

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 2003.

- 1 What is the difference between structural steel and other steel, iron or metal items?
- 2 **True or False:** Restraint against longitudinal rotation is required at beam or girder supports.
- 3 Which of the following statements are incorrect? Web crippling is:
 - a. caused by compressive forces only
 - b. caused by compressive and tensile forces
 - c. not affected by location of applied concentrated forces
 - d. affected by location of applied concentrated force
- 4 **True or False:** Doubler plates can be fillet welded to column flanges.
- 5 **True or False:** A "mil" is a common measure for paint and coating thickness.
- 6 What is web sidesway buckling?
- 7 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?
- 8 There is a standard dynamic test in which a notched specimen is struck and broken by a single blow in a specially designed testing machine. The measured test values may be the energy absorbed, the percentage shear fracture, the lateral expansion opposite the notch or a combination thereof. Which test is this?
 - a. Charpy V-notch impact test
 - b. Drop-weight test
 - c. Pendulum fracture test
 - d. Magnetic particle test
- 9 A section that can develop the yield stress in compression elements before local buckling occurs but will not resist inelastic local buckling at strain levels required for a fully plastic stress distribution is called a:
 - a. Slender section
 - b. Non-compact section
 - c. Compact section
 - d. Super-compact section

TURN PAGE FOR ANSWERS

- 1 Section 2.1 of the AISC *Code of Standard Practice* contains a definition and detailed list of items that are elements of the structural frame and are classified as structural steel. Section 2.2 lists other steel, iron or metal items. The general distinction is that items normally made and provided by a steel fabricator are listed in Section 2.1. Otherwise, the item appears in Section 2.2 and may be furnished by the fabricator only if specifically contracted to do so.
- 2 **True**, unless it can be shown by analysis that the restraint is not required. This provision can be found in Section B3.4 of the 2016 AISC *Specification* (Section B3.6 in the 2010 AISC *Specification*).
- 3 **b. and c.**
- 4 **True**. When fillet-welded edge details are used, the actual thickness of the doubler plate is adjusted to allow for proper beveling of the plate to clear the column flange-to-web fillet. Refer to Section 4.4 of AISC Design Guide 13: *Stiffening of Wide-Flange Columns at Moment Connections: Wind and Seismic Applications*.
- 5 **True**. A mil is equivalent to $1/1000$ in.
- 6 A limit state in a flexural member whereby the compression flange is braced at a concentrated load and the web is squeezed into compression. This results in the tension flange buckling. Please refer to Section J10.4 in the AISC *Specification* for the web design strength. For an illustration of this interesting limit state, refer to Commentary Section J10.4
- 7 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 AISC Design Guide 15: *AISC Rehabilitation and Retrofit Guide*.
- 8 **a.**
- 9 **b.**



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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.