

# steel quiz

This month's quiz is all about AISC Steel Design Guide 26  
*Design of Blast Resistant Structures.*

- 1 In general, the primary design criterion for blast design is not an allowable stress but rather the amount of \_\_\_\_\_.  
a) elastic deflection    b) elastic deformation  
c) plastic deformation    d) inelastic deflection
- 2 True or False: Blast mitigation and collapse mitigation are the same design philosophy.
- 3 When referring to a building, the term \_\_\_\_\_ implies the strength and sturdiness to resist excessive loads.  
a) redundancy            b) resilience  
c) robustness
- 4 True or False: Another source of redundancy and robustness inherent in steel buildings includes the common overstrength in the steel materials and connecting elements.
- 5 True or False: The typical details used in steel buildings inherently provide for redundancy and robustness, with the capability for load redistribution through alternative load paths.
- 6 Which of the following are good design guidelines for improving structural integrity (designing for progressive collapse) in structural steel buildings?  
a) Good plan layout    b) Redundancy  
c) Ductile detailing    d) All of the Above
- 7 True or False: Due to the nature of blast loading, elastic design is required and is measured by support rotations and ductility.
- 8 True or False: Beam-to-beam continuity consists of a distinct, clearly defined link across a column.
- 9 As compared with the static values normally used in design, which of the following properties vary for dynamic loading?  
a) The ultimate tensile strength increases slightly  
b) The yield point increases substantially  
c) All of the Above
- 10 True or False: For blast design the specified minimum yield stress should be multiplied by a strength increase factor, *SIF*, of 1.10.

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- 1 c) plastic deformation
- 2 False. Blast mitigation or blast-resistant design involves the evaluation of individual structural members or groups of structural members, depending on the distribution of blast load. Conversely, design to resist progressive collapse is, in a sense, threat-independent, in that the design intent is to provide sufficient redundancy in the structural system to prevent the propagation of failure.
- 3 c) robustness. The redundancy that is common in steel-framed buildings can be considered robust.
- 4 True. Other sources include membrane action in the floor and roof diaphragms and the strength and stiffness contributions of nonstructural components.
- 5 True. This fact has been demonstrated repeatedly when steel buildings have been subjected to abnormal loadings.
- 6 d) Effective design to resist progressive collapse is a matter of ductility and redundancy. Progressive collapse requires both an abnormal loading to initiate the local damage and a structure that lacks adequate continuity, ductility and redundancy to resist the spread of damage.
- 7 False. Plastic design is the required design methodology. Different codes can be used to define the strength of the elements, but no safety factor should be used in those calculations. Local and global stability should be guaranteed in those elements where plasticity must be achieved and ductility criteria must be used.
- 8 True. This link must be capable of independently transferring gravity loads for a removed column condition, regardless of the actual or potential damage state of the column.
- 9 c) Steel mechanical properties vary with the time rate of strain. Modulus of elasticity does not vary and the elongation at rupture either remains constant or is slightly reduced.
- 10 True. For typical steel grades of 50 ksi or less, the average yield stress is approximately 10% larger than the stress specified by ASTM. For higher grades this average is smaller than 5%; therefore, no factor is used on those grades. Ultimate strength is not factored in any case.



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](mailto:solutions@aisc.org).