

Night School 26: Developing Eye for Connection Design

Session 4: Bolts, August 3, 2021

Due: August 31, 2021, 8:00 am EDT – Submit through the online form



1. When someone refers to N, X, Slip Critical, and/or Bearing bolts:
 - a. these represent physically different bolts that must be tracked during construction.
 - b. they are using informal “shorthand” to represent what are primarily assumptions made during design.

2. Most bolted connections in structural steel buildings:
 - a. are required to be pretensioned.
 - b. are required to be slip critical.
 - c. can be installed snug-tight.

3. Which of the following is true?
 - a. Slip critical joints must be pretensioned.
 - b. Pretensioned joints must be designed as slip critical.
 - c. Snug-tightened joints must be designed as bearing.
 - d. Bearing joints cannot be pretensioned.
 - e. Statements a and c.

4. The RCSC *Specification for Structural Joints Using High-Strength Bolts* addresses:
 - a. any bolt made of steel that can be readily purchased.
 - b. only bolts manufactured in the U.S.
 - c. bolts conforming to a small set of ASTM standards and further restricted to a range of geometries and installation methods.
 - d. only heavy hex head bolts that have been used since the 1950s.

5. True or False: In practice, problems associated with joint pretensioning can often be resolved by recognizing that there was no reason to pretension the joint to begin with.
 - a. True
 - b. False

6. Slip critical joints are required for:
 - a. fatigue loads with reversal.
 - b. oversized holes.
 - c. slots parallel to the direction of the load (beyond 80 to 100 degrees)
 - d. All of the above.
 - e. None of the above.



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7. In end-loaded bolted connections:
 - a. the bolts are unequally loaded.
 - b. the bolts are assumed to be equally loaded during design.
 - c. unequal loading of the bolts is accounted for in the “bolt value” given in *Specification*.
 - d. All of the above.
 - e. None of the above.

8. Pretension in the joint:
 - a. significantly reduces the available tensile strength of the bolt.
 - b. significantly increases the available tensile strength of the bolt.
 - c. has a negligible effect on the tensile strength of the bolt.
 - d. None of the above.

9. The AISC *Manual* prying checks:
 - a. assume an asymmetrical condition.
 - b. assume a symmetrical condition.
 - c. can be used to address both symmetrical and asymmetrical conditions.
 - d. Both a and c.

10. The effect of the threads on the tensile strength of the bolt:
 - a. is negligible.
 - b. must be explicitly accounted for in the design calculations.
 - c. is accounted for in the “bolt value” given in *Specification*.
 - d. cannot be tolerated, and this is why all bolts in tension must be installed with the threads excluded.

