Night School 26: Developing Eye for Connection Design
Session 7: Extended Shear Tabs, August 24, 2021
Due: September 21, 2021, 8:00 am EDT – Submit through the online form

1. True or False. Every assumption made in a Design Example that could affect its applicability to a real-world design condition is clearly stated in the Given portion of the Design Example.
    a. True
    b. False

2. True or False. Given its advantages in terms of fabrication economy and ease of erection, the extended single-plate shear connection is the right option for all beam end shear connections.
    a. True
    b. False

3. The full effect of combined loading (such as vertical shear combined with axial load due to lateral loads) acting simultaneously will:
    a. always produce the greatest demand on the structural elements.
    b. never produce the greatest demand on the structural elements.
    c. sometimes produce the greatest demand on the structural elements.

4. The AISC *Specification* addresses all conditions that might be encountered in the full range of structural steel design and therefore:
    a. the building code requires strict, verbatim compliance with all AISC provisions.
    b. engineering judgment (being subjective) has no place in building design.
    c. conditions not explicitly addressed in the AISC *Specification* are prohibited.
    d. All of the above.
    e. This is a trick question -- the AISC *Specification* does not "provide specific criteria for infrequently encountered problems, which occur in the full range of structural design".

5. The stated intent of the Design Examples in the Companion to the AISC *Steel Construction Manual* is to:
    a. demonstrate an acceptable approach to the design.
    b. demonstrate the only acceptable approach to the design.
    c. demonstrate the most economical approach to the design.
    d. demonstrate the best approach to the design.

6. If the rotational ductility checks in Part 9 of the *Manual* are not satisfied:
    a. the connection is unsafe.
    b. the connection does not satisfy the *Specification*.
    c. the connection may not satisfy the *Specification*.
    d. the rotational ductility checks in Part 9 of the *Manual* are clearly not applicable to the condition being addressed.

7. For an extended single-plate shear connection such as the one discussed in Session 7, the brace at (near) the end of the connection:
    a. is intended to ensure that the coped beam model in Part 9 of the *Manual* can be safely applied to the design of the extended shear tab.
    b. is intended to ensure that the Chapter F flexural checks can be safely applied to the design of the beam.
    c. can always be assumed to exist.
    d. will exist if the beam is made to understand that it is in a steel building or "other structure" that is designed, fabricated, and erected in a manner similar to buildings, with building-like vertical and lateral load-resisting elements. This can be accomplished by softly stroking the beam while whispering, "I am a good beam. I am a strong beam. I have the strength to be braced. I have the stiffness to be braced. I can support these loads."
    e. a and b.

8. *Specification* Table D3.1 indicates that for "All tension members where the tension load is transmitted directly to each of the cross-sectional elements by fasteners or welds" the shear lag factor is 1.0 and therefore the net section calculated per *Specification* Section B4.3b is fully effective. This is an example of:
    a. why the check proposed by Whitmore in the 1950s was never used in practical design.
    b. why we do not consider effective lengths/widths of the elements that make up HSS members.
    c. the incredible ability of steel to distribute stress evenly across its entire section regardless of the condition being addressed.
    d. why engineers must apply their own judgment.

9. It sometimes makes sense to distribute all of the load to:
    a. the least stiff element since it will also tend to be the weakest link.
    b. the stiffest element since this is where most of the load is going to go anyway.
    c. the least ductile element since these elements will be least capable of losing stiffness and distributing additional load to other elements.
    d. b and c.
    e. None of the above. All elements will have stiffness and the load will distribute based on stiffness. Only an accurate and precise determination of the demand can result in a safe design.

10. Checks like *Manual* Equations (9-2) and (9-3) are included in design guidance because they have been adopted by a consensus process. This means that such checks:
    a. represent the only technically-sound approach.
    b. are unanimously determined to be the best approach.
    c. may be adopted despite dissenting opinions.
    d. cannot be questioned by members of the committee that adopts them.