



Building Inspection Engineers Certification Institute

P.O. Box 523, Pleasant Grove, Alabama 35127 - Phone 205-212-9983

Body of Knowledge

1. History of Building Construction, Including Historic Preservation

1. Primary phases of residential construction techniques in the 19th century and prior
2. Primary phases of commercial construction techniques in the 19th century and prior
3. Primary phases of residential construction techniques in the 20th century
4. Primary phases of commercial construction techniques in the 20th century
5. Overview of construction labor evolution
6. Review of typical construction organizational structures
7. Regional variations in construction
8. Significance of historic preservation efforts
9. Authority and jurisdiction of historic preservation organizations
10. Primary state and national preservation organizations

2. Construction Materials

1. Concrete
2. Masonry
3. Metals
4. Woods and plastics
5. Thermal and moisture protection
6. Doors and windows
7. Finishes

3. Construction Detailing/Techniques and Repair Practices

1. Foundations
2. Structures
3. Mechanical
4. Electrical
5. Building envelope

4. Structural Analysis and Theory of Structures

1. Strengths of materials
2. Section properties
3. Bending, shear and axial stresses
4. Allowable stresses in materials
5. Load paths
6. Dead and Live loads
7. Gravity and lateral loadings
8. Deflections
9. Failure modes
10. Simple beam analysis

5. Thermal Systems

1. HVAC fundamentals
2. Load estimating
3. Air distribution
4. Piping design
5. Refrigerants
6. Cooling towers
7. Solid, liquid and gaseous fuel-burning equipment
8. Safety components
9. Insulation
10. Inspection techniques, equipment and measurements
11. Indoor air quality

6. Surveying Engineering

1. Elementary principals of horizontal and vertical control
2. Property boundaries
3. Property topographic information
4. Coordinates
5. Concepts of Global Positioning Systems
6. Quantity surveying
7. Common surveying problems relevant to Building Inspection

7. Timber and Wood-Framed Structures

1. Strengths of materials/common timber species
2. Section properties of common members
3. Bending, shear and axial stresses
4. Allowable stresses in species
5. Advantages and disadvantages of timber as a structural material
6. Common means of deterioration; pests, moisture, fungus
7. Investigative methods
8. Lateral bracing methods
9. Common floor and roof decking
10. Connections

8. Steel Structures

1. Material properties
2. Construction uses in buildings
3. Construction procedures (installation techniques)
4. Structural properties
5. Interaction with other common building materials
6. Connections
7. Detailing
8. Inspection techniques (destructive and non-destructive)
9. Deterioration causes and symptoms
10. Common repair methods
11. Relative cost

9. Concrete and Masonry Structures

1. Material properties
2. Construction uses in buildings
3. Construction procedures (installation techniques)
4. Structural properties
5. Interaction with other common building materials
6. Connections
7. Detailing
8. Inspection techniques (destructive and non-destructive)
9. Deterioration causes and symptoms
10. Common repair methods
11. Relative cost
12. Common misapplications

10. Plumbing / Fire Protection Systems / Waste Management

1. Water and basic considerations
2. Stormwater
3. Supplying water
4. Sanitary and specialized waste
5. Bathroom design principles
6. Solid waste management
7. Fire resistance and smoke management
8. Fire suppression
9. Lightning protection
10. Fire detection and alarming

11. Building Electrical Systems

1. Basic principles
2. Wiring
3. Service and utilization
4. Common electrical design concepts
5. Quantity and quality of lighting
6. Light source
7. Common lighting design concepts
8. Lighting applications
9. Communications systems

12. Integrated Building System Design

1. HVAC and Electrical system interaction and integration
2. HVAC and Plumbing system interaction and integration
3. Plumbing and Electrical system interaction and integration
4. HVAC and Building Envelope system interaction and integration
5. The benefits of system integration
6. The disadvantages of system integration
7. Who is responsible for system integration?

13. Geotechnical Engineering

1. Engineering properties of soils and soils exploration
2. Consolidation of soil and settlement of structures
3. Shallow foundations
4. Pile foundations
5. Drilled caissons
6. Retaining structures
7. Expansive soil
8. Lateral movement and slope stability
9. Miscellaneous issues
10. Groundwater and moisture problems
11. Repair methods

14. Building Mechanical Systems

1. Vertical transportation types, traction equipment and hydraulic equipment
2. Safety devices
3. Hoistways
4. Pits
5. Moving walkways
6. Safety Code governing vertical transportation (ANSI/ASME A17. 1)
7. Inspection of vertical transportation systems
8. Boiler types
9. Boiler design
10. Steam generating equipment
11. Liquid fuel-fired boilers
12. Gas-fired boilers
13. Boiler ratings
14. Codes and Standards
15. Boiler safety devices
16. Inspection of boilers

15. Site Features, Including Security

1. Site analysis, history and zoning related issues
2. Topographic maps and aerial photographs
3. Drives, parking, walks, site amenities and recreational features
4. Grading, earthwork and construction layout
5. Drainage
6. Landscaping aids for grade changes
7. Landscaped environment
8. Land clearing
9. Site security in the post 9/11 environment

16. Building Codes and Standards. Including ADA Compliance

1. What are the applicable codes?
2. Who creates building codes?
3. What is the basic objective of most building codes?
4. How do building codes relate to construction quality?
5. When is a code applicable?
6. Where do codes apply?
7. Who adopts and enforces codes?
8. What are the differences between residential and commercial code enforcement and compliance?
9. What is the ADA and who enforces it?
10. What are the primary ADA standards as they relate to buildings?
11. Where and when does the ADA have jurisdiction?

17. Engineering Economics

1. Engineering economics and the requirements of economic studies
2. Value analysis
3. Interest and money time relationships
4. Depreciation
5. Cost estimating
6. Basic methods for economic studies
7. Replacement and reserve studies

18. Investigative Methods and Forensics

1. Scientific methods of analysis
2. Impartial and ethical conduct
3. Legal procedures and perspectives
4. Review of building design, construction and maintenance records
5. Site observations and gathering of facts
6. Documentation of site conditions, damage, and defects
7. Probable causes of failure or defects
8. Report with clarity and precision
9. Deposition testimony
10. Court testimony

19. Environmental Issues

1. Who establishes and enforces environmental standards?
2. What standards are applicable to commercial buildings?
3. What standards are applicable to residential buildings?
4. How is a hazardous material defined?
5. What are the common hazardous materials found in buildings?
6. Understand the relationship between environmental issues and personal health
7. Understand the relationship between environmental issues and national or global air quality
8. Understand the significance of indoor air quality (IAQ)
9. Understand the relevant ASTM and ASHRAE standards

20. Written Communication for Engineers. Including Liability Issues and Standards of Practice

1. Report format
2. Report content
3. Electronic communications
4. Field documentation
5. Copyright issues
6. Sealing and Certification
7. NABIE Standard of Practice
8. ASTM: Property Condition Assessment
9. ASTM: Environmental Site Assessment
10. ASCE: Structural Condition Assessments of existing buildings

21. Professional Practice

1. Ethics
2. Liability issues
3. Judgment vs. Analysis
4. Inspection criteria