Objective – Keep Buildings Safe

• Barriers are for Safety – DIIM
  • Properly *Designed* and Specified
    – *Tested and Listed Systems* – Directories, Tables
    – *Specified*
  • Professional *Installation* Companies
  • Properly *Inspected* – Commissioned, by Companies
  • *Maintained* –
    – NFPA 101 - 2012 (TJC, CMS)
    – International Fire Code - IFC 2015 - Annually

• *Effective Compartmentation for Fire & Life Safety*
“TOTAL FIRE PROTECTION”

• Effective Compartmentation
  – Fire Barriers, Fire Walls/Floors, Smoke Barriers
  – Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing

• Detection & Alarm Systems

• Sprinkler Suppression Systems

• Education & Egress–
  – Building Owners & Managers, Building Occupants and Firefighters
Building & Fire Code Requirements

• **Continuous Fire Resistance**
  – Walls / Horizontal Assemblies – Continuity
    • Firestop Products Become Firestop Systems
      – Penetrations
      – Joints – Head / Bottom of Wall – Perimeter Joints
    • Fire & Smoke Damper Duct Systems
    • Fire Doors and Hardware Systems
      – Rolling & Swinging
    • Fire Rated Glazing
Continuity
Effective Compartmentation Features
Barrier Continuity SYSTEMS

• **Products Become Systems Through Testing**
  – Fire & Smoke Barriers - ASTM E 119, UL 263
  – Fire/Smoke Dampers - UL 555, UL 555S
  – Swing/Rolling Fire Doors - UL 10B, 10C
  – Fire Rated Glazing - UL 9

• **SYSTEM Testing = Suitability statement for use of a product in a specific system application**
Products Become Systems
Hose Stream = Shock Test
Barrier Continuity
Products become SYSTEMS

• Fire Rated Systems Directories –
  – FM Approvals
  – Intertek
  – UL Fire Resistance Directory

  *Systems Selection & Analysis…Not as easy as it looks*
Barrier Continuity
I – Installation – Listed Systems
I- Installation
Who’s Responsible, How to Choose???
Contractor Qualifications?

• FM 4991 – Standard for the Approval of Firestop Contractors
• UL Qualified Firestop Contractors
• Other Industries…
  – Accreditations?
  – FM 4991 Approved / UL Qualified Firestop Contractors ENTATION
Why Contractor Qualifications?

• Built right – Building Life Cycle
• Documentation
• SYSTEMS Selection, Analysis, As-Builts
  – F, T, L, W Rated Systems
  – Tolerances - Annular Space Sizes, Angles
  – Gap Sizes - Undercuts - Framing
  – Anchors - Spacing – Hardware
  – Closers - Activation Sensors, more…
Installation & Inspection

Duct w/Pink FBGL

ST23-8a  ST23-8e
I – Inspection – Options

• Contractor Self Inspection
  – Verify Management System validity

• Manufacturer Inspection?
  – Does not exist … Survey, maybe

• Special Inspection/Commissioning
  – Independent 3\textsuperscript{rd} Party
  – Destructive, Non Destructive
  – Specified Frequency
  – Inspection Agency Accreditation – IAS AC 291
Compartmentation for Safety
Fire Code Requires Maintenance

- International Fire Code
- NFPA 101
- National Building Code of Canada
- UAE Fire and Life Safety Code of Practice

- Minimum Requirements Stated

- Frequency
SECTION 4.5.8 Maintenance, Inspection, and Testing.

4.5.8.1 Whenever or wherever any device, equipment, system, condition, arrangement, level of protection, fire-resistant construction, or any other feature is required for compliance with the provisions of this Code, such device, equipment, system, condition, arrangement, level of protection, fire-resistant construction, or other feature shall thereafter be continuously maintained in accordance with applicable NFPA requirements or requirements developed as part of a performance-based design, or as directed by the AHJ. [101:4.6.12.1]
4.5.8.2 No existing life safety feature shall be removed or reduced where such feature is a requirement for new construction. [101:4.6.12.2]

4.5.8.3* Existing life safety features obvious to the public, if not required by the Code, shall be either maintained or removed. [101:4.6.12.3]

4.5.8.4 Any device, equipment, system, condition, arrangement, level of protection, fire-resistive construction, or any other feature requiring periodic testing, inspection, or operation to ensure its maintenance shall be tested, inspected, or operated as specified elsewhere in this Code or as directed by the AHJ. [101:4.6.12.4]

4.5.8.5 Maintenance, inspection, and testing shall be performed under the supervision of a responsible person who shall ensure that testing, inspection, and maintenance are made at specified intervals in accordance with applicable NFPA standards or as directed by the AHJ. [101:4.6.12.5]
SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. The required fire-resistance rating of fire-resistance-rated construction, including, but not limited to, walls, firestops, shaft enclosures, partitions, smoke barriers, floors, fire-resistive coatings and sprayed fire-resistant materials applied to structural members and fire-resistant joint systems, shall be maintained. Such elements shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated. Records of inspections and repairs shall be maintained..
SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. (continued) Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space. Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire. Openings through fire-resistance-rated assemblies shall be protected by self- or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.
SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. (continued) 703.1.1 Fireblocking and draftstopping. Required Fireblocking and draftstopping in combustible concealed spaces shall be maintained to provide continuity and integrity of the construction.

703.1.2 Smoke barriers and smoke partitions. Required smoke barriers and smoke partitions shall be maintained to prevent the passage of smoke. Openings protected with approved smoke barrier doors or smoke dampers shall be maintained in accordance with NFPA 105.

703.1.3 Fire walls, fire barriers and fire partitions. Required fire walls, fire barriers and fire partitions shall be maintained to prevent the passage of fire. Openings protected with approved doors or fire dampers shall be maintained in accordance with NFPA 80.
SECTION 703
FIRE-RESISTANCE-RATED CONSTRUCTION

703.1 Maintenance. The required fire resistance rating of fire-resistance rated construction (including walls, fire stops, shaft enclosures, partitions, smoke barriers, floors, fire resistive coatings and sprayed fire resistant materials applied to structural members and fire resistive joint systems) shall be maintained. Such elements shall be visually inspected by the owner annually and properly repaired, restored or replaced when damaged, altered, breached or penetrated.

Openings made therein for the passage of pipes, electrical conduit, wires, ducts, air transfer openings, and holes made for any reason shall be protected with approved methods capable of resisting the passage of smoke and fire.
Chapter 1, SECTION 21
Firestopping

21.15.2 The required fire resistance rating of installed firestop systems shall be visually inspected by the owner or owner’s inspection agency annually. Damaged, altered or breached firestop systems shall be properly repaired, restored or replaced to comply with applicable codes as per the guidelines of Civil defense.

21.15.3 Any new Openings made therein for the passage of through penetrants, shall be protected with approved firestop system to comply with applicable codes as per the guidelines of Civil defense.
National Fire Code of Canada

Division B – Part 2, Building and Occupant Fire Safety

2.2.1.2 – Damage to Fire Separations – where fire separations are damaged so as to affect their integrity, they shall be repaired so that the integrity of the fire separation is maintained…

FCIA Manual of Practice – Appendix, Maintenance

FCIA recommends Barrier Management for Effective Compartmentation and Structural Protection
Maintenance

- Maintenance
  - Code Required
  - How??

- How to keep Track – Barrier Management Initiative
  - Paper
  - Software
  - Labeling
Barrier Management Begins when new construction ends...
M–Barrier Management Systems
Starts with CONSTRUCTION

• NEW Buildings – 07-84-00 Specs
  – www. FCIA .org

• Part I – Focus on
  – Systems
  – Not Products
  – Manufacturers

• “Single Manufacturer to the greatest extent possible” – EJ’s
M–Barrier Management Systems Starts with CONSTRUCTION

• Part II – Qualifications
  – FCIA Member in Good Standing, AND
  – FM 4991, Standard for the Approval of Firestop Contractors, OR
  – UL Qualified Firestop Contractor Program
  – Other Accreditation Program
  – AND
  – Manufacturer Accredited, Approved, Trained
M–Barrier Management Systems
Starts with CONSTRUCTION

• Part II – Qualifications – Special Inspection
  – Special Inspection Agency –
    • IAS AC 291 Accredited Special Inspection Agencies
  – Special Inspector Qualifications
    • FM Firestop Exam
    • UL Firestop Exam
    • AND
    • ASTM E 3038
M–Barrier Management Systems
Starts with CONSTRUCTION

• Part III – Execution
  – Special Inspection
    • ASTM E 2174 - Penetrations
    • ASTM E 2393 - Joints
M–Barrier Management Systems
Starts with CONSTRUCTION

• Specifications Reference 01-78-00
  – Closeout Submittals
  – 01 78 13 Completion and Correction List
  – 01 78 19 Maintenance Contracts
  – 01 78 23 Operation and Maintenance Data
  – 01 78 23.13 Operation Data
  – 01 78 23.16 Maintenance Data
  – 01 78 23.19 Preventative Maintenance Instructions
M–Barrier Management Systems Starts with CONSTRUCTION

• Reference 01-78-00 Closeout Submittals
  – 01 78 29 Final Site Survey
  – 01 78 33 Bonds
  – 01 78 36 Warranties
  – 01 78 39 Project Record Documents
  – 01 78 43 Spare Parts
  – 01 78 46 Extra Stock Materials
  – 01 78 53 Sustainable Design Closeout Documentation
M–Barrier Management Systems Starts with CONSTRUCTION

• Why Specifications Division 01-78-00?
  – Fire Resistance Inventory REQUIRED
  – F-113-16 – 2018 International Fire Code
  – Section 703.1 becomes 701.1
    • Fire Rated Walls & Floors
    • Firestop Systems
    • Fire & Smoke Dampers
    • Fire Rated Rolling & Swinging Doors
    • Fire Rated Glazing
701.6 Owner's responsibility. The owner shall maintain an inventory of all required fire-resistance-rated and smoke resistant construction, and the construction included in Sections 703 through 707 and such construction shall be visually inspected by the owner annually and properly repaired, restored or replaced where damaged, altered, breached or penetrated.
M–Barrier Management Systems
F113-16 – Fire Resistance

• 701.6, Continued…PC2

• **Records of inspections and repairs** shall be maintained. Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.
M–Barrier Management Systems
F113-16 – Fire Resistance

• 703.1 Maintaining protection. Materials and firestop systems used to protect membrane- and through-penetrations in fireresistance- rated construction and construction installed to resist the passage of smoke shall be maintained.
The materials and firestop systems shall be securely attached to or bonded to the construction being penetrated with no openings visible through or into the cavity of the construction. Where the system design number is known, the system shall be inspected to the listing criteria and manufacturer's installation instruction.
M–Barrier Management Systems

• Why Manage Barriers?
• International Fire Code
• International Property Maintenance Code
IPMC SECTION 703

[F] 703.1 Fire-resistance-rated assemblies. The required fire-resistance rating of fire-resistance-rated walls, fire stops, shaft enclosures, partitions and floors shall be maintained.

[F] 703.2 Opening protectives. Required opening protectives shall be maintained in an operative condition. Fire and smokestop doors shall be maintained in operable condition. Fire doors and smoke barrier doors shall not be blocked or obstructed or otherwise made inoperable.
M–Barrier Management Systems Policies

• **Barrier Management Policy**
  – Inventory
  – Monitor
  – Permits
  – Management
  – Budget to Meet Code Requirements
  – Implement Fire Resistance Maintenance
    • In House (Rules)
    • Outside Contractor (Rules)
M–Barrier Management Systems Policies

• Barrier Management Policy
  – Items to Survey
    • Fire Rated Walls and Floors
      – Breach?
      – Wall not completed at new construction?
      – Wall removed above ceiling?
M–Barrier Management Systems Policies

• “Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile or similar movable entry to the space.

[IFC 2015, 703.1]
M–Barrier Management Systems
Starts with CONSTRUCTION

• Fire Rated Walls & Floors
  – Walls - U, V 400, 900 Designs
  – Floors – P Designs
  – Calculated Fire Resistance
  – Code Defined Fire Resistance – IBC Sec. 720
M–Barrier Management Systems Operations

• Items to Survey - Fire Doors – Annually
  – NFPA 80
    – Close and Latch
    – Holes
    – Attach at Frame
    – Undercut & Astragals
    – Labels Legible
    – Labels recertified, requirements of 3\textsuperscript{rd} party certification agency
M–Barrier Management Systems
Operations

• Items to Survey - Firestop Systems
  – Not Concealed Only

• Through & Membrane Penetrations
  – Joints
    • Wall to Wall
    • Floor to Floor
    • Head – Bottom of Wall
    • Continuity Head of Wall
  – Perimeter Fire Containment
M–Barrier Management Systems
Operations

• Items to Survey - Firestop Systems
  – Visibly Comply with System
  – Visibly ‘sealed’
  – Without openings
  – Firestop Materials & Systems
  – Securely Attached
M–Barrier Management Systems

Items to Survey

Items to Survey - Dampers

• NFPA 80 –
• Initial Installation
• At 1 year, each 4 years,
• 6 years healthcare
  • Fire Dampers
  • Smoke Dampers
  • Combination Fire/Smoke Dampers
  • Ceiling Dampers
M–Barrier Management Systems

Items to Survey

• Items to Survey - Fire Rated Glazing
  – Verify it’s still fire rated
  – Glazing / Frame Attachment
  – Frame attached to wall
  – Glazing Marking as Built
M–Barrier Management Systems
Items to Survey

• Fire Resistance Inventory –
  – Systems & Manufacturers Installation, Maintenance Instructions
  – Paper & Files
  – Spreadsheets
  – Software
M–Barrier Management Systems

Building Operational

• Barrier Management Policy
  – Repairs
    • As originally permitted and approved
    • As required by Fire Code, Existing Building Code
    • If SYSTEMS required, SYSTEMS REPAIRS
    • If no Systems, original materials.
    • Fire Official
    • Insurance Company
M–Barrier Management Systems

• Now it’s your building....

• Gleeson Powers Graphic
M–Barrier Management Systems

• Barrier Management?
  – Issues…Budget???
  – Other Occupancies---Big Problem
  – Constant issues
  – Control?
  – Staff?
  – Manage?
Barrier Management HUB

- The HUB is Facility Director!
- HUB Controls Actions
  - C-Suite Execs – Budgeted Yearly
  - Construction –
    - In House Crews
    - Outside Contractors
  - I-T Department –
    - In House Crews & Outside Contractors
Barrier Hub = Facility Director?

• YOU answer to…
  – Other AHJ’s
  – C-Suite
  – Occupants, Students, Faculty, Patients
  – Building Official, Fire Marshal
  – Insurance Company
  – The Joint Commission
  – CMS Inspectors
Barrier Management Policy
Possible Contents

- **Annual Line Item Budget**
- **Rules of Engagement in Contracts**
  - Internal Contracts
  - External Contracts
- **Pre Construction Meetings**
- **Barrier Warnings - Markings**
- **Violation Consequences**
- **Ongoing Management**
- **Staff - Occupant Education**
Barrier Management Policy Tool

• Contracts = Rules
  – Internal Contracts -
    • In House Departments similar to Outside Contractors
  – External Contracts
    • AIA Contract
    • Marked Fire - Smoke Barrier Actions
    • Barrier Permits
    • Documentation Systems
    • Report
M–Barrier Management Systems

• Barrier Inventory Elements
  – Life Safety Drawings
  – Existing Conditions Documented
  – Ongoing Survey Records
  – Deficiency Reports
  – Systems Documentation Control, Retrieval

• ALL FIRE PROTECTION FEATURES
M–Barrier Management Systems

- Barrier Repair Examples
Gypsum Wallboard Repair Large Holes

- USG Photo
M–Barrier Management Systems

• Electronic Best Practice Elements
  – Action Oriented
    • Projects - Specifications
    • Ongoing Surveys – FCIA RPPS 2010-1
  – Action Reminders
  – In Process Status
  – Record Retrieval
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<th>LSR ID</th>
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<th>Detail Description</th>
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<th>Life Safety Sub Type</th>
<th>Letters</th>
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Barrier Management Policy - Markings

1-HR FIRE

[Image of barrier markings and labels]
Barrier Management Policy – Tools from Codes

703.7 Marking and identification. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1. Be located in accessible concealed floor, floor-ceiling or attic spaces;
2. Be located within 15 feet (4572 mm) of the end of each wall and at intervals not exceeding 30 feet (9144 mm) measured horizontally along the wall or partition; and
3. Include lettering not less than 3 inches (76 mm) in height with a minimum 3/8 inch (9.5 mm) stroke in a contrasting color incorporating the suggested wording.

“FIRE AND/OR SMOKE BARRIER—PROTECT ALL OPENINGS”
or other wording.

Exception: Walls in Group R-2 occupancies that do not have a removable decorative ceiling allowing access to the concealed space.
Barrier Management
Policy Tool

• Pre Construction Meetings - Education
  – Barrier Markings Mean...
  – Actions when at Barriers Required...
    • Permit required – Above Ceiling, Barrier Hole...
    • Infection Control Rules
    • Healthcare Facility Rules
Barrier Management Policy Tool

• Violation Consequences
  – In House –
    • 2 strikes & work reassignment to cleaning…
    • Others…
  – Outside Contractors
    • 2 strikes & not allowed to work above ceilings
    • Others…
Barrier Management
Policy Tool

• Find Violators….
  – Staff Awards, Incentives?
Barrier Management
Policy Tool

• Ongoing Management
  – Engineering Staff Reviews
  – User Staff Reviews
  – Inside Construction
  – Outside Contractor
Barrier Management
Policy Tool

• Education - Healthcare Staff – Simple??
  – Fire Doors & Hardware – Simple things…
    • Close & Latch
    • Holes in Door
  – Ladder on Floor = ?? Permit Sticker?
  – Fire Rated Walls - Holes
    • Accidental
    • Workers
  – Solutions???
Barrier Management Policy Tool

• Add a Line Item in Budgets…
  – Sprinkler Maintenance
  – Alarms Maintenance
  – Security
  – Fire and Smoke Resistant Assemblies
    • Doors
    • Dampers
    • Firestops
    • Glazing
    • Walls/Floors
“TOTAL FIRE PROTECTION”

• **Effective Compartmentation**
  – Fire Barriers, Fire Walls/Floors, Smoke Barriers
  – Firestopping, Fire Dampers, Swinging and Rolling Fire Doors, Fire Rated Glazing

• **Detection & Alarm Systems**

• **Sprinkler Suppression Systems**

• **Education & Egress** –
  – Building Owners & Managers, Building Occupants and Firefighters
“DIIM”

• Barriers are for Safety – DIIM
  • Properly *Designed* and Specified
    – *Tested and Listed Systems* – Directories,
  • Professional *Installation* - Companies
  • Properly *Inspected* – Commissioned
  • *Maintained* - Annually –

• For Patients, Staff, Visitors
  at Facilities, Worldwide
Effective Compartmentation is a SYSTEM
Contacts

Firestop Contractors International Association
Hillside, IL – +1-708-202-1108 - office
Bill McHugh – bill @ fcia.org
Barrier Management
Policy = Tool
Barrier Management Symposium™

Barrier Management Policies

Bill McHugh, FCIA
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