steel interchange

IF YOU'VE EVER ASKED YOURSELF "WHY?" about something related to structural steel design or construction, Modern Steel Construction's monthly Steel Interchange column is for you! Send your questions or comments to solutions@aisc.org.

Web Sidesway Buckling

I noticed that there is a t_w^3 term in the numerator and denominator of AISC Specification Equation J10-7 for the web sidesway buckling case where the compression flange is not restrained against rotation. Since these terms cancel out, why are they included in the equation? Is it true that the web sidesway buckling strength is independent of web thickness?

You're right about the t_w^3 cancelling out. AISC Specification Equation J10-7 reduces to a function that is dependent on the flange stiffness couple (moment of inertia times h). What you have observed is that when the compression flange is braced, the web is able to provide flexural stiffness to prevent lateral deflection of the tension flange (Equation J10-6). However, when the compression flange is not braced, the web is no longer able to provide this restraint and thus the web thickness cancels out of the equation (Equation J10-7).

The formula is in the form it is in for consistency and to keep the calculation simple. This may seem counterintuitive, but note that the reduced formula would have an "h" in it. This value is not published in the AISC Manual, rather it is incorporated into h/t_w.

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Weld Strength Calculation

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