

# CHAPTER 1

Answers:

1-1 Elastic strain, plastic strain, and strain hardening.

1-2 Cold Formed steel: AISI (American Iron and Steel Institute)  
Hot Rolled Steel: AISC (American Institute of Steel Construction)

1-3 Proportional limit: The largest stress for which Hooke's law applies, or the highest point on the linear portion of the stress-strain diagram.  
Elastic limit: The largest stress a material can withstand without being permanently deformed.

Yield stress: The stress at which there is a significant increase in the elongation, or strain, without a corresponding increase in stress.

1-4 Plates: A36  
W-shapes: A992  
C-sections: A36

1-5 Hot Rolled  
Cold Formed

1-6 Ductility, Elasticity, permanence, Uniformity, High-Strength/Weight Ratio, Constructability, or Fracture Toughness.

SFC ✓

1-1

1-7 A992

1-8 Wrought Iron: very low carbon content  
( $\leq 0.15\%$ )

Cast Iron: very high carbon content  
( $\geq 2.0\%$ )

Steel: Carbon content in the range  
of  $0.15\%$  to  $1.7\%$

1-9 Mild steel carbon range  $0.15\%$  to  $0.29\%$

1-10 Corrosion, Fireproofing Costs, Susceptibility  
of Buckling, Fatigue, or Brittle Fracture.

1-11. Insufficient size and strength, Details  
of Connections, Deflections, Erection  
problems, or Foundation settlement.

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1-2