Modern Steel Construction's monthly *Steel Quiz* allows you to test your knowledge of steel design and construction. All references to LRFD specifications pertain to the 1999 *LRFD Specification for Structural Steel Buildings*, available as a free download from AISC's web site:

www.aisc.org/lrfdspec

ASD references pertain to the 1989 *ASD Specification for Structural Steel Buildings*. Where appropriate, other industry standards are also referenced.

Anyone is welcome to submit questions for *Steel Quiz*—one question or 10! If you or your firm are interested in submitting a *Steel Quiz* question or column, contact ▶

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This month's Steel Quiz was developed by the staff of AISC's Steel Solutions Center. Sharpen your pencils and go!

1. Is it necessary to remove the ceramic insulator from a stud shear connector in composite construction?

2. Where "unit price" is the basis of a contract, what is the usual method of calculating the weight of a standard structural shape?

3. Where "unit price" is the basis of a contract, what is the usual method of calculating the weight of a circular plate?

4. If a beam bears on top of a column, is there any unique requirement for bracing?

5. Can a steel beam totally encased in concrete without shear connectors always be considered to be interconnected for providing composite action?

6. When erecting a steel solid-web member (beam), how many bolts are required to secure the member before the load can be released from the hoist line?

7. When erecting a cantilever member, how many bolts are required to secure the member?

8. **Yes or No:** If a welded splice plate connection contains a filler plate of ¼" thickness, is the filler required to be extended beyond the edges of the splice plate and to be welded on the part to which it is fitted?

9. **Yes or No:** Is a reduction in design bolt strength necessary if a bolt that carries load passes through a filler plate that is ¼" thick?

10. What is the latest AISC document available for the design of single-angle members?

Turn page for answers

Answers

1. **Yes.** "After welding, arc shields shall be broken free from studs to be embedded in concrete, and, where practical, from all other studs."—see AWS D1.1/D1.1M:2004.

2. "The weights of all Standard Structural Shapes shall be calculated using the normal weight per ft [mass per m] and the detailed overall length."—see 2000 AISC *Code of Standard Practice for Steel Buildings and Bridges*, Section 9.2.2. (a).

3. "The weights of plates and bars shall be calculated using the detailed overall rectangular dimensions."—see 2000 AISC *Code of Standard Practice for Steel Buildings and Bridges*, Section 9.2.2. (b).

4. **Yes.** Restraint against rotation about the longitudinal axis shall be provided at points of support. See 1999 AISC *LRFD Specification*, Section B6. Stability bracing is discussed and example details given starting on page 2-13 of the *LRFD Manual of Steel Construction*, Third Edition.

5. **No.** For an encased beam to be considered as composite the following must occur:
   - Concrete cover over the beam sides and soffit is at least 2" (50mm).
   - The top of the beam is at least 1½" (38 mm) below the top and two-in. (50 mm) above the bottom of the slab.
   - Concrete encasement contains adequate mesh or other reinforcing steel to prevent spalling of concrete.

   See Section I1 of the 1999 AISC *LRFD Specification* for concrete-encased beam requirements.

6. OSHA 1926.756 (a) (1).

7. A competent person shall determine if more than two bolts are necessary to ensure the stability of cantilevered members. See OSHA 1926.756 (a) (2).

8. **Yes.** "In welded construction, any filler ¼" (6 mm) or more in thickness shall extend beyond the edges of the splice plate and shall be welded to the part on which it is fitted with sufficient weld to transmit the splice plate load, applied at the surface of the filler." See 1999 AISC *LRFD Specification*, Section J6.

9. **No.** "When a bolt that carries load passes through fillers that are equal to or less than ¼" (6 mm) thick, the design shear strength shall be used without reduction." See 1999 AISC *LRFD Specification*, Section J6.

10. *Load and Resistance Factor Design Specification for Single-Angle Members*, dated November 10, 2000. It is available as a free download at **www.aisc.org**. ★

Do you have an idea for *Steel Quiz*? Send it to:

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