

steel quiz

LOOKING FOR A CHALLENGE? *Modern Steel Construction's* monthly Steel Quiz tests your knowledge of steel design and construction. Are you SteelWise? This SteelQuiz highlights some items that have appeared in the *SteelWise* feature.

- 1 Name six limit states that likely apply when designing simple shear connections?
- 2 According to the 2005 AISC *Code of Standard Practice*, the surface of steel that is to be painted must be prepared to a minimum of which of the following?
(a) Solvent Cleaning, SSPC-SP1
(b) Hand Tool Cleaning, SSPC-SP2
(c) Power Tool Cleaning, SSPC-SP3
(d) Commercial Blast Cleaning, SSPC-SP6
- 3 When it is suspected that installed bolts do not have the required pretension what procedures can be used for arbitration?
- 4 True/False: Additional shear studs beyond those required for support of gravity loads in a composite member must be provided to transfer diaphragm forces from the concrete slab to the steel in members that act both as collectors and gravity beams.
- 5 True/False: There is now an accepted method that can be used to protect ASTM A490 bolts with a metallic coating.
- 6 True/False: Weathering steel, which is also known as ASTM A588 steel, is a good choice for applications where the steel is constantly exposed to water and moisture.
- 7 There are six common mechanical fastener types that can be used in HSS connections? How many can you name?
- 8 Most structural steel produced in the United States comes from an electric arc furnace (EAF) process, which uses a large amount of ferrous scrap. The current surveyed value of total recycled content in steel produced by the EAF process is:
(a) 64.5% (b) 53.3%
(c) 93.3% (d) 32.7%
- 9 The current rate of recycling for structural steel in construction is:
(a) 55% (b) 78%
(c) 82% (d) 98%
- 10 True/False: The carbon footprint for structural steel material is currently 0.73 tons of CO₂ per ton of steel.

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steel quiz ANSWERS

- 1 Six common limit states for simple shear connections are: bolt shear, bolt bearing, shear yielding, shear rupture, block shear rupture, and weld shear. The many limit states applicable to the various types of simple shear connections are covered in Parts 7, 8, 9 and 10 of the 13th edition AISC *Steel Construction Manual*. See also the *SteelWise* article in the February 2008 issue of MSC at www.modernsteel.com.
- 2 (b) According to Section 6 of the 2005 AISC *Code of Standard Practice*, steel that is to be painted must be prepared to a minimum of SSPC-SP2. More information on surface preparation requirements also can be found in the *SteelWise* article in the April 2008 issue of MSC.
- 3 Section 10 in the RCSC *Specification* [located in Part 16 of the 13th edition AISC *Steel Construction Manual* and also available as a free download at www.boltcouncil.org] provides a detailed procedure for such arbitration. More information on bolted connections also can be found in the *SteelWise* article in the July 2008 issue of MSC.
- 4 False. As stated in the *SteelWise* article in the December 2008 issue of MSC, shear studs have sufficient ductility to transfer horizontal shear loads equal to the summation of strengths of all the shear studs on the member regardless of the demand on the shear studs from gravity loads.
- 5 True. The ASTM A490-08a revision allows ASTM F1136 Grade 3 coating to be applied to ASTM A490 bolts. RCSC is currently considering the inclusion of this new option for ASTM A490 bolts in the RCSC *Specification*. More information on this topic also can be found in the *SteelWise* article in the January 2009 issue of MSC.
- 6 False. Frequent wetting and drying cycles are essential for the proper formation of the protective coating on weathering steel. The patina will not form, however, when the steel is constantly wet. More information on weathering steel also can be found in the *SteelWise* article in the February 2009 issue of MSC.
- 7 Six common mechanical fastener types used in HSS connections are: through-bolts, threaded studs, flow-drilled bolts, screws, blind bolts, and nails. More information on this topic also can be found in the *SteelWise* article in the July 2009 issue of MSC.
- 8 (c) The typical products produced using the EAF process include beams, columns, channels, and angles; some HSS, plate, piling and steel deck also is produced with an EAF process. More information on this topic also can be found in the *SteelWise* article in the August 2008 issue of MSC.
- 9 (d) This compares to a rate of overall recycling of all steel products (including those not used in construction) of 78%. More information on this topic also can be found in the *SteelWise* article in the August 2008 issue of MSC.
- 10 True. Structural steel has a very low equivalent utilization carbon footprint of 0.73 tons of CO₂ per ton of steel. Plus, you get a lot more structure out of that ton of steel than you get out of a ton of any other structural material. Thus, the effective carbon footprint per square foot of construction is very favorable to steel. More information on this topic also can be found in the *SteelWise* article in the August 2008 issue of MSC.

Anyone 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.

