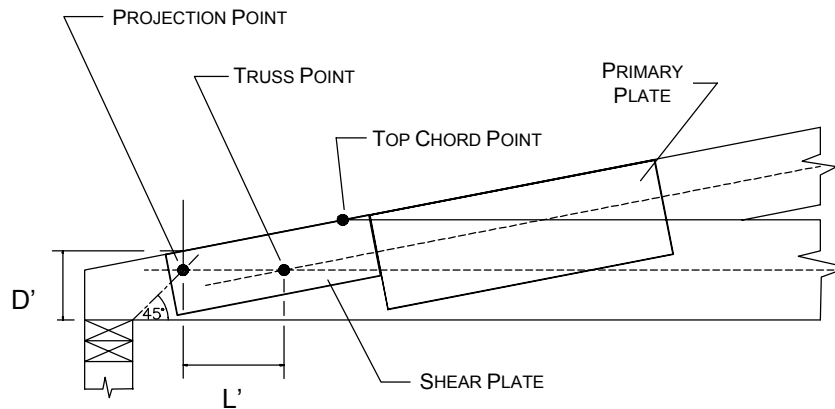


F.1 SHEAR PLATE DESIGN FOR GIRDER TYPE HEEL JOINT



Truss Point - the intersection of the centreline of top chord and the centreline of bottom chord.

Projection Point - the intersection of the forty five degree line from the inside edge of the bearing and the centreline of bottom chord.

Top Chord Point - the beginning point of the top chord scarf.

Shear Plate Requirements:

A shear check is required when the projection point is closer to the end of the truss than the truss point.

If $P_A > P_W$, then shear plates are required.

Where

- P_A = The factored shear load at the girder heel, N (lbs)
- $P_A = \frac{1.5RL'}{D'}$
- R = Reaction N (lbs)
- L' = Distance between projection point and truss point, mm (in)
- D' = Lumber depth at projection point, mm (in)
- P_W = The factored shear resistance of the lumber without plate, N (lbs)
- $P_W = \phi F_v t n L'$
- $\phi = 0.9$
- $F_v = f_v K_D K_{Hv} K_{sv} K_T K_{zv}$
- t = Lumber thickness per ply, mm (in)
- f_v = specified strength in shear, MPa (Psi)
- n = Number of plies
- K_D = Load duration factor
- K_{Hv} = Load sharing factor for shear
- K_{sv} = Service condition factor for shear
- K_T = Treatment factor
- K_{zv} = Size factor for shear

Shear Plate Design:

The shear plate must be sized and placed about the centreline of bottom chord to cover the distance L' such that:

- i) Area of the shear plate above or below the centreline of bottom chord must be capable of resisting the net shear force at the girder heel.

$$\text{Net Shear Force} = \frac{P_A - P_W}{n}$$

- ii) The length of the shear plate along the centreline of bottom chord must be such that the shear capacity of the plate, along the centreline of bottom chord, is greater than or equal to the net shear force at the girder heel. The shear length as calculated must not be less than L' .

Notes:

1. Where the primary plate interferes with the placement of the secondary shear plate then the primary plate must be specified long enough to provide the required grip and metal shear capacity due to the net shear force.
2. The tapered depth of the bottom chord at the inside edge of bearing should not be less than half the bottom chord size or 100mm (4 in), whichever is greater.
3. An additional moment check should be carried out due to extension of the bottom chord past the top chord. The moment to be used for this check is the overall span reaction times the distance from the inside edge of the bearing to the top chord point.