Managing Barriers for the Building Life Cycle

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NFPA Expo
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“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, Tables
  - Professional *Installation* - Companies
  - Properly *Inspected* – Commissioned, Inspected by Companies
    - *Maintained & Managed*
      - NFPA 101 - 2000, 2012 (TJC, CMS)
      - International Fire Code - IFC 2012 - Annually (Local)
- Barriers – ASHE/FCIA/UL TJC - 09/14 Barrier Management Symposium ...
“DIIM”

- **Maintained – Fire Code**
  - NFPA 101 - 2000 … soon 2012 (CMS)
  - International Fire Code - IFC 2012 - Annually (Local)
  - UAE Fire and Life Safety Code of Practice
  - National Fire Code of Canada
  - Other codes…

- Original Construction Sets Tone…
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
Types of Wall Assemblies

- Exterior walls
- Fire walls
- Fire barriers
- Fire partitions – No such assembly in NFPA
- Smoke barriers
- Smoke partitions
Five Points

• Required fire-resistance rating
• Continuity
• Openings and penetrations
• Types of materials
• Structural robustness
Continuity
Effective Compartmentation Features

New UL test standards for Life Safety Dampers will take effect in July 2002
Continuity = SYSTEMS

• Products Become Systems Through Testing
  – Fire Barriers ASTM E 119 & UL 263
  – Firestopping - ASTM E 814 / UL 1479, ULC-S-115, UL 2079, **E-2307** as the test method…”
  – Dampers - UL 555, UL 555S
  – Doors - UL 10B, 10C
  – Fire Rated Glazing UL 9

  • Testing = Suitability statement for use of a product in a specific application
  • ‘SYSTEMS’
Common to all Fire Resistance – North America
Hose Stream = Shock Test
North America = Hose Stream Shock Test
Fire Dampers

• Products Become Systems Through Testing
  – UL 555, UL 555S; NFPA SYSTEMS
  – NFPA 80 – Inspection & Operational Test
    • @ Installation
    • @ 1 Year
    • @ 4 Years; 6 for Hospitals
Fire Dampers

- **Products Become Systems Through Testing**
  - UL 555, UL 555S; NFPA SYSTEMS
  - NFPA 80 – Inspection & Operational Test
    - @ Installation
    - @ 1 Year
    - @ 4 Years; 6 for Healthcare
Fire Rated Glazing

• **Products Become Systems Through Testing**
  – ASTM E 119, NFPA 257 SYSTEMS
    • **Fire** –
      – Protective – Doors & Sidelites
      – Resistive – Radiant heat - Walls
    • **Hose Stream**
    • **Impact Safety**
    • **NFPA 80** –
Fire Rated Glazing

• Products Become Systems Through Testing, Labeling
Fire Rated Glazing

• **Labeling**
  - “W” - Glazing passes ASTM E119 – T, H
  - “D” – Glazing passed NFPA 252, Door standard
  - “O” - Glazing passes NFPA 257, Opening standard
Barrier Continuity
Products become SYSTEMS

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

*Systems Selection & Analysis…Not as easy as it looks*
Barrier Continuity Function of DIIM - Listed Systems
I- Installation/Renovation
Who’s Responsible, How to Choose???

Graphics – STI
What Contractor Qualifications?

• Firestopping – Company Qualifications
  – FM 4991 – Standard for the Approval of Firestop Contractors
  – UL Qualified Firestop Contractors

• Other Industries…

• UNDERSTANDS ALL ABOUT SYSTEMS & DOCUMENTATION
Firestop Contractor Company Qualifications – Components

1. Office/Facility Management System Audit
2. Field – Jobsite Audit
3. Employ person who Passed Exam, Appoint…
   – UL/FM Firestop Exam @ 80% or better
   – DRI if employed by Approved/Qualified Firm
     • Designated Responsible Individual (DRI)
4. Annual Renewal Audit

- Controlled Management Processes
- Project Successful Proven Contractor
- Education, Training, Accountability
1. FM, UL/ULC Company Audit

- Employee Training & Education
- Systems Selection
- Communicate systems to Field
- Material Controls
- Systems installation “protocol”
- Labeling
- Record keeping - Variance Procedure
- Non-Conformances
- Documentation
- Project closeout
2. Jobsite Audit - FM or UL

- 3rd Party Program
- Verification of Firestop Systems Processes
- Verify Management System Works
- Verify Company “communication”
  - Office to field, field to office
- “Culture of Quality…”
3. Company Appoints Designated Responsible Individual

• Pass Rigorous Firestop Examination
  – FCIA Firestop Manual of Practice
  – Firestop Systems Selection & Protocol
  – Management System Knowledge
• Keep CEU’s – 6 FM, 10 UL, ea. 3 yrs.
• Retested every 3 years (FM Only)
• One DRI per Approved Contractor Location
4. Annual Audit
FM 4991 UL / ULC
Contractor Company Personnel

• Continued satisfactory performance
  • Quality Manual Implementation
• Documented - Archived record keeping
• Employee Training Documentation
• Jobsite Visit
• DRI CEU Verification
• Find @www.fcia.org
UL-ULC/FM 4991 Contractor
Company Benefits

Quantified Differentiation …
  – Focus on the Company & Individual
  – Investment in Company Procedures
  – Investment in People Education
  – Investment in FCIA Manual of Practice
    • Project Successful Proven Contractor
    • Education, Training, Accountability
      = Reduced Risk – Life, Property, Business
What Contractor Qualifications?

- Rolling & Swinging Fire Doors – None
- Fire Dampers – NEMI Union Contractor Program
- Fire Rated Walls – ?
- Fire Rated Glazing – ?
Why Contractor Qualifications?

- Built right the first time…
- Documentation
- SYSTEMS Selection, Analysis
  - F, T, H, L, W
  - Tolerances - Annular Space Sizes
  - Gap Sizes - Undercuts - Framing
  - Anchors - Spacing – Hardware
  - Closers - Activation Sensors, more…
- Correct Cost – I & I
QUALITY PROCESS

INSPECTION

INSTALLATION

MAINTENANCE
Inspection
Means Correct ‘As Built’

Duct w/Pink FBGL

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

• **Contractor Self Inspection**
  – Verify Management System Works

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

• **Special Inspection**
  – Independent 3rd Party – ASTM E 2174/2393
  – Destructive, Non Destructive

• **Inspection Agency Accreditation** –
  – IAS AC 291 Inspection Companies
Compartmentation for Safety
M – Maintenance
(& Management)
Firestop Maintenance

• **Maintenance**
  – Code Required…by Fire Code
  – How??

• **How to keep Track – Barrier Management Initiatives**
  Paper
  Software
  Labeling
Maintenance & Management

• Maintenance
  – Code Required…by Fire Code
  – How??

• How to keep Track – Barrier Management Initiatives
  Paper
  Software
  Labeling
Maintenance & Management

• **Maintenance**
  – Code Required…by Fire Code
  – How??

• **How to keep Track – Barrier Management Initiatives**
  Paper
  Software
  Labeling
Maintenance & Management
Maintenance & Management

Greenheck Photo
• 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-resistive 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-resistive 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.
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 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.
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 recommends Barrier Management System for Effective Compartmentation and Structural Protection

Includes Fire Dampers, Fire Doors…and Continuity
M–Barrier Management Systems

‘When you’re up to you’re a__ in alligators, it’s hard to remember you’re there to drain the swamp.’
Barrier Management Begins when new construction ends...
M–Barrier Management Systems

• NEW Buildings – Specifications Set Stage
  – 07-84-00 SYSTEMS Expectations
  – Tested SYSTEMS by NRTL’s
  – Installation by Professional Contractors
  – Inspection by Professional Inspection Agencies

• AS BUILT DOCUMENTATION IN SPECIFICATIONS KEY TO SUCCESS
M–Barrier Management Systems

- Now it’s your building....

- Gleeson Powers Graphic
WHAT NEEDS TO BE MAINTAINED?

- Fire Resistive Wall Construction
- Fire Doors
- Fire Dampers
- Firestop Systems:
  - Joint Systems
- Hot and Cold Water Piping
- Laboratory Waste
- Medigas Piping
- Pneumatic Tubing
- Sprinkler Piping
- Rigid Electrical Conduits
- Cable Trays
- BX Cables
- Low Voltage Cables
- and More....
  - Low Voltage!!!
M–Barrier Management Systems

• **Barrier Management**
  – # 1 & 2 Violations from TJC
  – Constant issues
  – Control?
  – Staff?
  – Attitude?
Barrier Management HUB

• A HUB must control all Action
  – Building Owner & Manager
  – Construction – In House & Outside
  – I-T Department – In House & Outside

• The HUB is the Building’s Responsible Person(s)

• ALL OCCUPANCIES
Why Barrier Hub?

- Someone must answer to...
  - Building - Official, Fire Marshal
  - Other AHJ’s
  - Building Owner or Manager
  - Occupants
  - Visitors
Barrier Management
Policy = Tool

- Building Owner & Manager Directors
  - Rules of Engagement in Contracts
    - Internal Contracts
    - External Contracts
  - Pre Construction Meetings
  - Barrier Warnings - Markings
  - Violation Consequences
  - Ongoing Management
  - Staff, Occupant Education &
M–Barrier Management Systems

• Methods to Control
  – Paper, Pictures & Files
  – Electronic Pictures & Files
    • ‘Custom’
    • ‘Packages’
M–Barrier Management Systems

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

• Management of Change
M–Barrier Management Systems

• Document & Control Fire Resistance Rated & Smoke Resistant
  – Barrier Walls, Floors
  – Firestop Systems - Penetrations & Joints
  – Fire Doors – Rolling & Swinging
  – Fire Rated Glazing
  – Fire/Smoke, Combination Dampers
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
Sample Permit – Area
## Life Safety Details

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<tr>
<th>LSR ID</th>
<th>Status</th>
<th>Latest Photo</th>
<th>Detail Description</th>
<th>Life Safety Tally</th>
<th>Life Safety Sub Area</th>
<th>Letters</th>
<th>Numbers</th>
<th>LSR Count</th>
<th>Notes</th>
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<td>Non-compliant</td>
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<td>Firestopping</td>
<td>Through Wall Penetration</td>
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<td>002</td>
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<td><img src="image2" alt="Image" /></td>
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<td>Firestopping</td>
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<td>Through Wall Penetration</td>
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<td>3000-3999</td>
<td>1</td>
<td></td>
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</tbody>
</table>
Sample Project

Project is assigned to Contractor and Hospital evaluate Project FIRE BARRIE RS?

11

Finish Fire Barrier

Permit is Issued to Contractor

Is Contractor Qualified?

Qualified Contractor Installs Firestop Systems

Qualified Contractor is Subcontracted

Completed Work is reviewed for Compliance Firestop Installations Complaint?

Project Documentation is submitted as part of Closeout

YES NO

NO YES YES

Gleeson Powers Graphic
Barrier Management Policy Tool

• Pre Construction Meetings - Education
  – Barrier Markings Mean...
  – Actions when at Barriers Required...
    • Permit required – Above Ceiling, Barrier Hole...
  – Why?
    • Tenant Security, Safety...
    • Smoke & Fire, CBR
Barrier Management
Policy Tool
– Barrier Warnings on ASSEMBLIES

• Assemblies
• Systems Identified for Maintenance

ATTENTION: PRIOR TO WORKMAN CUTTING INTO THIS WALL CONTACT THE BUILDING REPRESENTATIVE

2 HR RATED
FIRE WALL
PROTECT ALL OPENINGS AND PENETRATIONS
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

• Education – Building Staff – Simple??
  – Fire Doors & Hardware – Simple things…
    • Close & Latch
    • Holes in Door
  – Ladder = ?? Permit Sticker?

• Fire & Smoke Barriers
  – Where are they?
  – Holes?
“DIIM”

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

- Barriers – Attend ASHE/FCIA/UL TJC Barrier Management Symposium …
Barriers are a SYSTEM = Sprinklers, Alarms

New UL test standards for Life Safety Dampers will take effect in July 2002
“TOTAL FIRE PROTECTION”

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