

steel quiz

Steel Quiz made its first appearance in the November 1995 issue of *Modern Steel Construction*. This month's Quiz takes a look at some of the best questions from 2004.

- 1 Is hand-guided thermal cutting an allowable method for shop fabrication of structural steel?
- 2 Is thermal cutting allowed as a field modification method for correcting minor fabrication errors?
- 3 What material type is commonly specified for floor plate?
 - a. ASTM A36
 - b. ASTM A572
 - c. ASTM A992
 - d. All of the above
 - e. None of the above
- 4 Why are compressible materials prohibited in connected plies of bolted parts?
- 5 **True or False:** Cables used for permanent bracing or suspension of systems are not considered structural steel.
- 6 What is the purpose of performing CVN (Charpy V-notch) tests on members and plates?
- 7 What notch-toughness requirements are appropriate for exterior exposed steel in structural steel bridges?
- 8 The AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360) Section J1.6 specifies dimensions for weld access holes. Why are these specific dimensions required?
- 9 **True or False:** When finger shims are used in bolted joints, the requirements for long-slotted holes are applicable.
- 10 Is it acceptable to fill weld access holes with weld metal for cosmetic or corrosion-protection reasons?
- 11 Why is a continuous fillet weld preferable to an intermittent fillet weld when considering fatigue in design?

TURN PAGE FOR ANSWERS

- 1 Yes. The AISC *Code of Standard Practice for Steel Buildings and Bridges* (ANSI/AISC 303-16) states, in Section 6.2.1: "The thermal cutting of structural steel by hand-guided or mechanically guided means is permitted." The Code is available as a free download at www.aisc.org.
 - 2 Yes. The Code (see answer 1) states, in Section 7.14: "The correction of minor misfits by moderate amounts of reaming, grinding, welding or cutting, and the drawing of elements into line with drift pins, shall be considered to be normal erection operations."
 - 3 **e.** None of the above. ASTM A786 is the standard specification for rolled steel floor plates. The plate will often be supplied without specific mechanical properties (see the AISC *Steel Construction Manual*, 14th Edition, page 2-25, for discussion).
 - 4 Compressible materials can prevent proper snug-tightening and pretensioning, when required, from being achieved during installation of high-strength bolts. A compressible element also creates a service condition different than that assumed in the AISC and RCSC specifications. As mentioned in Section 3.1 of the RCSC *Specification* (a free download at www.boltcouncil.org), compressible materials (gaskets, insulation or any compressible materials) shall not be placed within the grip of the bolt.
 - 5 **True.** Cables for permanent bracing (i.e., tension-only bracing) or suspension systems are considered other steel, iron or metal items per Section 2.2 of the Code.
 - 6 When thick plates and heavy shapes are used in applications loaded in tension, the core area has to be notch tough to ensure brittle fracture will not occur. CVN testing requirements are given in the AISC *Specification* (available at www.aisc.org/specifications).
 - 7 For bridges in cold-weather applications, notch toughness is the primary means of ensuring that the steel will perform properly. This may be necessary in cases where the steel is exposed, and the specifier should consult ASTM A709 Section 10 (including Tables 9 and 10).
 - 8 Weld access holes serve multiple functions. One function is to permit the access needed to continue welds past the web. Another function is to provide a transition that accommodates shrinkage strains from weld cooling. The weld access hole extends to a location where the end of the hole is in compression and therefore cannot crack. The dimensions indicated in the AISC *Specification* Section J1.6 and shown graphically in the commentary satisfy this distance requirement.
 - 9 **False**, per RCSC *Specification* Commentary Section 3.3.4.
 - 10 This practice is not recommended as it defeats all the purposes for which the weld access hole was used in the first place (except access for welding). Commentary Section 5.16.1 of AWS D1.1 states: "When weld access holes are required to be closed for cosmetic or corrosion protection reasons, sealing by use of mastic materials may be preferable to welding."
 - 11 Every fillet weld segment has a start and stop, and each start and stop has a crater in the weld. Craters serve as crack initiators in fatigue applications. Thus, the fewer starts and stops, the fewer crack initiators.
-

Everyone 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.