STEEL QUIZ, a monthly feature in Modern Steel Construction, allows you to test your knowledge of steel design and construction. Unless otherwise noted, all answers can be found in the LRFD Manual of Steel Construction. To receive a copy of the current AISC Publications List, please call 800/644-2400 or fax 312/670-5403.

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If you or your firm are interested in submitting a steel quiz column, please contact Scott Melnick at 312/670-5407 (email: melnick@aiscmail.com).

This month’s steel quiz column was submitted by Victor Shneur, P.E., from LeJeune Steel Company in Minneapolis.

QUESTIONS:

1. What is killed steel?

2. What is the AISC washer requirement for fully-tensioned A490 bolts over one inch in diameter when these bolts are used in slotted or oversize holes in external plies?

3. Can A325 and A490 bolts be galvanized?

4. Please list the accepted procedures for fully tensioning high strength bolts.

5. When W-shapes are shop-spliced with complete/partial joint penetration welds, why should the web weld be applied first?

6. What is the effective size of a flare-V-groove weld?

7. Why is an increased weld throat allowed for fillet welds made by the submerged arc process?

8. What are the limit states for the HSS wall at a single-plate shear connection?

9. When is tension field action not permitted in plate girder design?

10. What is the maximum acceptable variation in elevation of the top of anchor rods?
5. The web should be welded first, then the flanges. Welding the flanges first would place too much restraint on the web.

6. Per AWS D1.1-98 Table 2.1, the effective size of a flare-V-groove weld is 1/2R typically, except 3/8R for the GMAW process (except short circuiting transfer) when R is 1/2" or greater. Note R = radius of outside corner.

7. As explained in LRFD Commentary Section J2.2a, "This increased weld throat is allowed because the submerged arc process produces deep penetration of welds of consistent quality.

8. Base metal shear at weld and punching shear are the two limit states for the HSS wall at a single-plate shear connection.

9. Tension field action is not permitted for end-panels in non-hybrid plate girders, for all panels in hybrid and web-tapered plate girders, for all panels containing large web penetrations, when \( a/h > 3.0 \) or \( \left( \frac{260}{(h/t_w)} \right)^2 \). Reference LRFD Specification Appendix G3.

10. As specified in the AISC Code of Standard Practice for Steel Buildings and Bridges (June 10, 1992) Section 7.5.1.c, the elevation of the top of anchor rods must not vary from the dimensions shown on the erection drawings by more than +/-1/2 inch.