Structural Steel Design 7th edition McCormac Solutions Manual

SKU: 9780137874200-SOLUTIONS

Chapter 1
Introduction to Structural Steel Design

Problems 1-1 to 1-12

1. 1884
2. Ductility, Elasticity, Permanence, Uniformity, High-Strength/Weight Ratio, Constructability or Fracture Toughness.
3. Corrosion, Fireproofing Costs, Susceptibility to Buckling, Fatigue or Brittle Fracture.
4. Carbon Content:

   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%
5. *Mild* steel carbon range is 0.15% to 0.29%
6. Hardness and strength will increase but the steel will become more brittle, and its weldability will be adversely affected
7. W shape section
8. Elastic Strain – strain that occurs before the yield stress
   Plastic Strain – strain that occurs after the yield stress
   Strain Hardening – a range after plastic strain in which additional stress is necessary to produce additional strain
9. A992
10. Hot Rolled, Cold Formed
11. C sections A992
    HP sections A572
    W shape A992
12. The vast majority of designers select members of sufficient size and strength.
    Failures result from inefficient attention to:
    1. Detail of connections
    2. Deflection
    3. Vibration
    4. Erection Problems
    5. Foundation Settlements

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