

# 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*. **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).

## QUESTIONS:

1. Where can the expected tolerances for structural steel erection be found?
2. Does all exposed structural steel qualify as "architecturally exposed structurally steel"?
3. What is a good source of information on stainless steel?
4. Does the AISC Code of Standard Practice specify tolerances on the placement of bolt holes in fabricated steel?
5. What is the most current specification for steel design and construction from AISC?
6. Is it acceptable to substitute bolts known as "grade 5" or "grade 8" bolts for ASTM A325 or ASTM A490 bolts, respectively?
7. How does one verify the pretension in a previously installed bolt?
8. Does AISC have a compilation of frequently asked questions (FAQ)?
9. In what cases is eccentricity considered in the design of double angle connections?
10. Name the limit states that are applicable to a single plate shear connection that is welded to a column flange and bolted to an uncoped beam web.

## ANSWERS

1. The AISC Code of Standard Practice (June 10, 1992) covers erection tolerances in section 7.11, Frame Tolerances. These tolerances should be considered when designing other building materials and finishes that interface with structural steel.
2. Not necessarily. Section 10 of the AISC *Code of Standard Practice* (June 10, 1992) provides additional requirements which apply only to members specifically designated by the contract documents as "Architecturally Exposed Structural Steel" (AESS). This section of the Code establishes standards for AESS that account for both the desired finished appearance and the abilities of the fabrication shop to produce the desired product.
3. Contact the Nickel Development Institute (NiDI) for information on the availability and specification of stainless steel products: phone: 416-591-7999; web: www.nidi.org
4. No. While the Code does specify a  $\pm 1/16$ " tolerance in some cases on the overall length of members, as well as a  $1/16$ " clearance on the size of standard holes, these tolerances should not be construed as implying that the  $\pm 1/16$ " tolerance applies to the maximum tolerance on the hole location within a pattern of holes or to the position of intermediate connections.
5. The LRFD Specification for Structural Steel Buildings (December 1, 1993) is the most current specification. It has been updated by LRFD Specification Supplement No. 1 (January 30, 1998). Call the AISC Publications Department at 1-800-644-2400 for LRFD Specification Supplement No. 1, publication number S347L, free.
6. No. This designation usually refers to SAE J429 grades 5 and 8 bolts, which have the strength equivalent of ASTM A325 and ASTM A490 bolts respectively. However, the material specifications differ in that ASTM A325 and A490 specify thread length and head size, where SAE J429 does not. Also, quality assurance and inspection requirements for ASTM A325 and A490 bolts are more stringent.
7. It cannot easily be verified. The design and installation of bolted connections is covered in the *LRFD Specification for Structural Joints Using ASTM A325 or A490 Bolts* (June 3, 1994), authored by the Research Council on Structural Connections (RCSC) and endorsed by AISC. RCSC commentary section C8 states: "At the present time, there is no known economical means for determining the tension in a bolt that has previously been installed in a connection." Proper bolt pretension is most reliably achieved when proper installation procedures are followed, as outlined in RCSC section 8, Installation and Tightening. This is one case where, truly, an ounce of prevention is worth a pound of cure.
8. Yes! An information-packed reference for AISC *Specification* and *Code of Standard Practice* questions is *A Guide Engineering and Quality Criteria for Steel Structures, Common Questions Answered*. This little book with a big title contains commonly asked questions and answers on topics from mill production, member design, fabrication, erection, connections, bolting, welding, anchor rods, painting, and more. Call 1-800-644-2400 for publication number S323, \$20 + shipping.
9. When the angles are welded to the supporting beam, to the supported beam, or to both, eccentricity is considered in the design of the welds. Eccentricity is considered in the design of the bolts on either side of the connection when two or more rows of bolts are used or when standard gages are exceeded.
10. Following the load path from the beam web to the column: gross shear of beam web, bearing/tear-out of beam web, bolt shear, bearing/tear-out of plate, block shear of plate, net shear on plate (at bolt holes), gross shear on plate, weld strength, and column base metal yield at weld.