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 1997 AISC Publications List, please call 800/644-2400 or fax 312/670-5403.**

QUESTIONS:

1. Name the standards for tolerances in steel construction.

2. Which limit states may govern the design of a steel beam?

3. What is the LRFD equivalent of C_c ?

4. When A36 steel was introduced in the 1960s
   a. What were the commonly used structural steels for buildings and bridges?
   b. What were their specified minimum yield points?

5. Where can one find the most comprehensive information on painting of structural steel?

6. When concentrated loads are applied to steel beams or columns
   a. Which limit states may apply?
   b. Where in the AISC Specifications are there design provisions?

7. Are ASTM A307 bolts suitable for welding?

8. Name the three model building codes currently in use in the U.S. and the new model code scheduled for initial publication in the year 2000?

9. All beams need to be checked for the limit state of lateral-torsional buckling. True or False?

10. Serviceability is not covered in the AISC Specification. True of False?

Answers on page 14

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ANSWERS:

1. Mill and fabrication tolerances are specified in ASTM Standard A6 (Section 13: Permissible Variations in Dimensions or Weight), and are summarized in Part 1 of the Manual of Steel Construction (Vol. I of both LRFD and ASD) under the heading Standard Mill Practice. Erection tolerances are given the AISC Code of Standard Practice for Steel Buildings and Bridges (Section 7.11: Frame Tolerances), and explained in the Commentary on the Code. The Code of Standard Practice and its Commentary are in Vol. I of all editions of the AISC Manual.

2. The limit states governing the design of beams relate to strength and stability or to serviceability, in flexure or shear. Those related to flexural strength and stability are: flexural yielding, lateral-torsional buckling, flange local buckling, and web local buckling. Also related to strength and stability is the limit state of shear yielding and/or buckling. Serviceability limit states for beams are deflection and vibration.

1. lc = 1.5. In ASD, C_c is the value of Kl/r (effective slenderness ratio) which separates elastic and inelastic column buckling. This is accomplished in LRFD by lc = 1.5, where lc is a function of Kl/r per Eq. E2-4 in the LRFD Specification.

4. In the 1960s, ASTM A7 (Fy = 33 ksi) and ASTM A373 (Fy = 32 ksi) were common. The latter was used where welding was required.

5. The Steel Structures Painting Manual (Vol. 1: Good Painting Practice; Vol. 2: Systems and Specifications) is published by the Society for Protective Coatings (SSPC; formerly the Steel Structures Painting Council), Pittsburgh, PA (412/281-2331).

6. Applicable limit states include: local flange bending, local web yielding, web crippling, sidesway web buckling, and compression buckling of the web. Design provisions are given in Chap. K of both the ASD and LRFD Specifications.

7. A307 bolts are normally not suitable for welding. However, this can be corrected by specifying Supplementary Requirement S1 in ASTM A307-94, which provides the option of a chemical composition or carbon equivalent formula to insure weldability.

8. The three current model building codes are: The BOCA National Building Code, Building Officials and Code Administrators International, Country Club Hills, IL, 1996 (708/799-4981); The Standard Building Code, Southern Building Code Congress International, Birmingham, AL (205/591-1853); and The Uniform Building Code, International Conference of Building Officials, Whittier, CA, 1997 (800/284-4406). In 2000, the three organizations will jointly publish The International Building Code.

9. False. Lateral-torsional buckling is only applicable to beams bending about their major axis. Consequently, lateral bracing is not required for members loaded through their shear center and bending about their weak axis.

10. False. Serviceability design considerations are the subject of Chap. L of both the LRFD and ASD Specifications.