Topics on Industrial Building Design and Design of Non-Building Structures
Quiz for Session 8: Non-Building Structures 2 - August 11, 2020
Due: September 8, 8:00 a.m. EDT – Submit through the online form

1. The shell of a steel tank was modeled using plate/shell elements in a commercial finite element program. For design, the maximum plate stresses can be compared directly to the available stresses in AISC *Specification* Chapter E.
    a. True
    b. False

2. Stiffeners are usually modeled with
    a. Beam elements
    b. Plate/shell elements
    c. Solid elements

3. Stiffener moments caused by loads in the plane of the plate can be captured by…
    a. Refining the mesh in areas if high stress gradient
    b. Explicitly modeling the residual stresses
    c. Offsetting the stiffener from the plate centerline
    d. Using combined models

4. The structural performance of an element that is subjected to primary stresses is best described by:
    a. Minor distortions can affect the serviceability of the structure
    b. Yielding relieves the local stresses without failure
    c. Results in failure if the primary stress exceeds the strength

5. The structural performance of an element that is subjected to secondary stresses is best described by:
    a. Minor distortions can inhibit the functionality of the structure
    b. Yielding relieves the local stresses without failure
    c. High local stresses can cause a structural collapse

6. For elevated plate structures, the accuracy of the model can be improved by considering deformation compatibility at the interface between the plate structure and the support structure. This can be done by…
    a. Using combined models, where the plate/shell models are imported into the support-structure model
    b. Using spring supports in the plate/shell model based on the stiffness of the support-structure model
    c. Using manual calculations for the plate elements
    d. a and b

7. For flat-plate stiffeners, a portion of the attached plate can be assumed to act compositely with the stiffener. For stiffeners that are subjected to flexure, the effective plate width is dependent on several variables, including…
    a. The thermal load magnitude
    b. The tensile strength of the stiffener
    c. The span
    d. a, b and c

8. Shear lag can cause a reduction in the effective plate width for ring stiffeners subjected to flexure. In this case, the effective plate width for ring stiffeners is dependent on several variables, including…
    a. The shell radius
    b. The tensile strength of the stiffener
    c. The thermal load magnitude
    d. a, b and c

9. Several limit states are applicable to flat-plate stiffeners subjected to axial compression loads, including…
    a. Out-of-plane flexural buckling
    b. Stiffener tripping
    c. Fatigue cracking
    d. a and b

10. For I-shaped flat-plate stiffeners subjected to flexure, the connected plate can be assumed to provide adequate bracing if…
    a. The connected flange is subjected to flexural compression
    b. The non-connected flange is subjected to flexural compression
    c. Thermal loads are considered in the model
    d. a and b