

# steel quiz

Steel Quiz made its first appearance in the November 1995 issue of *Modern Steel Construction*. This month's Steel Quiz takes a look at some of the best questions from 2000.

- 1 Why is back-gouging required at complete-joint-penetration groove welds?
- 2 What is the oldest arc welding process?
- 3 What is the additional required procedure for hot-dip galvanized surfaces to be used in slip-critical connections?
- 4 What is a "torsionally pinned end" condition?
- 5 What is the definition of a "HAZ?"
- 6 Is there a difference between the terms filler metal and weld metal?
- 7 Is steel in older existing structures weldable?
- 8 What does the term "Christmas Treeing" mean?
  - a. Putting a Christmas tree on the topping-out piece
  - b. Lifting more than one piece on a load line at one time
  - c. Erecting the structure in a stepped back fashion
- 9 Name at least two elements that are commonly found in structural steel alloys.
- 10 What is the difference between form deck and composite deck?

TURN PAGE FOR ANSWERS

Everyone is welcome to submit questions and answers for Steel Quiz.



Steel  
**SolutionsCenter**

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](mailto:solutions@aisc.org).

# steel quiz

## ANSWERS

- 1 Back-gouging is required to ensure complete fusion and complete joint penetration upon subsequent welding. Back-gouging is not required when a backing bar is used.
- 2 Bare wire arc welding is the oldest arc welding process.
- 3 To provide sufficient slip resistance, hot-dip galvanized surfaces should be roughened. Wire brushing (but not power wire brushing, which tends to polish the surface) is usually used for this purpose.
- 4 A torsionally pinned end is an end that is permitted to warp but is not permitted to rotate.
- 5 According to AISC Design Guide 21: *Welded Connections—A Primer for Engineers*, the heat-affected zone, or HAZ, is “the narrow region next to the weld metal, the part of the base metal that is heated by welding to a temperature lower than that required to melt the steel. While the chemistry in this region is unchanged, the mechanical properties of the material may be significantly affected, depending on the composition of the steel and the cooling rate experienced by the HAZ.”
- 6 Yes, though it’s a somewhat esoteric one. Filler metal is the product sold by the manufacturer used to make a weld. Weld metal is what’s in place after the filler metal has been melted to form the joint.
- 7 Possibly. If the chemical properties of the steel to be welded are known, either by valid mill certification or by laboratory sample testing, its weldability can be judged by computing the carbon equivalent value. A more obvious approach would be to examine the existing structure for evidence of original welding. Alternatively, an on-site investigation could be performed to address weld ductility and base-metal hardening. Other factors should also be considered, such as past history of the structure, the nature of the loads, weather conditions and whether the members to receive welds are loaded.
- 8 **b.** Erectors lift more than one piece at a time to avoid having to return to the main steel storage place, often on another floor, for every piece.
- 9 Carbon, nickel, manganese, molybdenum and chromium are a few.
- 10 Form deck is only used as form work for a concrete slab. Composite deck is designed to act compositely with the concrete slab; it is a structural element.



Steel  
**SolutionsCenter**