

STEEL QUIZ

STEEL QUIZ, A MONTHLY FEATURE IN *MODERN STEEL CONSTRUCTION*, allows you to test your knowledge of steel design and construction. Unless otherwise noted, all answers can be found in the *LRFD Manual of Steel Construction*. **To receive a copy of the 1997 AISC Publications List, please call 800/644-2400 or fax 312/670-5403.**

QUESTIONS:

1. What is a W530x66?
2. The variable L has at least three different meanings in the AISC LRFD Specification. Can you name them?
3. In slip-critical connections with uncoated faying surfaces, what is the difference between surface preparations for Class B and Class C?
4. When a pair of angles is noted as LLBB, what does this indicate?
5. The equation for C_b in the Second Edition of the LRFD Specification is less conservative than that in the First Edition of LRFD and in ASD. True or False?
6. The greatest savings in structural steel design with LRFD versus ASD can be realized with composite beams. True or False?
7. Where can one find Specification provisions for the design of single-angle members?
8. If steel delivered to a project site is A572 Grade 50, what paint markings should it have? A36?
9. When can high-strength bolts be installed snug tight?
10. The design strength of a complete-joint-penetration groove weld, joining members of unequal cross-section or different material strength, is governed by:
 - a. the strength of the weld
 - b. the strength of the stronger member
 - c. the strength of the weaker member
 - d. none of the above

Answers on page 14

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ANSWERS:

1. W530x66 is the metric designation for a W21x44. The nominal depth of a W21x44 is 530 mm, and its weight is 66 kg/m. The metric equivalents of all U.S. structural steel shapes, together with their metric dimensions and properties, are given in the AISC publication *Metric Properties of Structural Shapes*.
2. In the *LRFD Specification*, L can be: story height, in inches (Equation C1-4); length of connection in the direction of loading, in inches (Equation B3-2); or live load due to occupancy and moveable equipment (Section A4.1).
3. Blast-cleaned surfaces are Class B (slip coefficient not less than 0.50), while roughened surfaces are Class C (slip coefficient not less than 0.40). Clean mill scale surfaces are Class A (slip coefficient not less than 0.33).
4. LLBB denotes "long legs back to back".
5. True. The bending coefficient C_b is a function of moment gradient. In the first *LRFD Specification* and in *ASD* (including the Ninth Edition), the limitations on the equation for C_b caused us to use $C_b = 1.0$ in many cases, including "where moment within a significant portion of the unbraced segment is greater than or equal to the larger of the segment end moments." As can be seen from Table 4-1 on page 4-9 of the Second Edition of the *LRFD Manual of Steel Construction*, this conservatism is no longer necessary.
6. True. The abandonment of *ASD*'s fictitious linear-elastic approach to composite design has enabled engineers using *LRFD* to realize savings of 12 to 15% in the steel weight of composite beams.
7. The design of single-angle members is covered in the *Specification for LRFD of Single-Angle Members* (1993) and the *Specification for ASD of Single-Angle Members* (1989), which are contained in the respective AISC Manuals of Steel Construction.
8. According to *ASTM Standard A6* (Section 12.6.3), the color marking for A572 Grade 50 steel (including the new A572 Grade 50 Enhanced) is green and yellow. There is no color identification for A36 steel.
9. As stated in Section J3.1 of the *LRFD Specification*: "Bolts in connections not subject to tension loads, where slip can be permitted and where loosening or fatigue due to vibration or load fluctuations are not design considerations, need only be tightened to the snug-tight condition. The snug-tight condition is defined as the tightness attained by either a few impacts of an impact wrench or the full effort of a worker with an ordinary spud wrench that brings the connected plies into firm contact."
10. The correct answer is c, according to Table J2.5 of both the current *LRFD* and *ASD Specifications*.