DISCUSSION

Improved Shear Strength of Webs Designed in Accordance with the LRFD Specification

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The author has presented a more accurate model for the shear buckling coefficient, k_v. While the improved k_v is intellectually satisfying and I have no reason to doubt its accuracy, the example he chose to illustrate the alleged savings using his approach is wholly unconvincing.

First, it does not seem wise to this writer to put stiffeners on 60-in. centers in a web whose h / t_w is 90. At this slenderness, 75 percent of the maximum possible shear strength can be achieved with no stiffeners at all. Stiffeners are expensive to install: if one is going to use them, one might as well use them on a much thinner web.

Secondly, the 253^k shear capacity of the beam probably far exceeds the factored shear load such a beam is likely to see. The author's method permits an increase to 280^k. This writer believes this increase to be irrelevant for the example shown.

The beam of the author's example has a plastic section modulus of 451 in.^{3} and ϕM_p = 1218 ft-k. Let's suppose the beam is 30 feet long (a span depth ratio of 10/1). The maximum factored uniform load is 10.5 k/ft. The maximum shear, then, is 157^k. Unless there is a very large concentrated force near the support, it is not likely that this beam would need an increase in ϕV_n from 253^k to 280^k. With no stiffeners at all, this beam still has a design shear strength of 211^k, according to AISC.

The author's method may be more exact than what is currently in the AISC-LRFD Specification, but I question whether the savings in cost will justify the added complication of a revised k_v, which must be scaled from a graph. Stiffeners cost money. It would make a more convincing argument if the author could show us how to reduce the number of stiffeners in a plate girder, whose h / t_w ratio is 170 or greater.

There is an error in Equation 8. The denominator should not be squared.