

steel quiz

LOOKING FOR A CHALLENGE? *Modern Steel Construction's* monthly Steel Quiz tests your knowledge of steel design and construction. This month's questions highlight activities taking place with bridges and bridge construction. The answers can be found in resources available on the National Steel Bridge Alliance (NSBA) website, www.steelbridges.org, including the monthly NSBA Newsletter, NSBA White Papers, and the *Steel Bridge Design Handbook*; on the American Iron and Steel Institute (AISI) website, www.steel.org; in ASTM material standards available at www.astm.org; and on the SteelDay website at www.steelday.org.

- 1 True/False: SIMON is NSBA's steel plate and box girder bridge design and analysis program.
- 2 How many total units make up NSBA's *Steel Bridge Design Handbook*?
 - a) 9 units and 3 design examples
 - b) 3 units and 9 design examples
 - c) 19 units and 3 design examples
 - d) 13 units and 9 design examples
- 3 What is the relationship between AISC and NSBA?
- 4 How many steel highway bridges are currently in service in the United States?
 - a) About 415,000
 - b) About 850,000
 - c) About 75,000
 - d) About 185,000
- 5 Near which U.S. city is NSBA's flagship SteelDay event being held on September 23, 2011?
 - a) Chicago
 - b) Washington
 - c) New York
 - d) Pittsburgh
- 6 What was the first bridge in the United States to make extensive use of steel and cantilevered construction?
 - a) Smithfield Street Bridge, Pittsburgh
 - b) The original North Avenue Bridge, Chicago
 - c) Eads Bridge, St. Louis
 - d) Hell Gate Bridge, New York City
- 7 True/False: The color formula for the Golden Gate Bridge's "International Orange" is available to the public.
- 8 Where is the 2012 NSBA World Steel Bridge Symposium going to be held?
 - a) Phoenix
 - b) Toronto
 - c) Dallas, Texas
 - d) Pittsburgh
- 9 True/False: The American Association of State Highway and Transportation Officials (AASHTO) allows only heat cambering methods for rolled beams for bridges.
- 10 ASTM A709 Grades HPS 50W, HPS 70W and HPS 100W high-performance steels are available in which of the following form(s)?
 - a) Structural plate
 - b) Wide flange shapes
 - c) All rolled shapes
 - d) All of the above

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steel quiz ANSWERS

- 1 True. Since the 1980s, SIMON has served hundreds of bridge engineers as a key tool to efficiently design and analyze steel bridges. It is intended to be used in the preliminary design phase to realize efficiencies and demonstrate the practicality of a steel bridge for a specific application. A popular legend has it that *Bridge Over Troubled Water* was the number one song at the time SIMON was written; "Garfunkel" would have been too obvious a name for it.
- 2 (a) The original *Highway Structures Design Handbook* was produced by US Steel in the 1970s. The renamed successor *Steel Bridge Design Handbook* is available as a free download on the NSBA website (www.steelbridges.org). This document is in the process of being updated with a plan for 23 units and seven design examples.
- 3 NSBA is a division of AISC dedicated to advancing the state-of-the-art of steel bridge design and construction. NSBA is a unified industry organization of businesses and agencies interested in the development, promotion, and construction of cost-effective steel bridges. The organization includes three regional directors who are the primary liaisons between the NSBA and bridge owners. They assist fabricators, designers, and owners in making the best bridge decisions and selections possible. In addition, the NSBA provides steel superstructure technical assistance at various stages of drawing completion.
- 4 (d) The Federal Highway Administration provides data on all U.S. bridges through its National Bridge Inventory (NBI) database. For more information about the NBI, visit www.fhwa.dot.gov/bridge/nbi.htm. As of the end of 2010, the NBI database listed 185,148 steel bridges in the U.S.
- 5 (b) NSBA in conjunction with the Ironworker Management Progressive Action Cooperative Trust (IMPACT) will host an interactive, hands-on event just outside Washington (in Upper Marlboro, Md.) on September 23, 2011. To learn more and attend this event, go to www.steelday.org.
- 6 (c) Named for its designer and builder, James B. Eads, the Eads Bridge in St. Louis was the first major bridge built using steel and cantilevered construction. At the time of its construction in 1874, the 6,442-ft-long by 46-ft-wide ribbed steel structure was the longest arch bridge in the world. An article about the Eads Bridge was published in the March 2011 issue of *MSC* and is available online at www.modernsteel.com/backissues.
- 7 True. Now you can find the exact paint mixture on the Golden Gate Bridge, Highway and Transportation District's website: <http://goldengatebridge.org/research/factsGGBIntOrngPaint.php>
- 8 (c) NSBA's 2012 World Steel Bridge Symposium will be held in conjunction with the NASCC: The Steel Conference in Dallas, Texas, April 18-21, 2012. The World Steel Bridge Symposium brings together design engineers, construction professionals, academicians, transportation officials, fabricators, erectors, and constructors to discuss and learn state-of-the-art practices for enhancing steel bridge design, fabrication, and construction techniques.
- 9 False. The 2010 Interim Revisions to the AASHTO LRFD Construction Specifications have added cold cambering as an allowed method. See "Cold Bending of Wide-Flange Shapes for Construction" by Reidar Bjorhovde in the 4th Quarter 2006 issue of AISC's *Engineering Journal* for further information.
- 10 (a) High-performance steel, which typically has higher toughness than other steels that could be used in bridges, is available only as structural plate.



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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.