steelwise

DEVELOPING M_p

Does an R=3 directly welded ange moment connection do it?

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CHANGE TO AN AUTHORITA

of tension ange rupture. The applied moment consistently exceeded the plastic moment capacity of the beam calculated with the yield strength from tensile coupon tests. Strain hardening is the reason provided by most researchers to explain the ability of the anges to carry loads exceeding their yield strength; however, several specimens were loaded well in excess of the measured tensile strength.

While it is clear that strain hardening of the beam anges plays a signi cant role in the performance of directly welded moment connections, another important factor is the transverse restraint of the ange at the column face. Generally, the ange is free to deform through the thickness as shown in Figure 3a. However, deformation across the width of the ange is restrained as shown in Figure 3b.

Fig. 3. Restraint at the beam flange.

The triaxiality increases with the level of restraint, which results in increased strength and decreased ductility. Figure 4 shows the stress-strain cteltress-strain a 4 mbain whichpFigt3f9 0h17 -1.27b.

Moment Connections, Tested

Several tests have been performed, and subsequent papers/reports written, on directly welded moment connections. Here are ten:

Blackman, B. and Popov, E.P. (1995), "Studies in Steel Moment Resisting Beam-to-Column Connections for Seismic-Resistant Design," Report No. UCB/EERC-95/11, Earthquake Engineering Research Center, October.

Chen, W.F. and Patel, K.V. (1981), "Static Behavior of Beam-to-Column Moment Connections," *Journal of the Structural Division*, ASCE, Vol. 107, No. ST9, September.

Engelhardt, M.D. and Husain, A.S. (1992), "Cyclic Tests on Large Scale Steel Moment Connections," Report No. PMFSEL 92-1, Phil M. Ferguson Structural Engineering Laboratory, The University of Texas at Austin, June.

Huang, J.S., Chen, W.F. and Beedle, L.S. (1973), "Behavior and Design of Steel Beam-to-Column Connections," WRC Bulletin 188, Welding Research Council, October.

Krawinkler, H. and Popov, E.P. (1982), "Seismic Behavior and Design of Moment Connections and Joints," *Journal of the Structural Division*, ASCE, Vol. 108, No. ST2, February.

Popov, E.P. and Tsai, K.C. (1989), "Performance of Large Seismic Steel Moment Connections Under Cyclic Loads," *Engineering Journal*, AISC, Second Quarter.

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