

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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This month's *Steel Quiz* was prepared by the staff of the AISC Steel Solutions Center.

1. Can ASTM A325 or A490 high-strength bolts be torch cut?
2. What is the maximum length for ASTM A325 high-strength bolts?
3. Can ASTM A325 or A490 high-strength bolts be used as anchor rods?
4. Why must a cambered beam be measured in the Fabricator's shop in the unstressed condition?
5. For connections whose design requires flexibility of the outstanding legs, what is the maximum length of fillet welded end returns?
6. Is there a comprehensive Specification available for designing with ASTM A53 Grade B pipe?
7. Where can I obtain electronic copies of past NASCC Proceedings?
8. Can the new AISC Bookstore product codes can be used to identify contract document specifications?
9. What was one of the first high-strength steels used in 1915 in the Metropolis Bridge (Illinois) and later in portions of the Golden Gate Bridge?
10. What is the maximum spacing to anchor steel deck to supporting members in order to resist uplift?

TURN PAGE FOR ANSWERS

STEEL QUIZ

ANSWERS

1. No. ASTM A325 and A490 bolts are heat treated, quenched and tempered according to the ASTM A325-02 and A490-02 Standards. Heat, such as from torch cutting, can alter the mechanical properties of the bolt.
2. Although there is no maximum length specified in the ASTM A325-02 Standard, some suppliers can stock up to 10" lengths, which is near the practical limit for high-speed cold heading machines. Longer lengths may be available through special orders.
3. No. ASTM A325 and A490 are high-strength structural bolts developed for use in steel-to-steel bolted assemblies based on the design provisions found in the AISC *Specification* (Chapter J) and/or the *RCSC Specification for Structural Joints using ASTM A325 or A490 Bolts*. Also, the length limitations discussed in Answer No. 2 hamper their use as anchorages. Proper materials for use as anchor rods are discussed in AISC FAQ 7.1.2 at www.aisc.org/faq or Table 2-3 of the 3rd Edition *LRFD Manual*.
4. According to Section 6.4.4. of the 2000 *Code of Standard Practice for Steel Buildings and Bridges*, there is no known way to inspect beam camber after the beam is received in the field because of factors that include:
 - a. The release of stresses in members over time and in varying applications;
 - b. The effects of the dead weight on the member;
 - c. The restraint caused by the end connections in the erected state; and,
 - d. The effects of additional dead load that ultimately could be applied, if any.
5. The length of weld returns cannot exceed four times the nominal size of the fillet weld. Refer to Section J2.2b(3) of the 1999 *LRFD Specification* (a free download from www.aisc.org/lrfdspec).
6. Yes, the 2000 *LRFD Specification for Steel Hollow Structural Sections* was developed explicitly for HSS (ASTM A500, A501, A618 and A847) and Steel Pipe (ASTM A53 Grade B) members. It is available as a free download from www.aisc.org/freedownloads.
7. The most popular NASCC Proceedings papers, as well all AISC Design Guides and a special version of the AISC Shapes Database are now available for immediate download from the ePubs section of the AISC website, www.aisc.org/epubs. If you are a Professional Member, the service is free-of-charge.
8. Yes. The new AISC product codes serve a dual-purpose. They are used to place orders with the AISC Bookstore (www.aisc.org/bookstore) or can be used in specification contract documents. As an example, the 1999 *LRFD Specification* is product code AISC 350-99. As one can readily notice from this product code, this specification was released in 1999.
9. ASTM A94, also historically known as silicon steel. During retrofits, one can find mention of silicon steel in old structural design drawings. One of the first high-strength steels, silicon steel had a yield strength of 45 ksi and a tensile strength of 80-95 ksi. It typically was used in steel bridges and incorporated into the lower portions of built-up columns in buildings back in the 1910s and 1920s. For information regarding historical materials, shapes and specification design values, refer to *Design Guide 15: AISC Rehabilitation and Retrofit Guide*.
10. 18 inches. Section I3.5b of the 1999 *LRFD Specification* contains this information, and states that anchorage shall be provided by stud connectors, a combination of stud connectors and arc spot (puddle) welds, or other devices specified by the designer.