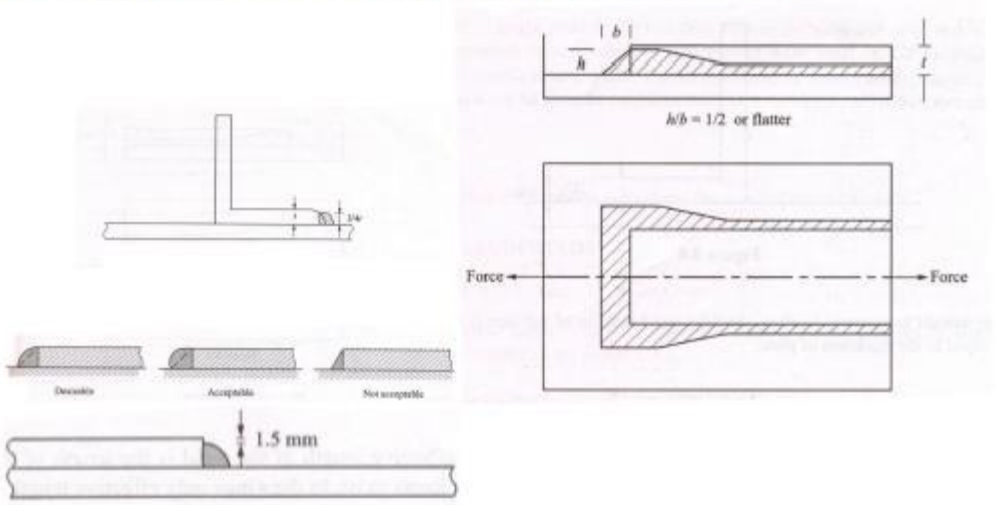


Slot weld.



Plug welds.

I.S. 800-2007 PROVISIONS FOR WELDED CONNECTION:-



1. Butt weld:-
   - The size of weld is specified by effective throat tks.
   - In case of complete penetration butt weld, it is taken as tks of the thinner part jt.
   - Double U & Double V Double J type butt welds are regarded as complete penetration butt welds.
   - For incomplete penetration butt welds, is taken as 5/8t
   - The eff. Length of butt weld is taken as length of full size weld.
   - The mini. Length of butt weld shall be 4 times the size of weld.

2. Filled weld:-

(a) Size of fillet weld:-
   - The size of normal fillet weld is taken as mini weld leg size
   - For deep penetration weld with penetration not less than 2.4mm, the size of weld is mini. leg size + 2.4mm

(b) Mini size of weld is 3mm. for plates of tks 10 to 20mm, min size is 5mm, for 20 to 32mm plates min size is 6mm & greater than 32mm plates min size is 8mm

(c) Eff. Threat tks:-
   - It shall not be less than 3mm and shall not exceed 0.7t [upto 90°] where, t=tks of thinner plate.

(d) Eff. Length:-

- The eff. Length of the weld is the length of weld for which the specified size and throat tks exist.
- The welding length provided is equal to the eff. Length t twice the size of weld

$$L = l_{eff} + 2s$$

- Eff. Length should not be less than 4 times the size of weld.

(e) The min. lap should be 4 times the tks of thinner part jt (or) 40mm whichever is more.