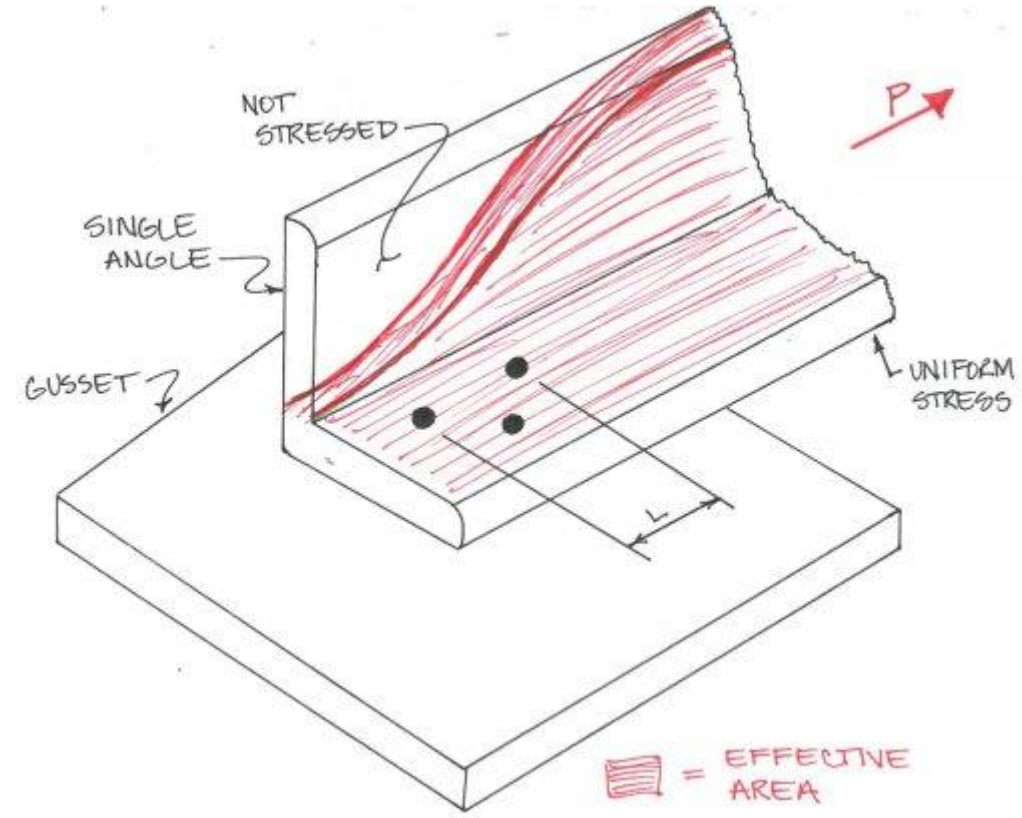
2.2 SHEAR LAG EFFECT



Design rules for tension splices are substantially the same as those for hanger connections.

In buildings, splices should develop the strength required by the stresses at point of splice.

For groove welds, however, the full strength of the smaller spliced member should be developed.

In highway bridges, splices should be designed for the larger of the following: 75% of the strength of the member or the average of the calculated stress at point of splice and the strength of the member there. Where a section changes size at a splice, the strength of the smaller section may be used in sizing the splice. In tension splices, the strength of the member should be calculated for the net section.

In railroad bridges, tension splices in main members should have the same strength as the members. Splices in secondary and bracing members should develop the average of the strength of the members and the calculated stresses at the splices.
In groove-welded tension splices between parts of different widths or thicknesses, a smooth transition should be provided between offset surfaces or edges. The slope with respect to the surface or edge of either part should not exceed 1:2.5 (equivalent to about 5:12 or 22). Thickness transition may be accomplished with sloping weld faces, or by chamfering the thicker part, or by a combination of the two methods.
Splices may be made with complete-penetration groove welds, preferably without splice plates. The basic allowable unit stress for such welds is the same as for the base metal joined. For fatigue, however, the allowable stress range Fsr for base metal adjacent to continuous flange-web fillet welds may be used for groove-welded splices only if
1. The parts joined are of equal thickness.
2. The parts joined are of equal widths or, if of unequal widths, the parts are tapered as indicated in Fig. 5.28, or, except for A514 and A517 steels, tapered with a uniform slope not exceeding 1:2.5.
3. Weld soundness is established by radiographic or ultrasonic testing.
4. The weld is finished smooth and flush with the base metal on all surfaces by grinding in the direction of applied stress, leaving surfaces free from depressions. Chipping may be used if it is followed by such grinding. The grinding should not reduce the thickness of the base metal by more than 1â• „32 in or 5% of the thickness, whichever is smaller.
Groove-welded splices that do not conform to all these conditions must be designed for reduced stress range assigned to base metal adjacent to groove welds.
For bolted flexural members, splices in flange parts between field splices should be

avoided. In any one flange, not more than one part should be spliced at the same cross section.

Fatigue need not be considered when calculating bolt stresses but must be taken into account in design of splice plates.