

STEEL QUIZ

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*.

If you or your firm are interested in submitting a Steel Quiz column, please contact Scott Melnick at 312/670-8311 or via email at melnick@aiscmail.com.

Questions and answers for this month's Steel Quiz were contributed by **Victor Shneur**, P.E., of the LeJeune Steel Company, Minneapolis, MN. Thanks, Victor!

mended plate length for single-plate shear connections?

9. Why should doubler plates or longitudinal stiffeners be extended at least a distance d_c (depth of cope) beyond the cope at the end of a reinforced coped beam?
10. Refer to brace connection shown in special case 3, fig. 11-10 in *LRFD Manual*, 2nd ed.: What effective length factor K should be used to check the gusset plate for compression?

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QUESTIONS

1. What is a non-self supporting steel frame?
2. True/False? The *RCSC Specification for Structural Joints Using ASTM A325 or A490 Bolts* (1994) prohibits the use of any published relationship between torque and tension for ASTM A325 and A490 bolts.
3. In bolted connections, what is a minimum thickness for the ply closest to the nut to exclude threads from the shear plane of a $\frac{3}{4}$ in. bolt if a $\frac{5}{32}$ in. thick washer is present?
4. True/False? ASTM A992 steel has good weldability and ductility characteristics.
5. Is it okay to field weld through shop coatings? If so, when is it acceptable?
6. What is the fabrication tolerance for camber for a 40' beam?
7. What limit states of the supported beam web should be checked at a stiffened seated connection?
8. What is the minimum recom-

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ANSWERS

1. From the AISC *Code of Standard Practice for Steel Buildings and Bridges* (1992) Section 7.9.3: "A non-self-supporting steel frame is one that, when fully assembled and connected, requires interaction with other elements not classified as Structural Steel to provide stability and strength to resist loads for which the frame is designed." An example would be a steel-framed building that is dependent on masonry shear walls for lateral stability.
2. True. According to Section 8(d)(2) of the bolt specification: "This specification does not recognize standard torques determined from table or from formulas which are assumed to related torque to tension."
3. From figure 8-3 in the LRFD Manual, the minimum ply thickness closest to the nut to exclude the bolt threads is 1/4 in.
4. True. The ASTM A992 specification was modeled closely on the ASTM A572 grade 50 specification.
5. From the AISC *LRFD Specification* (1993) Commentary, Section M3.5: "The Specification allows for welding through surface materials, including appropriate shop coatings, that do not adversely affect weld quality nor create objectionable fumes."
6. The fabrication tolerance shall be between minus 0 in. and plus 1/2 in. Refer to the *Code of Standard Practice for Steel Buildings and Bridges* (1992) Section 6.4.5.
7. Local web yielding and web crippling are applicable limit states.
8. From the *LRFD Manual* section on "Single-Plate Connections", p. 9-148: "To provide for stability during erection, it is recommended that the minimum plate length be one-half the T -dimension of the beam to be supported."
9. Extending the doubler plates or longitudinal stiffeners prevents local crippling of the beam web.
10. An effective length factor of $K = 1.2$ could be used. The gusset in compression could be envisioned as a column with a fixed base (welded to beam) and a fixed top free to translate laterally. See case (c) in Table C-C2.1 in the LRFD Specification.