

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 cover a wide variety of subjects related to fabricated structural steel.

- 1 What is Edmund Davy credited with discovering in 1836?
 - a) Oxyacetylene
 - b) Acetylene
 - c) Cyanogen
 - d) None of the above
 - 2 True/False: The word "castellated" originates from a Latin architectural term used in the Middle Ages.
 - 3 True/False: Chamfer and bevel are terms that describe a surface that does not form a right angle with adjacent surfaces.
 - 4 What steel material was developed through research to benefit the small arms manufacturing industry?
 - a) Weathering steel
 - b) Stainless steel
 - c) Silicon steel
 - d) None of the above
 - 5 What is one application of a thermochromic system?
 - a) Temperature indicating devices
 - b) Insulation
 - c) Thermal breaks
 - d) None of the above
 - 6 True/False: Henry Bessemer was known for inventing the Bessemer process to make steel, but a competitor was the patent holder for rolling devices that created the shape forms that steel took.
 - 7 What company produces bolt tension calibrators?
 - a) AISC
 - b) RCSC
 - c) The Lincoln Electric Company
 - d) Skidmore-Wilhelm
 - 8 True/False: The first known use of steel occurred more than 4,000 years ago.
 - 9 What is the first name of the engineer known as Whitmore, who wrote "Experimental Investigation of Stresses in Gusset Plates," which was published by the University of Tennessee in 1952?
 - a) Ronald
 - b) Robert
 - c) Raymond
 - d) Richard
 - 10 True/False: A rivet buster is one effective method of removing rivets.
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steel quiz ANSWERS

- 1 (b) Edmund Davy discovered this gas by accident in 1836 and originally proposed its use for lighting. Only in 1860 when it was rediscovered by Marcellin Berthelot did it receive the moniker "acetylene." Today this fuel is used in both fabrication processes and welding.
- 2 True. The term castellated was used in medieval times to describe a structure that was furnished with turrets and battlements, like a castle. Current use of this term can describe the fabrication process for some beam and column sections. The parent section is cut in a zigzag pattern forming two halves (resembling medieval parapets). The cut sections are welded together to produce a section deeper than the original section, which is called a castellated beam.
- 3 True. The terms chamfer and bevel both originated around the late 16th century, originally to describe a cut in a wood or stone surface.
- 4 (b) The discovery of one type of stainless steel is accredited to Harry Brearly from Sheffield in 1913. The insides of rifle barrels were eroding too quickly due to heating and discharge gases and he was looking for a material that would perform better under these conditions. He combined small percentages of chromium with carbon. When examining the grain structure, he found that this new steel performed well.
- 5 (a) Temperature-indicating devices, such as paint, crayons, pellets, and tapes, to name a few, exhibit thermochromism—the ability to change color with temperature. Temperature-indicating crayons or paints can be used to evaluate surface temperature, which is a useful aid for welders in determining when steel has reached the proper preheat temperature. Interestingly, thermochromic materials have been around a long time in many industries, and are used in many common applications today including beer cans that change color when cold, coffee mugs that turn a color when hot, and even some thermometers.
- 6 False. Henry Bessemer also invented a process for mass-producing steel inexpensively. After Bessemer patented his process in 1855 to remove carbon by blasting air through pig iron, he also patented in 1857 a casting process with rollers to form the steel shapes.
- 7 (d) Skidmore-Wilhelm invented a device to measure the pretension in a bolt in the 1940s. Today, the label "Skidmore" is often used as a generic term to mean bolt tension calibrator.
- 8 True. The first known steels were likely produced in bloomeries (iron smelters) that produced a porous iron and slag mix, or sponge iron, which was called a bloom. Starting around the 17th century, steel was produced using blast furnaces to make pig iron and then cast steel. Innovations have ensued and today, most steel for structural uses is produced using electric arc furnaces to re-melt recycled steel that is then continuously cast into structural shapes.
- 9 (d) At the University of Tennessee in the early 1950s, Dean A.T. Granger asked Richard E. Whitmore and another graduate student to study the behavior of joints in a Warren truss. The research consisted of using polarized light on an aluminum joint to measure stress distribution via electrical strain gages. Whitmore later became a professor of civil engineering at UT, teaching material science until the late 1960s. He subsequently became involved in the road building business in the Nashville area. However, Richard E. Whitmore is best known professionally for his research and paper on gusset plates. The Whitmore section carries his name today.
- 10 True. Ironworkers often call them "hell dogs," and a more colloquial term is "rivet buster." This is a pneumatic hammer with a chisel bit that is used to remove the rivet head. Switching to a B&O bit (a back-out punch), the same tool can be used to drive the rivet out. See it and a couple other methods in action by visiting <http://bit.ly/qygf1V>.



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