

Steel Quiz

Steel Quiz, a monthly feature in *Modern Steel Construction*, allows you to test your knowledge of steel design and construction. Answers can generally be found in the *LRFD Manual of Steel Construction*, 2nd edition, but other industry standards are often referenced.

If you or your firm are interested in submitting a *Steel Quiz* question or column, please contact:

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This month's Steel Quiz was contributed by AISC's **Engineering and Research Department**.

Questions

1. What is the maximum fillet weld size that can be made with one pass using the shielded metal arc welding process?
2. True or False: The AISC *Manual of Steel Construction* should be referenced in specifications.
3. Which weighs more: a ton of A36 steel or a ton of A992 steel?
4. True or False: Structural steel can be field-welded through protective coatings.
5. True or False: According to the RCSC *Specification for Structural Joints Using ASTM A325 or A490 Bolts*, compressible materials are permitted between the plies of a bolted connection.
6. True or False: A vertical series of V-braces (or inverted V-braces) is an efficient lateral bracing system.
7. AISC's Quality Certification Department currently offers certification programs in the following fields:
 - a. fabrication
 - b. erection
 - c. coffee roasting
 - d. both a and b
8. True or False: Per AWS D1.1:2000, ASTM A992 steel is welded like A572 Grade 50.
9. Name the four acceptable methods of installation for fully-tensioned structural bolts.
10. True or False: Material costs represent the most significant portion of the structural steel cost.

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Answers

1. 5/16-in. is the maximum allowable weld bead that can be placed in one pass using SMAW per AWS D1.1:2000.
2. False. AISC specifications and codes should be referenced in contract documents by their full name and date, even though the *Manual* contains the AISC specifications and codes.
3. Despite the metallurgical advances that have produced higher strength steels, the basic density of steel remains unchanged at 490 lbs. per cubic foot! A36 and A992 weigh the same.
4. True, if certain conditions are met: the AISC LRFD *Specification*, Section M3.5, Surfaces Adjacent to Field Welds, *Unless otherwise specified in the design documents, surfaces within two inches of any field weld location shall be free of materials that would prevent proper welding or produce objectionable fumes during welding.* Therefore, if the coating does not produce objectionable fumes or affect the quality of the weld, it is possible to weld through the coating.
5. False. All material within the grip of the bolt (between the head and the nut) must be steel.
6. False, at least in comparison to other bracing options. A more efficient lateral bracing system alternates V-braces and inverted V-braces at each floor, forming a series of two-story “X-braces.”
7. d. both a and b. Call 312/670-5435 for more information on Quality Certification for fabricators and erectors. For information on coffee roasting, visit www.starbucks.com.
8. True. ASTM A992 steel falls into category II, group according to AWS D1.1:2000 therefore it is welded just like A572 grade 50.
9. According to the RCSC *Specification for Structural Joints Using ASTM A325 or A490 Bolts*, there are four acceptable methods for installing fully-tensioned bolts: turn-of-the-nut method; calibrated wrench method; installation of alternative fasteners; and installation using tension indicating devices.
10. False. In reality, the labor costs for fabricating are the most significant cost in structural steel buildings, comprising about 60% of the total steel cost.