Fundamentals of Earthquake Engineering for Building Structures
Session 5: System ductility and seismic design – March 15, 2021
Due: April 12, 2021, 8:00 am EDT – Submit through the online form

Pick the best answer

1) Utilizing a ductile material is beneficial in seismic design if
   a) Local buckling can be prevented
   b) Connection failure can be prevented
   c) Ductility demands can be spread to multiple elements
   d) All of the above
   e) None of the above

2) Local buckling is prevented by
   a) Limiting the force in elements
   b) Using highly compact shapes
   c) Using a ductile material

3) Decreasing width-to-thickness ratios
   a) Increases rotation capacity
   b) Reduces rotation capacity

4) Lateral bracing
   a) Prevents lateral torsional buckling
   b) Increases member ductility
   c) Reduces connection demand
   d) A and B
   e) None of the above

5) System ductility requires
   a) Ductile material
   b) Highly compact sections
   c) Strong connections
   d) Lateral stability of members
   e) Distributed yielding
   f) All of the above

6) Distributed yielding in a moment frame means
   a) Plastic hinges forming in beams and columns
   b) Plastic hinges forming in beams at multiple levels and at column bases

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7) At the local level "capacity design" means
   a) Analyzing the structure such that you have a high capacity that member required strength does not exceed member resistance (capacity)
   b) Deriving the required strength of a member or connection from the capacity of an adjacent member

8) At the system level "capacity design" means
   a) Analyzing the structure such that you have a high capacity that member required strength does not exceed member resistance (capacity)
   b) Deriving the required strength of a member or connection from the a system yield mechanism in which multiple members are yielding

9) Which is most correct?
   a) In capacity design gravity forces need not be added to the capacity-design forces caused by member yielding
   b) In capacity design gravity forces are always added to the capacity-design forces caused by member yielding
   c) In capacity design gravity forces are not added to the capacity-design forces caused by member yielding in certain cases in which those gravity forces represent a portion of the force causing yielding of the fuse member

10) Which is most correct?
   a) In a braced frame, increasing the brace size will always lead to a better performing system
   b) In a braced frame, increasing the brace size is likely to lead to a better performing system if connections, beam, and column sizes are adequate to resist the resulting increased forces