Practice quiz: ICC S1 Structural Steel and Bolting Special Inspector

10 questions. The answer key is on page 2.

Name _____ Date _____

1. **For this exercise, the project specification gives a minimum pretension of 35.0 kips for a fictional bolt assembly and sets the pre-installation verification target at 7% above that minimum. What is the target, to the nearest 0.5 kip?**
   A. 35.0 kips
   B. 42.0 kips
   C. 37.5 kips
   D. 32.5 kips

2. **For this exercise, the pre-installation verification target is 37.5 kips. Three twist-off-type assemblies from one lot shear their splines in a tension calibrator at 39.6, 37.6 and 38.4 kips. What is the result?**
   A. The lot passes, since every assembly reached 37.5 kips
   B. The lot fails, since one reading is under 38.0 kips
   C. The lot fails, since the average reading is under 39.0 kips
   D. The lot passes only if two more assemblies are tested

3. **For this exercise, the minimum pretension is 35.0 kips and the verification target is 37.5 kips. In a turn-of-nut verification, one assembly reads 36.8 kips in the tension calibrator after the required rotation. What does this mean?**
   A. The combination passes, since 36.8 kips is above the 35.0 kip minimum
   B. The combination passes, since one of three assemblies may fall short
   C. The combination passes, since 36.8 kips is within 1 kip of the target
   D. The combination is not verified yet

4. **During pre-installation verification on a fictional job, a crew finds the calibrated wrench setting that brings three 7/8 in. x 3 in. assemblies from lot K-12 to the target. To what does that setting apply?**
   A. Every 7/8 in. bolt on the project, whatever its lot or length
   B. Only the same lot, diameter, length and grade, for the period the reference allows
   C. Every bolt that wrench tightens, whatever the lot
   D. Every bolt of the same grade on site

5. **After a week of installing bolts from a verified lot on a fictional project, a new shipment arrives with a different lot number for the same diameter, length and grade. What is needed before the new lot is installed?**
   A. Nothing, since that size and grade were already verified
   B. Verification only if a bolt from the new lot later fails in the field
   C. Pre-installation verification of the new lot
   D. A new calibration of the tension calibrator before work resumes

6. **For this exercise, the verification target is 37.5 kips. The tension calibrator gauge on a fictional job reads in pounds and shows 38,200 lb when an assembly's spline shears. What is the result for that assembly?**
   A. It passes; 38,200 lb is 38.2 kips, above 37.5 kips
   B. It fails; 38,200 lb is 3.82 kips, below 37.5 kips
   C. It fails; the reading has to be in kips to count
   D. It passes; any reading over 30,000 lb is enough for this size

7. **On a fictional job, the crew will install bolts by turning the nut, with a hardened washer under the nut. How should each assembly be set up in the tension calibrator for verification?**
   A. With no washer, so the reading is not affected
   B. With the head turned instead, since that is easier in the device
   C. With two washers under the nut to protect the device
   D. Washer under the nut, nut turned, as in the field

8. **In pre-installation verification of twist-off-type assemblies on a fictional job, which reading does the inspector compare with the target?**
   A. The highest reading reached before the snug stage
   B. The tension calibrator reading when the spline shears off
   C. The tension calibrator reading at snug-tight
   D. The torque shown on the installation tool's dial at spline shear

9. **For this exercise, the direct tension indicator instructions require that, when the tension calibrator reaches the 37.5 kip target, the feeler gauge is refused in at least 3 of the indicator's 5 spaces. Three assemblies are tested: assembly 1 shows 4 refusals, assembly 2 shows 3, and assembly 3 shows 2. What is the result?**
   A. All three assemblies meet the rule
   B. Assemblies 2 and 3 both fall short of the stated rule, so the lot fails
   C. Assembly 3 falls short, so the indicator lot is not verified
   D. Only assembly 1 meets the rule

10. **A lot of assemblies fails pre-installation verification on a fictional job. The erector's foreman tells the special inspector to let the crew install the lot anyway because the schedule is tight. What should the inspector do?**
    A. Record the failure, tell the contractor, and notify the design professional and building department if the lot is installed uncorrected
    B. Allow it, since the foreman decides how the work is scheduled
    C. Allow it if the crew tightens every bolt an extra 1/8 turn
    D. Say nothing, and retest the lot after it is installed

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Answer key

ICC S1 Structural Steel and Bolting Special Inspector. One line of why for each answer.

1. **C** 35.0 x 1.07 = 37.45, which rounds to 37.5 kips.
2. **A** Each reading is at least 37.5 kips, so the lot passes.
3. **D** Verification compares each reading with the target, 37.5 kips, not the minimum.
4. **B** A wrench setting reflects one lot's thread condition and lubrication at one diameter, length and grade, so it holds only for that combination and only as long as the reference allows.
5. **C** Each lot is verified on its own, because lubrication and thread condition can differ between lots.
6. **A** One kip is 1,000 lb, so 38,200 lb is 38.2 kips, which meets 37.5 kips.
7. **D** Verification has to reproduce the field installation, so the same washer goes in the same place and the same element is turned.
8. **B** A twist-off assembly is meant to reach pretension when its spline shears, so the reading at that moment is the one compared with the target.
9. **C** At least 3 refusals means 3 or more.
10. **A** A failed lot is a discrepancy: record it, tell the contractor first, and if it goes into the work uncorrected, notify the design professional in responsible charge and the building department.

Full explanations

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