

steel quiz

This month's steel quiz is all about the design of reinforcement, based on AISC consultant Bo Dowswell's two-part AISC webinar, which can be viewed via YouTube. Part 1 is at <https://tinyurl.com/desrein1> and Part 2 is at <https://tinyurl.com/desrein2>.

1 Name at least one drawback to using singly symmetric reinforcement for columns, similar to what is shown in Figure 1.

2 **True or False:** With regards to reinforcing columns, pre-load can be neglected

3 Which of the following can be said about the beam reinforcement shown in Figure 2?

- a. Plate can easily be clamped for fit-up
- b. Welding can be done in the horizontal position
- c. Camber due to weld shrinkage is upward
- d. All of the above

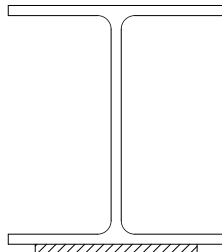


Figure 1

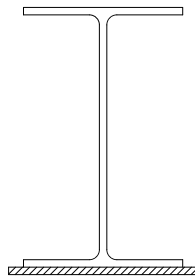


Figure 2

4 The strength of the reinforced beam shown in Figure 2 can be evaluated using which section in the AISC Specification?

5 Using intermittent welds to attach member reinforcement will:

- a. Potentially lower welding costs
- b. Decrease corrosion potential in exposed structures
- c. Less weld shrinkage distortion
- d. Both a and c

6 When welding to loaded members, it is recommended to set the maximum interpass temperature to:

- a. 300 °F b. 600 °F c. 800 °F d. 1,100 °F

7 **True or False:** Temperature crayons can be used to monitor the temperature of the base metal near the weld.

8 **True or False:** Shear flow can be used to design the weld attaching the reinforcing to the existing steel member.

TURN PAGE FOR ANSWERS

- 1 Adding singly symmetric reinforcement to a column will cause the centroid of the member to shift, creating an eccentricity resulting in a moment in the column in addition to the axial load in the column (see Figure 3). For welded singly symmetric reinforcement, there is more concern about distortion that could result due to weld shrinkage.

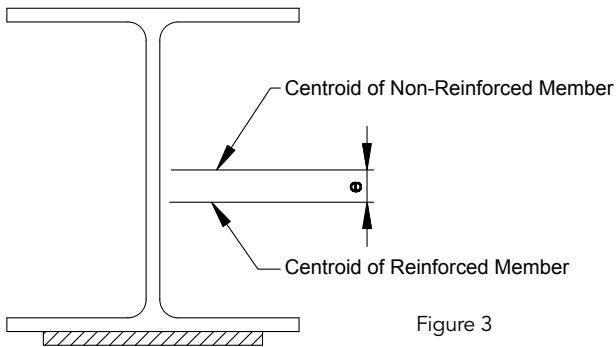


Figure 3

- 2 **Mostly true.** Pre-load can be neglected when reinforcement that is provided is considered stabilizing. Pre-load must be considered when added reinforcement is considered non-stabilizing. In most cases, reinforcement that is provided is stabilizing. Refer to Part 1 of Bo's presentation for more information.
- 3 **d.** All of the above.
- 4 Section F4 of the AISC *Specification for Structural Steel Buildings* (ANSI/AISC 360, available at www.aisc.org/specifications) can be used to evaluate reinforced singly-symmetric I-shaped beams with compact or noncompact webs.
- 5 **d.** Use of intermittent welds will potentially lower welding costs (should be confirmed with the fabricator performing the work) and should result in less weld shrinkage distortion.
- 6 **a.** 300 °F. Where appropriate, it's recommended to set the maximum interpass temperature to 300 °F.
- 7 **True.**
- 8 **True.**



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Everyone 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.