

steel quiz

Most of the answers to this month's steel quiz can be found in the AISC *Specification* and AISC *Steel Construction Manual* as well as on the AISC and *Modern Steel Construction* websites (www.aisc.org and www.modernsteel.com).

- 1 Guidance for the welded repair of mislocated bolt holes is provided by which section in AWS D1.1?
a) Clause 5.25.1 b) Clause 5.26.5
c) Clause 5.30.1 d) None of the above
- 2 True/False: The Commentary to Chapter E3.6e. of the AISC *Seismic Provisions* provides guidance on the welding of web doubler plates in the column panel zone of special moment frame connections.
- 3 True/False: Weathering steel requires a different painting or coating method/system than non-weathering carbon steel.
- 4 True/False: The term "mill to bear" is an outdated term that refers to the bearing surface needing further treatment in contact bearing applications.
- 5 True/False: Bearing values in Table J3.3 in the AISC *Specification* are for steel-to-steel bolted connections, not bearing plates or embedded items.
- 6 Which section of the AISC *Code of Standard Practice* provides three options for connection design/selection?
a) Section 3.1.2 b) Section 3.2
c) Section 4.1 d) None of the above
- 7 True/False: The AISC *Seismic Provisions* require that column base connections must be prequalified.
- 8 True/False: For statically loaded structures, drilled, punched and thermally cut holes are treated the same in the AISC *Specification*.
- 9 True/False: The need for multiple washers in a bolted joint depends on the connected material as well as the type of bolt used.
- 10 Which section of the RCSC *Specification* discusses bolt installation in pretensioned joints?
a) Section 7 b) Section 8
c) Section 9 d) All of the above

TURN PAGE FOR ANSWERS

- 1 b) AWS D1.1 Clause 5.26.5 and its associated *Commentary* contain requirements and describe a procedure for repairing the hole. However, as stated at the beginning of Clause 5.26.5, "Except where restoration by welding is necessary for structural or other reasons, punched or drilled mislocated holes may be left open or filled with bolts."
- 2 True. The most critical welds for web doubler plates are those that connect the doubler plate to the column flanges. Accordingly, these welds are required to develop the available strength of the full doubler plate thickness. Figure C-E3.3 provides three details for welds of web doublers.
- 3 False. The paint requirements for weathering steel do not differ from those for carbon steel. In locations where the outdoor environment is aggressive, the same quality paint systems found effective in protecting carbon steel are recommended for weathering steel. To achieve the effectiveness of the protective coating selected, the stringent rules of surface preparation must be adhered to for both steels.
- 4 True. This term comes from an age when cutting methods were not as advanced as those in use today. Today, cutting methods are much more advanced, and contact surfaces in bearing joints are only required to be "finished," where this corresponds to an ANSI roughness height value not greater than 500. Cutting methods used today, including cold-sawing and mechanically guided thermal cutting, will generally produce such a surface, and milling is rarely required.
- 5 True. Bearing on concrete is covered in Section J8.
- 6 a) The *AISC Code* (a free download from www.aisc.org/epubs) provides three methods that can be used for connection design: (1) The complete connection design shall be shown in the structural design drawings; (2) In the structural design drawings or specifications, the connection shall be designated to be selected or completed by an experienced steel detailer; or (3) In the structural design drawings or specifications, the connection shall be designated to be designed by a licensed professional engineer working for the fabricator. Option 3 was new in the 2010 *AISC Code*. See Section 3.1.2 and its *Commentary* for further information.
- 7 False. The requirements for column base design can be found in Section D1.4 in the *AISC Seismic Provisions*. The column base should be designed to support the required strengths of the members and elements attached to it. The designer should design and detail the connection to be able to accomplish the expected behavior, such as hinging, as assumed in design.
- 8 True. Design requirements for bolted joints in Chapter J of the *AISC Specification* are the same regardless of how the hole is made. There is a requirement in Section M2.5 saying that thermally cut holes must have a surface roughness not greater than 1,000 μin .
- 9 True. Section 6 in the *RCSC Specification* (available for free download at www.boltcouncil.org) provides the requirements for washers including the number required. Some tension-control (TC) bolts have a head size that eliminates the need for an additional washer.
- 10 b) The bolt installation methods for pretensioned joints are covered in Section 8. Four pretensioning methods are included.



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