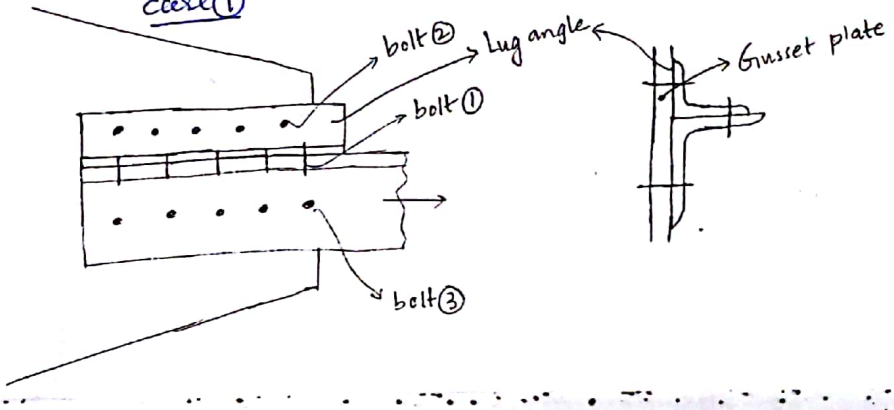
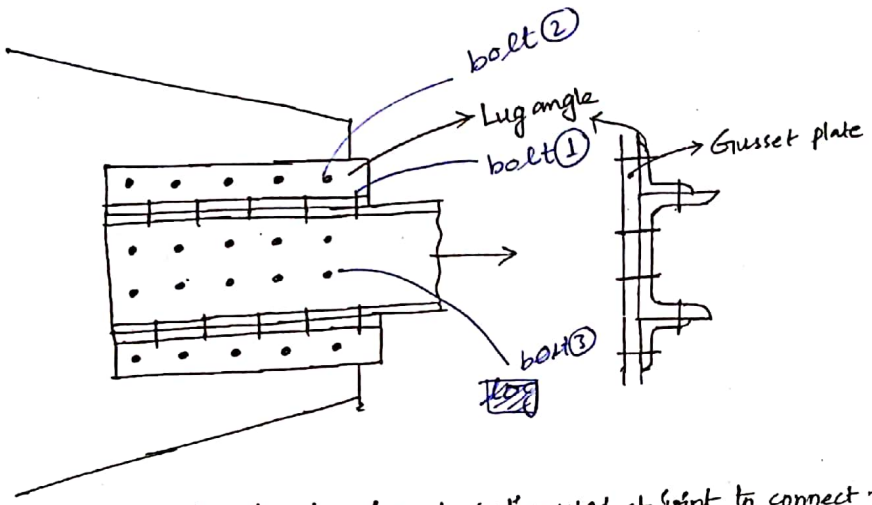
→ Lug angles ;

case ①



case ②



→ Lug angle is a short length of angle section used at joint to connect the outstanding leg of a member thereby reducing the length of a joint.

→ Bolts connecting the outstanding leg of main member with Lug angle (bolt ①) should start in advance of all the other bolts, this will ensure that force in the outstanding leg is effectively transferred to the Lug angle.

→ Where Lug angles are used to connect the angle member, the whole area of the member shall be taken as effective, i.e, shear lag is not accounted.

→ Atleast two bolts should be used for attaching the Lug angle to the Gusset plate. (bolt ②)

→ When angle member is the main member is the main member; (bolt

a) Lug angle and their connection with the gusset plate (bolt ②) should be designed for a force ≥ 1.2 times the force in outstanding leg of main member.

b) Connection of outstanding leg of main member with the Lug angle (bolt ①) should be designed for a force ≥ 1.4 times the force in outstanding Leg.

→ When the Channel member is the main member;

a) Lug angles and their connections with the gusset plate should be designed for a force ≥ 1.1 times the force in the outstanding leg.

b) Connection of Lug angle with outstanding leg of main member should be designed for a force ≥ 1.2 times the force in outstanding Leg.

→ Design of Tension member ;

Design steps ;

i) $(A_n)_{req} = \frac{T}{0.9 f_u / \gamma_{m1}}$ → for plates

(or)

$(A_n)_{req} = \frac{T}{\alpha f_u / \gamma_{m1}}$ → for angles with one leg connected

Where T → factored load (or) design load

ii) A_n so obtained is increased by 10-25% to compute the gross sectional area (A_g) and a trial section is chosen.

iii) for the chosen section we should check for gross section yielding;

i.e, $A_g = \frac{T}{f_y / \gamma_{mo}}$, $\gamma_{mo} = 1.1$

and $(A_g)_{Provided} > (A_g)_{yielding}$.

(iv) Connection is designed and safety is checked w.r.t;

a) Gross section yielding (already checked)

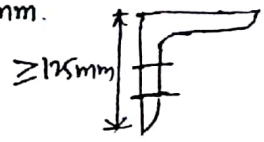
b) Net section rupture

c) Block shear failure

(v) Check for slenderness ratio. i.e, $\boxed{\lambda < \lambda_{max}}$

Note :-

→ On one leg of angle two lines of bolts can be accommodated only when Length of leg ≥ 125mm.



→ Two lines of bolts can be accommodated in the web of a channel only if depth ≥150mm.