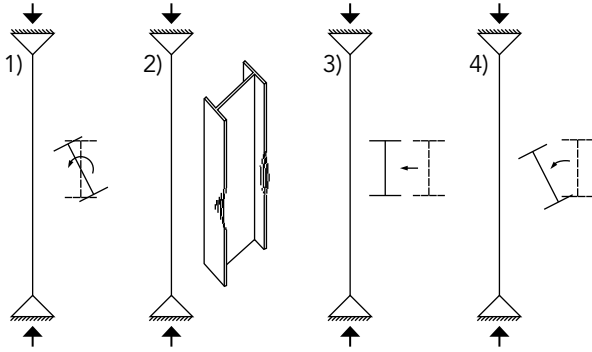


# steel quiz

The answers to this month's Steel Quiz can be found in AISC Design Guide 17 *High Strength Bolts—A Primer for Structural Engineers*, as well as on the AISC and *Modern Steel Construction* websites ([www.aisc.org](http://www.aisc.org) and [www.modernsteel.com](http://www.modernsteel.com)).

1 Match the term with the correct figure (choose 4). Bonus question: Include the applicable specification section.



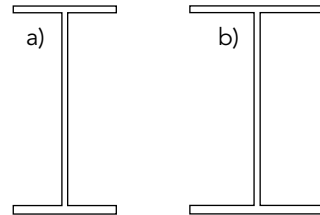
- a) Column Warping
- b) Flexural Buckling
- c) Local Buckling
- d) Web Buckling
- e) Torsional Buckling
- f) Flexural-Torsional Buckling

2 Section E4 of the AISC Specification requires that a member be checked for either lateral-flexural buckling or torsional buckling, but not both. Which of the following shape types need to be checked for LTB and which for TB?

- a) Doubly Symmetric Members
- b) Singly Symmetric Members
- c) Unsymmetric Members
- d) Double Angles
- e) WT Shapes
- f) Z Shapes

3 The factor 0.002 in Equation C2-1 in the AISC Specification accounts for column out-of-plumbness up to the 1/500 plumbness tolerance permitted in the AISC Code of Standard Practice, but there is no factor in this equation for the column straightness tolerance of 1/1000. Why?

4 Which shape is more likely have local buckling occur and why?



5 How are local buckling effects considered when calculating column strength?

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# steel quiz

## ANSWERS

- 1 1: e) Torsional Buckling (Section E4)  
2: c) Local Buckling (Section E7)  
3: b) Flexural Buckling (Section E3)  
4: f) Flexural-Torsional Buckling (Section E4)
- 2 Flexural-torsional buckling applies to singly symmetric members (b), unsymmetric members (c), double-angles (d) and WT shapes (e). Torsional buckling applies to doubly symmetric (a) and Z-shape members (f) (see Table C-E4.1 in the Commentary).
- 3 The equations in Chapter E already account for column out-of-straightness up to 1/1000.
- 4 The shape in Figure b is more likely to have local buckling occur than the shape in Figure a, because the column flanges are wider and, therefore, more slender.
- 5 By calculating a reduction factor Q in Section E7. After determining the controlling strength from Sections E3 and E4 for flexural buckling, lateral-torsional buckling and torsional buckling, Equation (E7-2) or (E7-3) is used, with Q representing the reduction in strength.



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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](mailto:solutions@aisc.org).