CLOSURE

Block Shear Equations Revisited...Again

Paper by HOWARD I. EPSTEIN and LANCE J. ALEKSIEWICZ
(First Quarter, 2008)

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The primary conclusion of the authors' paper was the need for more cases to be included for the new block shear reduction factor (due to eccentricity), U_{bs}, less than 1.0. Of the cases suggested, angles connected by one leg are the most critical due to this common way of connecting angles. The discussion by Prof. Driver indicates that there is "gross conservatism" built into the 2005 AISC *Specification* for this case. The authors disagree. Prof. Driver's recent co-authored paper (Driver et. al., 2006) base this "gross conservatism" conclusion on a small fraction of the tests that were conducted at the University of Connecticut (Epstein, 1992) by not considering 12 of the 15 block shear failures found due to the stagger in those 12 connections. But, as already pointed out in the author's paper, "Stagger…was shown not to have an appreciable effect on capacity." Out-of-plane eccentricity is a significant factor in reduced capacity for block shear. This was also shown for flange connected tees.

The case of flange connected tees was extensively investigated at the University of Connecticut (Epstein and Stamberg, 2002). The discusser states that "…no reduction is required for this case" due to relatively small out-of-plane eccentricity. The authors disagree. The "shear lag" factor, $U = 1 - x/L$, is a strong indicator of out-of-plane eccentricity. There are many potential flange-connected Tees where U is calculated to be 0.7 or less. The discusser also indicated that the test results for flange-connected Tees of Epstein and Stamberg (2002) show no need for including an U_{bs} factor less than 1.0, and he calculated ratios and coefficients to back his point. The authors, however, would like to point out that the tests for Tees varied from very little to significant out-of-plane eccentricities, and there was a strong correlation between the $U = 1 - x/L$ factor and the need for a U_{bs} factor significantly less than 1.0.

The authors thank Prof. Driver for his discussion. From our mutual writings, it is clear that we agree that some "tweaking" of the AISC *Specification* for block shear is still very much warranted. It remains the author's opinion that "… either the definition of U_{bs} must change or the figures in the (AISC) commentary need to include more cases where U_{bs} is not equal to 1.0. As a minimum, two gage lines in an angle as well as Tees connected by their flanges and, probably, W sections connected by their flanges should be added to the cases in Figure 5b."

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