

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 2002.

- 1 Who is responsible for grouting base plates?
- 2 Which of the following statements is correct? Visual weld inspection performed by the fabricator/erector:
 - a. shall be done for all welds only if it is specified in the contract documents
 - b. shall be done for all welds
 - c. shall be done only for 50% of welds if it is not specified in the contract documents
 - d. is not required if ultrasonic inspection is specified
- 3 What is the minimum required preheat temperature for thermally cutting beam copes and weld access holes in ASTM A6/A6M hot-rolled shapes with a flange thickness exceeding 2 in.?
- 4 What is the correct torque to pretension a 3³/₄-in.-diameter ASTM F3125 Grade A325 bolt?
 - a. 5 ft-lb
 - b. 50 ft-lb
 - c. 500 ft-lb
 - d. Torque varies and is not a suitable measure of pretension
- 5 How does the heat of welding near F3125 Grade A325 and A490 bolts affect the mechanical properties of these bolts?
- 6 How does cambering affect the design strength of beams?
- 7 **True or False:** Truss camber should be inspected immediately after it is received in the field.
- 8 Is it acceptable to use welding to correct an excessively large root opening for a complete joint penetration (CJP) groove weld?
- 9 Bonus question (not from 2002): Where is the 2017 North American Steel Construction Conference going to be held?
 - a. Allright, Illinois
 - b. Okay, Oklahoma
 - c. Why, Arizona
 - d. Whynot, North Carolina
 - e. San Antonio, Texas

TURN PAGE FOR ANSWERS

- 1 Section 7.7 of the AISC *Code of Standard Practice* notes that grouting is the responsibility of the owner's designated representative for construction. This is the entity that is responsible to the owner for the overall construction of the project, including its planning, quality and completion and is usually the general contractor, the construction manager or similar authority at the job site.
- 2 **b.**
- 3 In accordance with the AISC *Specification* Section M2.2, the minimum preheat temperature is +150 °F (+66 °C). In addition, the Commentary to Section M2.2 states that preheat "tends to minimize the hard surface layer and the initiation of cracks."
- 4 **d.** Torque cannot be used to measure the pretension in a bolt unless it is calibrated (as for the calibrated wrench method). Depending on the conditions of the threads and surfaces in contact between the nut and washer/steel, for a given torque, pretension can vary up to 40%. For example, well-lubricated bolts require much less torque to obtain the pretension compared to rusted, dirty or poorly lubricated bolts.
- 5 As noted in the Commentary of Section J1.8 of the AISC *Specification*, "The heat of welding near bolts will not alter the mechanical properties of the bolts." Metallurgy and heat treatment of bolts must be investigated prior welding on bolts.
- 6 Page 2-37 of the 14th Edition AISC *Steel Construction Manual* states: "Cambering and curving induce residual stresses similar to those that develop in rolled structural shapes as elements of the shape cool from the rolling temperature at different rates. These residual stresses do not affect the available strength of structural members, since the effect of residual stresses is considered in the provisions of the AISC *Specification*."
- 7 **False.** As stated in Section 6.4.5 in the AISC *Code of Standard Practice*: "For the purpose of inspection, camber shall be measured in the fabricator's shop in the unstressed condition."
- 8 Per Section 5.22.4.3 of AWS *D1.1*, "Root openings greater than those allowed in 5.22.4.1, but not greater than twice the thickness of the thinner part or $\frac{3}{4}$ in. [20 mm], whichever is less, may be corrected by welding to acceptable dimensions prior to joining the parts by welding." Note that per 5.22.4.4, root openings greater than allowed by 5.22.4.3 may be corrected by welding only with the approval of the engineer. See the Commentary to Section 5.22.4.3 for more information.
- 9 **e.** San Antonio, Texas, March 22–24.



Steel
SolutionsCenter

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.