

# steel quiz

**LOOKING FOR A CHALLENGE?** *Modern Steel Construction's* monthly Steel Quiz tests your knowledge of steel design and construction. Most answers can be found in the 2005 *Specification for Structural Steel Buildings*, available as a free download from AISC's web site, [www.aisc.org/2005spec](http://www.aisc.org/2005spec). Where appropriate, other industry standards are also referenced.

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

- 1 What is the maximum slenderness ratio  $Kl/r$  required by the 2005 AISC specification for compression members?
- 2 **True or False:** Local buckling is not applicable as a limit state when checking HSS for flexure.
- 3 What is the minimum size of fillet weld required when two plates of  $\frac{7}{8}$  in. thickness are joined?
- 4 What is the minimum pretension required when using pretensioned high-strength bolts?
- 5 What design thickness is used for HSS walls produced by the electric-resistance-weld (ERW) process?
- 6 **True or False:** All structural steel is required to receive a shop coat of paint.
- 7 What is second-order drift?
- 8 **True or False:** Fatigue needs to be considered when designing a steel structure for seismic effects.
- 9 What is a protected zone in a high-seismic frame?
- 10 What do  $R_y$  and  $R_t$  in the AISC *Seismic Provisions* represent?

TURN PAGE FOR ANSWERS

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## ANSWERS

**1 Trick question!** There is no prescribed maximum slenderness ratio for members designed on the basis of compression. However, it is recommended in a User Note that this ratio not exceed 200. (Refer to Section E2 of the 2005 AISC specification, a free download at [www.aisc.org/2005spec](http://www.aisc.org/2005spec).)

**2 False.** Local buckling can occur in compression walls of HSS when the  $b/t$  ratio exceeds the compact limit. Accordingly, the AISC specification includes local buckling as a limit state for HSS shapes subjected to flexure. (Refer to Sections F7 and F8 of the 2005 AISC specification.)

**3** A  $\frac{5}{16}$ -in. minimum fillet weld is required when the material thickness of the thinner part joined exceeds  $\frac{3}{4}$  in. (Refer to Table J2.4 of the 2005 AISC specification.)

**4** Minimum pretension required for pretensioned bolts is 70% of the minimum tensile strength of the bolts

with UNC threads. (Refer to Table J3.1 of the 2005 AISC specification.)

**5** The design wall thickness for HSS walls with ERW welds is 0.93 times the nominal wall thickness. (Refer to Section B3.12 of the AISC specification.)

**6 False.** Section M3 of the AISC specification states: "Shop paint is not required unless specified by the contract documents." Guidance on the subject of painting requirements can be found in FAQ 10.1.1 at [www.aisc.org/faq](http://www.aisc.org/faq).

**7** A structure subject to lateral loads (and/or unsymmetrical gravity loads) will initially drift an amount that is inversely proportional to the lateral stiffness of the frame. Because the gravity loads are now acting on the displaced structure, they cause an additional drift. This is the second-order drift.

**8 False.** Seismic loading does not produce enough cycles to require

consideration of fatigue loading. (Refer to Section B3.9 of the specification.)

**9** The protected zone is the region in a beam, brace, or other fuse element that is expected to undergo inelastic straining in a major earthquake. For example, a special moment frame beam has a protected zone at each end just outside the connection. (Refer to Section 7.4 of the 2005 AISC *Seismic Provisions*, available as free download at [www.aisc.org/2005seismic](http://www.aisc.org/2005seismic).)

**10**  $R_y$  is the ratio of the expected yield stress to the specified minimum yield stress  $F_y$ .  $R_t$  is the ratio of expected tensile strength to the specified minimum tensile strength  $F_u$ . (Refer to 2005 AISC *Seismic Provisions* symbols and Section 6.2.)

Anyone is welcome to submit questions and answers for Steel Quiz. If you are interested in submitting one question or an entire quiz, contact AISC's Steel Solutions Center at 866.ASK.AISC or at [solutions@aisc.org](mailto:solutions@aisc.org).



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