

also been applied in Tables in Part 10 of the *Manual*.

Block Shear Rupture

Specification Section J4.3

$$R_n = 0.6F_uA_{nv} + U_{bs}F_uA_{nt} \\ \leq 0.6F_yA_{gv} + U_{bs}F_uA_{nt} \quad (J4-5)$$

$$\phi = 0.75 \text{ (LRFD)}$$

$$\Omega = 2.00 \text{ (ASD)}$$

Additional References

Manual Table 9-3

Block shear is the tearing out of a block of material at a connection as shown in Figure 2. Numerically, it is the sum of shear yield or shear rupture on a failure path parallel to the load and tension rupture perpendicular to the load. It most often applies on coped beam sections, gusset plates, and angle legs. It also is applicable to the perimeter

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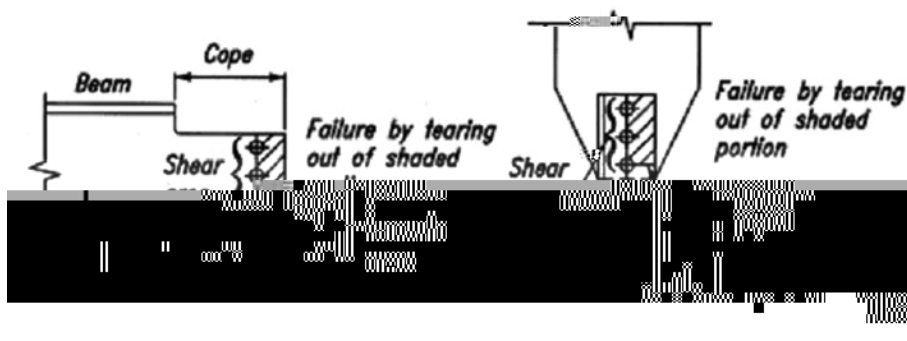


Figure 2. Typical block shear failure paths from AISC Specification Commentary.

and the slots are transverse to the direction of the load. The strength of the bolts in the connection is then limited to 50% of the available bearing strength of the bolted connection. See Specification Section J1.8 for more information.

Minimum sizes of fillet welds and partial-joint penetration welds are given in Tables J2.3 and 2.4 in the Specification and are based on the thickness of the thinner part joined. This is a change from previous editions of the Specification, in which minimum weld sizes were based off the thicker part joined.

Base Metal at Welds

Specification Section J2.4

Base Metal: $R_n = F_{BM}A_{BM}$ (J2-4)

$\phi = 0.75$ (LRFD)

$\Omega = 2.00$ (ASD)

Additional References

Weld strength, Table J2.5

Minimum fillet weld sizes, Table J2.4

The nominal strength of a welded connection is the lower value between the strength of the base metal at the weld and the weld itself. The base metal must be checked for the limit states of shear yield and/or shear rupture. Table J2.4 gives minimum thicknesses for base metal at welds. This assures that the shear rupture strength of the base metal will match the shear rupture strength of the weld.

In Conclusion

There are limit states outside the scope of this article, such as coped beam limit states, prying action, and local buckling. These are addressed in detail in Parts 7 (Bolts), 8 (Welds), and 9 (Connection Elements) in the Manual.

As a summary, I have included two tables detailing limit states to be checked for various connection configurations. These tables follow the connections outlined in Part 10 of the Manual. I hope you find this helpful in your design!

MSC

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