

Steel Quiz, a monthly feature in *Modern Steel Construction*, 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 at

www.aisc.org/lrfdspec

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

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The questions in this month's *Steel Quiz* all pertain to the 2002 AISC *Seismic Provisions*, a free download at www.aisc.org/epubs.

1. "A reduction in cross section over a discrete length that promotes a zone of inelasticity in the member" best describes:
 - a. reduced beam section
 - b. seismic resistance factor
 - c. continuity plate
 - d. plastic section modulus
2. **True or False:** The special detailing requirements of the AISC *Seismic Provisions* need not be followed in Seismic Design Categories A,B, and C, regardless of the value used for the response modification coefficient, R .
3. **True or False:** All bolted connections in a steel-framed building detailed under the AISC *Seismic Provisions* must be slip-critical.
4. **True or False:** Tension-only bracing can be used in Special Concentrically Braced Frames.
5. Where is the "special segment" located for each truss that is part of the seismic load-resisting system in special-truss moment frames?
 - a. mid-height of columns below truss
 - b. between quarter points of the span of the truss
 - c. within Vierendeel panels
 - d. at any truss splices
6. Which of the following are types of braces used in ordinary concentrically braced frames?
 - a. K-bracing
 - b. X-bracing
 - c. diagonal bracing
 - d. all of the above
7. What is the R_y factor?
8. Which type of brace is commonly referred to as a "Chevron" brace?
 - a. inverted V-brace
 - b. X-brace
 - c. V-brace
 - d. K-brace
9. **True or False:** Demonstration of code conformance is required for moment connections in all moment frames.
10. Which are characteristics of Special Moment Frames?
 - a. the expectation of withstanding significant inelastic deformations under the design earthquake
 - b. frames where the beam-to-column connections must be capable of sustaining an inter-story drift angle of at least 0.04 radians
 - c. frames where qualification testing or prequalification of beam-to-column connections is required
 - d. all of the above

TURN PAGE FOR ANSWERS

STEEL QUIZ

ANSWERS

1. **a.** reduced beam section (defined in Glossary)
2. **False.** When $R > 3$ is used, the special detailing requirements of the AISC *Seismic Provisions* appropriate for the actual R value selected apply regardless of Seismic Design Category. This is discussed in the Commentary C1.
3. **False.** The AISC *Seismic Provisions* do not require slip-critical. They require that bolted connections that are part of the seismic load-resisting system be designed for the bearing values of the bolts, be installed as pretensioned, and that the faying surfaces in these bolted connections be prepared to achieve a class A or better slip resistance. See Section 7.2.
4. **False.** SCBF must have braces deployed to act in tension and compression to achieve the associated level of energy dissipation in a strong seismic event. See Section 13.2c.
5. **b.** between quarter points of the span of the truss—See Section 12.2.
6. **d.** all of the above—each of these frames are illustrated in Commentary Figure C-I-13.1.
7. As defined in the Glossary, the R_y factor is the ratio of expected actual yield strength to minimum-specified yield strength. It is used to more properly estimate the effects of material overstrength, which increases the force generated from elements of seismic frames that are selected to yield in a strong seismic event.
8. **a.** inverted V-brace
9. **False.** Such conformance is not required in ordinary moment frames (or $R = 3$ moment frames, which only need to meet the requirements in the AISC *Specification for Structural Steel Buildings*). See Section 11.
10. **d.** all of the above—See Section 9.