Protection of Cultural Resource Properties and Historic Buildings – NFPA 909 and NFPA 914

CTIF Fire Prevention Commission Meeting

12 May 2015 | Gregory Harrington, P.E.: Principal Fire Protection Engineer

Historic Buildings and Cultural Resource Properties

• Compliance with current building, fire and safety regulations?
• Achieving compliance can be exceedingly difficult and costly
• Preservation of historic fabric parallels objectives for fire and life safety

nfpa.org
Building Regulations

- Reflection of public expectation for safety
- Primary focus is protection of occupants and neighboring properties
- Preservation of historic fabric and culturally significant collections not typically addressed

Building Regulations

- Typically prescriptive in nature
NFPA 909 & 914 - A Different Approach

- Building Regulations
  - Developers
  - Code officials

- NFPA 909 & 914
  - Preservationists
  - Fire protection engineers
  - Facility owners and operators

Technical Committee on Cultural Resources

- Established in the 1940s
  - First pamphlet: Protecting our Heritage (1948)

- Current documents
  - NFPA 914, Code for Fire Protection of Historic Structures
Technical Committee on Cultural Resources

Past & current members include representatives of:

- U.S. Library of Congress
- National Gallery of Art
- Historic Scotland
- Smithsonian Institution
- Schönbrunn Palace, Vienna
- National Fire Corps of Italy
- U.S. General Services Administration
- Colonial Williamsburg Foundation, Virginia
- National Library of Scotland
- U.S. National Park Service
- The J. Paul Getty Trust

NFPA 909 – Code for the Protection of Cultural Resource Properties
NFPA 909 – Cultural Resource Property

• Definition
  – Buildings, structures, sites, or portions thereof that are culturally significant or that house culturally significant collections for museums, libraries, and places of worship

Windsor Castle, UK - 1992
The Cabildo, New Orleans - 1988

Morning Star Baptist Church, Portland, OR - 2007
NFPA 909 – Scope

- Principles and practices of protection for cultural resource properties, their contents, and collections, against conditions or physical situations with potential to cause damage or loss
- Ongoing operations and rehabilitation; acknowledges the need to preserve culturally significant and character-defining building features and sensitive, often irreplaceable, collections and to provide continuity of operations

NFPA 909 - Purpose

- Minimum requirements for the protection of cultural resource properties and their contents and collections through a comprehensive protection program
- Supplements existing codes and standards
  - Recognizes special nature of cultural resource properties
NFPA 909 – Application

- Culturally significant:
  - Structures
  - Spaces used for culturally significant purposes
  - Contents
- New buildings and additions
- Existing buildings (NOT retroactive)
  - Alterations, modernizations, renovations
  - Change of occupancy

NFPA 909 – Goals & Objectives

- Collection preservation
  - Protect/preserve original qualities of collection
  - Structural integrity
  - Emergency responder access
- Building preservation
  - Preserve original qualities/character of building, structure, site, environment
  - Minimize removal/alteration of distinctive architectural features
NFPA 909 – Goals & Objectives (continued)

• Continuity of operations
  – Minimize disruption of operations consistent with property’s mission and protection goals

NFPA 909 – Protection Plan

• Plan development – Ch. 5
• Emergency operations – Ch. 6
• Fire safety management – Ch. 7
  – Vulnerability assessment
  – Fire safety manager
  – Training
• Security – Ch. 8
  – Vulnerability assessment
NFPA 909 – Construction, Additions, Alterations, Renovations (Ch. 9)

Estimated to cause 15% - 20% of fires in heritage properties

NFPA 909 – Management Operational Systems (Ch. 10)

- Responsibilities of fire safety manager and security manager
- Opening and closing procedures
- Emergency response
- Training and drills
- Compliance audit
NFPA 909 – Fire Prevention (Ch. 11)

- Decorations
- Housekeeping
- Smoking
- Hot work
- Open Flames
- Chimneys
- Electrical hazards
- Water control

NFPA 909 – Specific Hazards

- Chapter 13 – Special Events
- Chapter 14 – Museums, Libraries, and their Collections
- Chapter 15 – Places of Worship
NFPA 909 – Additional Guidance

- Annex B – Fire Experience in Cultural Resource Properties
- Annexes H & I – Compact Storage Fire Tests
- Annex J – Fire Safety Inspection Forms
- Annex K – Fire System Maintenance Checklists
- Annex L – Salvage of Water-Damaged Library Materials

NFPA 914, Code for Fire Protection of Historic Structures
NFPA 914 – Historic Structure

• Definition
  – A building, bridge, lighthouse, monument, pier, vessel, or other construction that is designated, or deemed eligible for such designation, by a local, regional, or national jurisdiction as having historical, architectural, or cultural significance

NFPA 914 – Scope and Purpose

• Scope
  – Principles and practices of fire safety and security for historic structures and for those who operate, use or visit them

• Purpose
  – Minimum requirements for protection of historic structures from fire and security vulnerabilities
  – Preserve elements, spaces, features that make them historically significant
NFPA 914 – Goals & Objectives

- Life safety
  - Egress, structural integrity, const./operations, security
- Historic preservation
  - Preserve original qualities or character of building, structure, site, or environment
  - Minimize removal or alteration of historic features
  - Distinctive features treated with sensitivity
  - Encourage compatible use with minimal alteration

NFPA 914 – Process (Ch. 7)

- Team approach
- Identification of historic features
- Identification of fire safety issues
- Compliance Options
  - Prescriptive provisions
  - Performance-based option
- Compliance Audit
NFPA 914 – Compensatory Features

- Construction materials
- Fire-retardant treatments
- Noncombustible contents
- Fire/smoke barriers
- Shaft enclosures
- Firestopping
- Fire-resistive construction
- Fire detection and alarm systems
- Automatic suppression systems
- Management operational controls
- Electrical equipment

NFPA 914 – Performance-Based Design

- Fire safety goals, objectives and criteria
- Characteristics and assumptions about people or property exposed
- Potential hazards and fire scenarios
- Evaluation tools (calculation methods, computer models, fire tests)
NFPA 914 – Fire Risk Indexing

- Codes specify minimum requirements with no credit for superior conditions
- Fire Risk Indexing balances weak and strong attributes (e.g., height, area, egress path length)

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<th>ATTRIBUTE</th>
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<td>Significance</td>
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<td>Automatic Suppression</td>
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<td>Bldg Height &amp; Construction</td>
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<td>Compartmentation</td>
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<td>Fuel (contents &amp; finishes)</td>
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<td>Emergency Response</td>
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### NFPA 914 – Management Operational Systems (Ch. 10)

- Fire safety manager
- Management plan
  - Operational requirements
  - Fire emergency response plan
  - Training
  - Drills
  - Record keeping
  - Periodic compliance audit
  - Procedures for opening and closing

### NFPA 914 – Fire Prevention (Ch. 11)

- Decorations
- Fire spread control
- Housekeeping
- Smoking
- Open flame use
- Electrical systems
- Cabling
- HVAC systems
- Commercial cooking/food service
- Access
- Fire proofing
- Lightning protection
- Wildland fires
- Water control
NFPA 914 – Provisions for:

- Security
- Additions, alterations & rehabilitation
- Fire precautions during construction, repair, and alterations
- Inspection, testing & maintenance
- Special events

NFPA 914 – Additional Guidance

- Annex B – Planning and Design Appraisal
- Annex C – Survey Criteria for a Historic Structure
- Annex F – Examples of Compliance Alternatives
- Annex J – Fire Safety Inspection Forms
- Annex O – Fire Ratings of Archaic Materials and Assemblies
NFPA’s Approach to Building Rehabilitation

• Stepped approach to trigger requirements
• Minor rehabilitation - minimal requirements
• Major rehabilitation - more substantial requirements

NFPA’s Approach to Building Rehabilitation

• Existing Buildings
• Rehabilitation
• New Construction

• Repair
• Renovation
• Modification
• Reconstruction
• Change of use
• Change of occupancy
• Addition
• (Historic Building)
Emerging Issues – Dry-Pipe Sprinkler System Corrosion

Emerging Issues – Impact of Extinguisher Agents on Cultural Resource Materials
Summary

• Cultural resource properties and historic buildings pose unique fire safety engineering problems
• Other building and fire prevention codes do not adequately address conservation issues
• NFPA 909 and NFPA 914 provide a framework to help bridge the gap

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Questions

Thank You