End-loaded Bolted Joints

Chapter J in the AISC *Specification* covers reduction factors for long bolted joints and discusses an end-loaded configuration. What is an end-loaded joint and when do these reduction factors apply?

End-loaded connections are illustrated in AISC *Steel Design Guide 17*, Chapter 5; see Figures 5.2 and 5.3 and the supporting text. In the 2005 AISC *Specification*, there is a 20% reduction that covers the first 50 in. of length and an additional 20% reduction if the joint gets longer than that. The confusing part is that the first 0.8 reduction factor (for shorter connections, less than 50 in.) is already included in the bolt values in Table J3.2 of the 2005 *Specification*.

Of course, in a shear connection, the bolts are usually loaded uniformly unlike an end-loaded connection, so it is conservative to include this reduction factor, and that is what has been done traditionally to simplify bolt design by not having different values for different applications. For longer end-loaded connections, there is an additional 0.8 factor shown in Table J3.2 footnote f.

Note that the 2010 *Alue1vnvat[illegible]vreo the E[illegible] To do this, [illegible]ould have to hire an engineer to revie[illegible]hem. [illegible]at does AISC think of this requirement[illegible]*

In the general sense, it is inappropriate—illegal in some licensing jurisdictions—to place an engineer's stamp on drawings that were not prepared under that engineer's supervision. Shop and erection drawings are not instruments of design, but rather documents that are used in the shop and field to make the parts and assemble them. An engineer's stamp is placed on the work of the engineer—design drawings and design information—to show who is the engineer in responsible charge and signify that the engineer has exercised his

Accounting for Existing Web Openings

I am analyzing an existing structure for some new, increased floor soaoopening equal in size to the extents of the two op openings are large, this may not work, and then you would need to base your analysis on structural mechanics and engineering judgment. Perhaps you could consider the behavior of the beam in the region of the opening as similar to a [illegible]erendeel truss and use the design guide as one source of guidance for limit states to consider. Chapter 5 lists several additional limit states to consider for closely-spaced openings.

Heath Mitchell, P.E.

Checking Combined Loads

For a built-up "C" section in compression and major-axis bending, what criteria from Table B4.1 in the AISC *Specification* need to be used to check the flanges and webs for width-thickness ratios?

The flanges and web will each be classified for local buckling (LB) twice: once for uniform compression (for use in the Chapter E calculations of compressive strength) and once for bending (for use in the Chapter F calculations of flexural strength). Note that the Chapter E calculations are performed as if the member has no bending, and the Chapter F calculations are performed as if there is no axial force. Axial force and bending are then combined later with these results in the Chapter H equations, after you have computed ϕP_n and ϕM_n.

In compression, you have two conditions: non-slender and slender. In bending, you have three conditions: compact, non-compact, and slender.

For the web, Cases 10 and 9 in Table B4.1 cover the slenderness conditions for compression and flexure, respectively. For the flanges, Case 3 and Case 1 cover compression and flexure, respectively.

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