Fundamentals of Earthquake Engineering for Building Structures
Session 4: Steel Behavior – March 8, 2021
Due: April 5, 2021, 8:00 am EDT – Submit through the online form

Pick the best answer

1) Weld backing can be problematic because
   a) Backing can form a heat sink.
   b) Backing leaves an unfused contact area that acts like a crack.
   c) Backing can fuse to the weld metal.

2) Notch toughness can be characterized as
   a) The resistance of the material to crack propagation.
   b) The ability of material to deform in a ductile fashion.
   c) The energy absorption capacity of the material.

3) Members made of ductile material can be stronger than those made of brittle material because
   a) Ductile materials have higher strength.
   b) Brittle materials have larger stress concentration factors.
   c) Ductile materials can redistribute stress by local yielding.

4) Strain-hardening of steel can be described as
   a) Increased yield strength after inelasticity
   b) Decreased inelastic deformation capacity due to inelastic demand
   c) Both A and B.
   d) None of the above.

5) Under extreme seismic loading steel may fracture due to
   a) Low-cycle fatigue
   b) High-cycle fatigue

6) Restraint causes
   a) Stress normal to the principal stress by restriction of transverse Poisson's-effect contraction.
   b) Elevated yield stress.
   c) Elevated rupture stress.
   d) Decreased elongation capacity.
   e) All of the above.
   f) A, B, and D.

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7) Which is the most restrained condition?
   a) A bar in tension.
   b) A butt-splice of two plates.
   c) A T-joint of a beam flange to a heavy column flange.

8) Expected yield stress is
   a) The specified minimum yield stress times the resistance factor.
   b) The mean yield stress of that material determined by AISC through industry-wide sample testing.
   c) The highest material yield stress permitted under the ASTM classification.

9) Partial-joint penetration groove welds can be problematic because
   a) Potential fusion beyond the joint.
   b) An unfused contact area that acts like a crack.

10) A reinforcing fillet weld on the backing can improve the joint behavior because
   a) A larger weld area is provided.
   b) Any gaps are hidden from the inspector.
   c) The unfused contact area becomes more like an interior crack than an exterior crack.