# DISCUSSION

## Design of I-Beam to Box-Column Connections Stiffened Externally

Paper by TING, SHANMUGAM, and LEE
(4th Quarter, 1993)

Discussion by Nestor R. Iwankiw, AISC

The authors present one possible connection arrangement between these two steel shapes using tees as external beam stiffeners, or flange attachments. This appears to be a reasonable solution to provide a more direct flexural force transfer from the I-beam flanges to the box-column flanges.

One important dimension that requires additional consideration is the minimum tee stiffener length. Without the equivalent U.S. traditional unit conversions shown in Appendix II, Example 1, it is not obvious how short the computed stiffener length is based on the proposed stiffness and strength criteria: only two inches! Despite the reported analyses and tests, this will not be perceived as a practical design. Furthermore, such a connection violates the AISC weld requirements contained in LRFD Section J2. An additional length limit proportional or equal to the beam or stiffener depth would be more reasonable.

It appears from Figure 2 that the beam itself is fully welded to the column. If so, is the tee stiffener sized to transmit the full plastic moment of the beam only as a conservative simplification, since some of the flexure will be transmitted through the beam flanges and web to the supporting box column web?

The $A_w$ (stiffener area between the flange and k-line) term contributes relatively little to Equation 2. It could be conveniently dropped without much penalty.

In addition to a LRFD resistance factor associated with Equation 2, an explicit shear lag reduction should be included per LRFD Section B3. In accordance with LRFD Section D1, the ultimate tensile strength, $F_u$, is employed for the strength limit state of tensile fracture on the net section. However, the authors use the lower tensile yield in the presented examples which amounts to an implied 0.65 reduction.

In summary, the recommended connection details and their design should be reviewed prior to actual applications for consistency with the published AISC Manuals and Specification, and, of course, any other building code requirements.

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# CORRECTION

## Discussion of Design of Column Base Plates Under Gravity Load

Paper by THOMAS SPUTO and NESTOR R. IWANKIW
(4th Quarter, 1993)

p. 151: The equation below Equation 3 should read:

$$t = R\sqrt{\frac{F_p}{2.7F_y}\left[1 - 3\left(\frac{R_c}{R}\right)^2 + 2\left(\frac{R_c}{R}\right)^3\right]}$$