Barrier Management Symposium
Improving Barriers Nation Wide

ashe.org/annual
Details

- Emergency Exits
- Restrooms
- Mobile Phones...
Today’s Speakers

• Jonathan Flannery, ASHE
• Anne Guglielmo, The Joint Commission
• Lennon Peake, Koffel Associates
• Bill McHugh, Firestop Contractors International Association
Barrier Management Symposium
Effective Compartmentation Features

New UL test standards for Life Safety Dampers will take effect in July 2002
Barrier Management Symposium

- **World Travelled Faculty**
  - Jonathan Flannery, ASHE Advocacy
  - Anne Guglielmo, The Joint Commission
  - Rich Walke, UL
  - Bill Koffel, Koffel Associates
  - Nestor Sanchez, USG Corp.
  - Rich Walke, UL - Concrete Industry
  - Bill McHugh, FCIA – Firestopping
  - Paul Baillargeon, DHI – Fire Doors
  - Marc Sorge, Greenheck – Fire & Smoke Dampers
  - Tim Warren, TGP – Fire Rated Glazing
  - Others....
Details – Jonathan Flannery

• Objective – YOU
• Speakers Volunteer
Why is ASHE Educating with TJC?

- Identified Problem
- Passion for Patient Safety
- Trusted Industry Resource

ASHE Mission
Dedicated to optimizing the health care physical environment
2015

BARRIER MANAGEMENT SYMPOSIUM

Anne Guglielmo, Engineer
Department of Engineering
The Joint Commission
Barrier Management Symposium

Free Symposium
Sept 5-6
Steamboat Springs, CO
Hosted By CAHED

Learn about
Design, Installation,
Inspection & Maintenance
of Rated Barrier Systems in
Healthcare Environments

The safety and welfare of patients depends on many things, including a healthcare environment that is fire safe.

Department of Engineering 2015 - 9
BARRIER MANAGEMENT SYMPOSIUM

Program Developers:
- Joint Commission
- Firestop Contractors International Association
- Underwriters Laboratories

Participating Organizations:
- American Society for Healthcare Engineering
- Gypsum Association
- Fire Damper Industry
- Fire Rated Glazing Industry
- Door & Hardware Institute
### Top Scored Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>2014 Non Compliance</th>
<th>2013 Non Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC.02.06.01</td>
<td>56%</td>
<td>39%</td>
</tr>
<tr>
<td>EC.02.05.01</td>
<td>53%</td>
<td>47%</td>
</tr>
<tr>
<td>IC.02.02.01</td>
<td>52%</td>
<td>46%</td>
</tr>
<tr>
<td>LS.02.01.20</td>
<td>50%</td>
<td>52%</td>
</tr>
<tr>
<td>RC.01.01.01</td>
<td>49%</td>
<td>52%</td>
</tr>
<tr>
<td>EC.02.03.05</td>
<td>48%</td>
<td>45%</td>
</tr>
<tr>
<td>LS.02.01.10</td>
<td>46%</td>
<td>48%</td>
</tr>
<tr>
<td>LS.02.01.35</td>
<td>43%</td>
<td>36%</td>
</tr>
<tr>
<td>LS.02.01.30</td>
<td>43%</td>
<td>45%</td>
</tr>
<tr>
<td>EC.02.02.01</td>
<td>36%</td>
<td>34%</td>
</tr>
</tbody>
</table>
# Top Scored Standards

<table>
<thead>
<tr>
<th>Standard</th>
<th>2014 Non Compliance</th>
<th>2013 Non Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM.03.01.01</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>PC.01.03.01</td>
<td>33%</td>
<td>27%</td>
</tr>
<tr>
<td>PC.02.01.03</td>
<td>29%</td>
<td>18%</td>
</tr>
<tr>
<td>EC.02.05.09</td>
<td>27%</td>
<td>21%</td>
</tr>
<tr>
<td>PC.03.01.03</td>
<td>26%</td>
<td>20%</td>
</tr>
<tr>
<td>MM.04.01.01</td>
<td>25%</td>
<td>22%</td>
</tr>
<tr>
<td>LD.01.03.01</td>
<td>23%</td>
<td>19%</td>
</tr>
<tr>
<td>LD.04.01.05</td>
<td>22%</td>
<td>14%</td>
</tr>
<tr>
<td>EC.02.05.07</td>
<td>21%</td>
<td>23%</td>
</tr>
<tr>
<td>IC.02.01.01</td>
<td>20%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Barrier Management Symposium

Together we can make the Environment of Care a SAFE Environment of Care

Mission Statement
To provide concise, accurate education at no cost to the attendee, resulting in excellent barrier system management in healthcare buildings.
<table>
<thead>
<tr>
<th>EP</th>
<th>Assembly Affected</th>
<th>Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Door</td>
<td>Locking</td>
</tr>
<tr>
<td>2</td>
<td>Door</td>
<td>Swing</td>
</tr>
<tr>
<td>3</td>
<td>Horizontal exits</td>
<td>Requirements</td>
</tr>
<tr>
<td>4</td>
<td>Outside stair</td>
<td>Building protection</td>
</tr>
<tr>
<td>5</td>
<td>Horizontal exit: door</td>
<td>Requirements</td>
</tr>
<tr>
<td>6</td>
<td>Horizontal exit</td>
<td>Fire jump</td>
</tr>
<tr>
<td>8</td>
<td>Exit</td>
<td>Discharge</td>
</tr>
<tr>
<td>9</td>
<td>Stair doors</td>
<td>Hold open</td>
</tr>
<tr>
<td>10</td>
<td>Doors</td>
<td>New boiler rooms, mechanical rooms, and heater rooms</td>
</tr>
<tr>
<td>EP</td>
<td>Assembly Affected</td>
<td>Issue</td>
</tr>
<tr>
<td>----</td>
<td>-----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>1</td>
<td>Building type</td>
<td>Construction type</td>
</tr>
<tr>
<td>3</td>
<td>Rated walls</td>
<td>Features</td>
</tr>
<tr>
<td>4</td>
<td>Rated walls</td>
<td>Openings</td>
</tr>
<tr>
<td>5</td>
<td>Rated doors</td>
<td>Features</td>
</tr>
<tr>
<td>6</td>
<td>Doors</td>
<td>Protective plates</td>
</tr>
<tr>
<td>7</td>
<td>Doors</td>
<td>Coverings</td>
</tr>
<tr>
<td>8</td>
<td>Ducts</td>
<td>Penetration</td>
</tr>
<tr>
<td>9</td>
<td>Penetrations</td>
<td>Firestopping</td>
</tr>
<tr>
<td>EP</td>
<td>Assembly Affected</td>
<td>Issue</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Vertical openings</td>
<td>Protection</td>
</tr>
<tr>
<td>2</td>
<td>Hazardous areas</td>
<td>Walls &amp; doors</td>
</tr>
<tr>
<td>3</td>
<td>Gift shop</td>
<td>Protection</td>
</tr>
<tr>
<td>6</td>
<td>Corridor partitions</td>
<td>Features</td>
</tr>
<tr>
<td>7</td>
<td>Corridor walls, new</td>
<td>Limit transfer of smoke</td>
</tr>
<tr>
<td>8</td>
<td>Fire windows in corridor walls</td>
<td>Features</td>
</tr>
<tr>
<td>9</td>
<td>Corridor doors</td>
<td>Features</td>
</tr>
<tr>
<td>10</td>
<td>Corridor doors</td>
<td>Plates</td>
</tr>
<tr>
<td>11</td>
<td>Corridor doors</td>
<td>Features</td>
</tr>
<tr>
<td>EP</td>
<td>Assembly Affected</td>
<td>Issue</td>
</tr>
<tr>
<td>-----</td>
<td>--------------------------------------------</td>
<td>------------------------------</td>
</tr>
<tr>
<td>12</td>
<td>Corridor walls</td>
<td>Openings</td>
</tr>
<tr>
<td>16</td>
<td>Smoke barriers</td>
<td>Features</td>
</tr>
<tr>
<td>18</td>
<td>Smoke barriers</td>
<td>Features</td>
</tr>
<tr>
<td>19</td>
<td>Smoke barriers</td>
<td>Features</td>
</tr>
<tr>
<td>20</td>
<td>Smoke barriers</td>
<td>Duct penetrations</td>
</tr>
<tr>
<td>21</td>
<td>Smoke barriers</td>
<td>Damper protection</td>
</tr>
<tr>
<td>22</td>
<td>Smoke barriers; smoke doors</td>
<td>Window opening rating</td>
</tr>
<tr>
<td>23</td>
<td>Smoke barriers doors</td>
<td>Features</td>
</tr>
<tr>
<td>24</td>
<td>Exit stair</td>
<td>Rating</td>
</tr>
<tr>
<td>EP</td>
<td>Assembly Affected</td>
<td>Issue</td>
</tr>
<tr>
<td>----</td>
<td>----------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>8</td>
<td>Linen &amp; waste chute inlet doors</td>
<td>Protection</td>
</tr>
<tr>
<td>9</td>
<td>Linen &amp; waste chute inlet &amp; discharge doors</td>
<td>Features</td>
</tr>
<tr>
<td>10</td>
<td>Linen &amp; trash chutes discharge door</td>
<td>Features</td>
</tr>
<tr>
<td>11</td>
<td>Linen &amp; waste chutes discharge</td>
<td>Separation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EC.02.06.01: Built Environment</td>
<td>#1</td>
<td>#8</td>
<td>#7</td>
<td>#11</td>
</tr>
<tr>
<td>EC.02.05.01: Utility Systems Risks</td>
<td>#2</td>
<td>#4</td>
<td>#10</td>
<td>#13</td>
</tr>
<tr>
<td>LS.02.01.20: Means of Egress</td>
<td>#4</td>
<td>#1</td>
<td>#2</td>
<td>#2</td>
</tr>
<tr>
<td>EC.02.03.05: Fire Safety Systems</td>
<td>#6</td>
<td>#7</td>
<td>#5</td>
<td>#5</td>
</tr>
<tr>
<td>LS.02.01.10: General Building Req’s</td>
<td>#7</td>
<td>#3</td>
<td>#3</td>
<td>#3</td>
</tr>
<tr>
<td>LS.02.01.35: Extinguishment</td>
<td>#8</td>
<td>#9</td>
<td>#9</td>
<td>#10</td>
</tr>
<tr>
<td>LS.02.01.30: Protection</td>
<td>#9</td>
<td>#6</td>
<td>#6</td>
<td>#4</td>
</tr>
<tr>
<td>EC.02.02.01: Haz Materials &amp; Waste</td>
<td>#10</td>
<td>#11</td>
<td>#11</td>
<td>#15</td>
</tr>
</tbody>
</table>
Department of Engineering
630 792 5900

George Mills, MBA, FASHE, CEM, CHFM, CHSP, Green Belt
Director

Anne Guglielmo, CFPS, CHFM, CHSP LEED, A.P.
Engineer

John Maurer, SASHE, CHFM, CHSP
Engineer

Kathy Tolomeo, CHEM
Engineer

James Woodson, P.E., CHFM
Engineer
THE JOINT COMMISSION DISCLAIMER

These slides are current as of 4/13/2015. The Joint Commission reserves the right to change the content of the information, as appropriate.

These slides are only meant to be cue points, which were expounded upon verbally by the original presenter and are not meant to be comprehensive statements of standards interpretation or represent all the content of the presentation. Thus, care should be exercised in interpreting Joint Commission requirements based solely on the content of these slides.

These slides are copyrighted and may not be further used, shared or distributed without permission of the original presenter or The Joint Commission.
FIRE/SMOKE BARRIER
FUNDAMENTALS FOR HEALTH CARE FACILITIES

Lennon Peake
Koffel Associates, Inc.
www.koffel.com
wkoffel@koffel.com
OBJECTIVE

• Identify the different types of barriers used in health care facilities
• Identify the key characteristics for each barrier
  ▪ Continuity
  ▪ Protection of openings
• List at least three strategies that can be used to improve a barrier management program
TYPES OF WALL ASSEMBLIES

• Exterior walls
• Fire walls
• Fire barriers
• Fire partitions – No such assembly in NFPA
• Smoke barriers
• Smoke partitions
FIRE TESTED WALL ASSEMBLIES

• In accordance with ASTM E119/UL263
• Resist passage of heat and hot gases
• Structural integrity during the test fire
• Have something left at the end of the test
FIVE POINTS

• Required fire-resistance rating
• Continuity
• Openings and penetrations
• Types of materials
• Structural robustness
Fire barriers are used in the following applications:

- Fire area separations
- Mixed occupancy separations
- Incidental use areas
- Hazardous area separations
- Exit enclosures
- Shaft enclosures
- Horizontal exits
- Corridor walls – NFPA only
• Supported by construction with the same fire-resistance rating as the fire barrier
• Some exceptions
  ▪ Vary between NFPA and ICC
# SUMMARY OF FIRE BARRIERS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>Depends upon specific use</td>
</tr>
<tr>
<td>Required continuity</td>
<td>Floor/ceiling below to deck above</td>
</tr>
<tr>
<td>Openings</td>
<td>General: Aggregate glazing area (or width) &lt;25% wall area/length; maximum size 120 sf. Specific: Rules based on use of barrier</td>
</tr>
<tr>
<td>Types of materials</td>
<td>As required for the type of construction</td>
</tr>
<tr>
<td>Robustness of structural system</td>
<td>If load bearing, fire tested with load</td>
</tr>
</tbody>
</table>
• Smoke barriers are used in the following applications:
  ▪ Group I-2
  ▪ Group I-3
  ▪ Areas or refuge
  ▪ Other specific applications
## SUMMARY OF SMOKE BARRIERS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>1-hour with the exception that a construction of a minimum 0.1” thick steel in Group I-3 buildings is allowed</td>
</tr>
</tbody>
</table>
| Required continuity                | **Horizontal:** Outside wall to outside wall  
**Vertical:** Floor to slab or deck above, continuous through interstitial spaces  
Supporting construction may be required based upon the applicable codes                                                                 |
| Openings                           | 20 minutes – but not a true fire door in NFPA 101  
Smoke- and draft-controlled doors tested in accordance with UL 1784 – IBC only                                                                                                                        |
| Types of materials                 | As required for the type of construction                                                                                                                                                                     |
| Robustness of structural system    | If load bearing, fire tested with load                                                                                                                                                                         |
Smoke partitions are used in the following applications:

- Corridor walls in Group I-2 – IBC only
- Sprinkler protected hazardous areas – NFPA
### SUMMARY OF SMOKE PARTITIONS

<table>
<thead>
<tr>
<th>Issue</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Fire-Resistance Rating</td>
<td>Not required (unless otherwise required)</td>
</tr>
<tr>
<td>Required continuity</td>
<td>Floor/ceiling below to deck above or tight to underside of ceiling membrane in ceiling membrane designed to limit passage of smoke - Difference between NFPA/ICC for ceiling tiles</td>
</tr>
<tr>
<td>Openings</td>
<td>Windows: Sealed to resist free passage of smoke Doors: No louvers Air leakage rated (UL 1784) – IBC?? Self closing, or automatic closing by smoke detectors</td>
</tr>
<tr>
<td>Types of materials</td>
<td>As required for the type of construction</td>
</tr>
<tr>
<td>Robustness of structural system</td>
<td>If load bearing, fire tested with load</td>
</tr>
</tbody>
</table>
EQUIVALENCY
UTILITIES RUN IN EXIT PASSAGEWAY

ZONE H01-09
EXISTING HEALTH CARE
COMPLETE SPRINKLER PROTECTION
5231 SQ FT

ZONE H01-09
EXISTING HEALTH CARE
COMPLETE SPRINKLER PROTECTION
18017 SQ FT

ZONE H01-08
NEW HEALTH CARE
COMPLETE SPRINKLER PROTECTION
17628 SQ FT

ZONE H01-08
EXISTING HEALTH CARE
COMPLETE SPRINKLER PROTECTION
11325 SQ FT

Blue dashed line clearly indicates extent of zones

STAIR 5
STAIR 4
STAIR 3
STAIR 9
STAIR 8
STAIR 7
STAIR 6
STAIR 5
STAIR 4
STAIR 3
STAIR 9
STAIR 8
STAIR 7
STAIR 6
STAIR 5
STAIR 4
STAIR 3
STAIR 9
STAIR 8
STAIR 7
STAIR 6
BUILD IT CORRECTLY!!
SUCCESSFUL STRATEGIES

• BUILD IT CORRECTLY
  - Thorough plan review process
  - Contractor qualifications
  - Commissioning systems and buildings
    o NFPA 3, NFPA 4, ASHE documents, pending ICC std.
  - Complete SOC documentation while contractor still on site
  - Use of certified inspectors or special inspectors
FIRE/SMOKE BARRIER
FUNDAMENTALS FOR HEALTH CARE
FACILITIES

Lennon Peake
Koffel Associates, Inc.
www.koffel.com
wkoffel@koffel.com
Testing of Fire Resistance and Smoke Resistant Assemblies

Rich Walke
UL Codes and Advisory Services
Fire-Resistance-Rated Construction
Code Requirements

• IBC Section 703.2 – Fire-resistance ratings shall be determined in accordance with ANSI/UL 263 or ASTM E119

• LSC 8.2.3.1 – The fire resistance of structural elements and building assemblies shall be determined in accordance with test procedures set forth in NFPA 251 (i.e. ANSI/UL 263 or ASTM E119)
Fire Resistance

- Expressed as an Hourly Time Period
- Ratings range from 1/2 to 4 hours
- Containment of Fire to Room or Floor of Origin
Standards

- ANSI/UL 263
- ASTM E119
- NFPA 251 (Withdrawn)
Through- and Membrane-Penetration Firestop Systems
Fire-Resistance-Rated Construction

Establishing an L Rating
Opening Protectives

• Fire Door Assemblies

• Fire Window Assemblies
Conditions of Acceptance – Walls

• Flame passage
• 250°F / 325°F
• Support load
• Hose stream
Where Are Listings Found?

Hard Copy

CD-ROM

Online
Barrier Management Symposium

April 14, 2015

Nestor Sanchez, USG Corporation
Learning Objectives

1. Explore the gypsum mineral and its impact on fire resistance in a systems basis
2. Understand the different types of gypsum core and their relation to fire resistance
3. Determine recognized methods for repair installed gypsum panels
4. Innovative Technology
Gypsum Core Types

Three (3) Types of Gypsum Cores

• Regular Core
• Type X
• Type C
Repair Small Holes
Repair Large Holes

Partial Elevation - 1
Bill McHugh, Executive Director
Firestop Contractors International Association
Hillside, IL – +1-708-202-1108 - office
Bill McHugh – bill @ fcia.org
I – Systems

SECTION A-A

1. Floor or Wall Assembly—Use 4-1/2 in. thick lightweight or normal weight 1000 psi (g/cm²) reinforced concrete. Reinforcing bars shall be either grade 60 or 65 concrete blocks. Door or three through opening in floor or wall assembly to be 3/8 in. in 1-1/2 in. in 1-1/2 in. larger than door of flexible metal conduit (Item 2) inserted through opening. Max. size of opening is 6 in.

See Laminated Block (LAD) category in the Fire-Resistance Directory for names of manufacturers.

2. Through Penetrating Product—Use 4 in. thick (or smaller) pipe or brick 3 in. thick (or smaller) and flexible metal conduit. Most common method is to be installed near center of circular through opening in floor or wall assembly. Flexible metal conduit to be tightly supported on both sides of floor or wall assembly.

Allied Cable Corp.

1. Piping Material—Use 1 in. thick, thickness of concrete (approx. 3/4 in.) over metallic or flexible metal conduit. Insulation shall be placed and into opening as a permanent form. Piping material to be inserted into 3 in. from top surface of pipe or wall surface of wall assembly.

2. Fill or Cavity Material—Apply 1 in. thick over the metallic or flexible metal conduit. Insulation shall be placed and into opening as a permanent form. Piping material to be inserted into 3 in. from top surface of pipe or wall surface of wall assembly.
Firestopping for Continuity
I – Systems
Firestopping for Continuity

Firestop Products

- Sealants
  - Silicone, Latex, Intumescent
- Wrap Strips
  - “Thick, Thin, Wide, Less Wide”
- Putties
- Pillows
- Composite Sheets
- Bricks / Plugs
- Pre Fabricated Kits
- Mortar
- Spray Products

Graphics, STI, 3M, AD, HILTI, Nelson
Firestopping for Continuity
Products become Systems

• What are Firestop *Systems*?
• ‘Field Erected Construction…Tested to…’
  – **F Rating** - Flame
  – **T Rating** – Temperature
  – **H Rating** – Hose (Always)
  – **L Rating** – Smoke
  – **W Rating** – Water

Graphics – 3M
Products become Systems
Hose Stream = Shock Test
U.L. SYSTEM NO. CAJ1155
METAL PIPE THROUGH A SLEEVE IN CONCRETE FLOOR OR WALL

F RATING = 3-HR.
T RATING = 0-HR.
L RATING AT AMBIENT = LESS THAN 1 CFM/SQ. FT.
L RATING AT 400°F = 4 CFM/SQ. FT.

TOP VIEW

SECTION A-A

1. FLOOR OR WALL ASSEMBLY:
   A. MINIMUM 4-1/2" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR.
   B. U.L. CLASSIFIED CONCRETE BLOCK WALL (MINIMUM 8" BLOCK).
   2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:

   1. Concrete Sleeve
   2. Metal Sleeve
   3. Combination sleeve
   4. Firestop"
Gypsum Wall assembly running up to concrete over metal deck

Hilti Photos

Fire Stop Technologies, Inc.

Fire Stop Technologies, Inc.
Firestopping for Continuity
Products become Systems

• Firestop Systems Directories –
  – UL
  – Intertek
  – FM Approvals

*Systems Selection & Analysis…Not as easy as it looks…*
IFC Guidelines for Evaluating Engineering Judgment

‘Construction industry professionals, building officials, fire officials, firestop contractors and other stakeholders need appropriate guidelines for evaluating and using such judgments.’

‘As such, IFC developed Recommended IFC Guidelines for Evaluating FireStop Systems in Engineering Judgments.’
Fire/Smoke Dampers & Firestops

• Dampers are UL 555, 555S Listed *Systems*
  – Installed to manufacturer’s written instructions (Systems
  – Angles…no sealants)

• Firestop sealants – UL 1479 –
  – Improper hole sizing or poor installation…

Consult the Damper Manufacturer & the Authority Having Jurisdiction

Graphics - Greenheck
Firestop Materials, Systems & Physical Properties

• Serve Building Needs
  – Smoke
  – Germs
  – Chemical Resistance – Cleaning?
  – Chemical, Biological, Radiation?

• Product Types
  – Intumescent, Latex, Silicone
  – Ablative
  – Endothermic

Graphics – 3M, STI, Nelson
Firestop Contractor Qualifications

FM & UL/ULC – 4 Components

1. Office Facility Quality Management System Audit
2. Field – Jobsite Audit
3. Employ a person
   - UL/FM Firestop Exam @ 80% or better
   - DRI if employed by Approved/Qualified Firm,
     • Designated Responsible Individual (DRI)
4. Annual Audit
Firestop Systems Inspection
ASTM E 2174 - ASTM E 2393

- “Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints”
  - Standard Inspection Procedure
  - Special Inspection Agency Companies
  - Other Qualified Firms
  - Report to Building Owner, Fire Marshals & Code Officials
Inspection in Codes
ASTM E 2174 - ASTM E 2393

• NFPA 101 / 5000 - Chapter 8 - Annex
• 2012 International Building Code
  – CH 17 – Special Inspections
    • Buildings 75’ & higher above Fire Department Access
    • Occupancy Type III, IV, Chapter 16 Table 1604.5
• Abu Dhabi International Building Code
Bill McHugh, Executive Director
Firestop Contractors International Association
Hillside, IL – +1-708-202-1108 - office
Bill McHugh – bill @ fcia.org
Inspecting Swinging Fire Doors with Builders Hardware

A Practical Guide for AHJs and Facility Management Personnel

Paul Baillargeon, DSSF/ DHI
Top 10 Deficiencies Swinging Fire Doors

- Painted or missing fire door labels
- Poor clearance dimensions around the perimeter of the door in the closed position
- Kick down door holders
- Auxiliary hardware items that interfere with the intended function of the door
- Fire door blocked to stay in the open position
- Area surrounding the fire door assembly blocked by furniture, equipment, and/or boxes
- Broken, defective, or missing hardware items (e.g., latch bolts, strike plates, closer arms, cover plates, etc.)
- Fire exit hardware installed on doors that are not labeled for use with fire exit hardware
- Missing or incorrect fasteners
- Bottom flush bolts that do not project 1/2-inch into the strikes
Care and Maintenance

- Replacing door frames, doors, and builders hardware
  - Meets the requirements for fire protection
  - Meets the requirements for new installations

- Replacing glass and glazing products
  - New glass and glazing products are required to be labeled
  - Existing glass and glazing products are permitted to be replaced with same (e.g., 1/4-inch wire glass can be replaced with same)
Field Modifications

- NFPA 80, Chapter 5 contains provisions for field modifications
  - Contact the testing laboratory whose label is on the product being modified
  - Verify the proposed work does not compromise the integrity of the door assembly
  - Might not require field inspection by testing laboratory
Safety Inspections of Fire Door Assemblies

- Inspections are required to be performed by a qualified person

- **Qualified Person:**
  - “A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with the subject matter, the work, or the project.”

✓ **AHJs need to have confidence in the expertise of the persons performing NFPA 80’s safety inspections**
Index of Fire Door Assemblies

- Assign each fire door a unique identifier
  - Door number
  - Bar code
Documentation

- **Acceptance Testing**
  - Initial installation
  - After maintenance work

- **Safety Inspections**
  - Annual safety inspections
  - Performance-based inspections
Documentation

➢ Acceptance Testing records
  o Retained for life of installation
    • Before Certificate of Occupancy is issued
    • After maintenance work is performed
  o Format that survives the retention period
    • Digital (secured – can’t be edited)
    • Paper
  o Signed by inspector(s) and kept for AHJ’s review
Documentation

- Safety Inspections
  - Format that survives the retention period
  - Minimum retention period of 3 years
  - Signed by inspector and kept for the AHJ’s review.
Corrective Actions

- Inspection reports
  - Inspector’s recommendations for repairing fire doors

- Minor corrective actions
  - Replacing and/or tightening fasteners
  - Adjusting doors and hardware
    - Shimming doors to correct excessive clearance gaps
    - Adjusting door closers
    - Aligning latching hardware with strike plates
  - Filling unused fastener holes
Frame Condition

- No unused fastener holes.
- Frame jamb extends to floor. No space between bottom of frame and floor.
- Fasteners installed in miters of knock down frames.
Steel and Wood Doors  5.2.3.5.2(2)

- No broken welds on rails or stiles of steel doors.
- No holes in faces and edges of steel doors.
- Verify face of door for delaminating of face skins from core of door.
Glazing

4.4.1

- Glazing beads securely fastened/no missing fasteners.
- Labeled light kits secured fastened - no missing fasteners.
- Correctly sized fire rated glazing installed.
Hinges, Continuous Hinges, Pivots

6.4.3.1

- Labeled or listed.
- Steel hinges and pivots.
- Ball Bearing hinges.
- Spring Hinges (must be labeled on fire doors)
- Door must fully close from an open position of 30 degrees with spring hinges.
Fire Exit Hardware  6.4.4.2.1

- Must bear fire exit hardware label

- Latch bolt projects the required distance into the strike
  - 1/2-inch minimum or as required by the manufacturer

- No missing parts
  - lever, knob
  - end caps
  - Strikes
  - bottom rods
  - fire pin
Blockage 5.2.3.5.2(10)

- Area around door must remain clear of any materials
Door Wedges  5.2.3.5.2(10)

- Manual blocking open of doors is not permitted
  - Kick-down door holders
  - Friction door holders
  - Overhead door holders
  - Hold open arms on door closers
  - Furniture, trash cans, fire extinguishers, etc…
Decorations can cause premature door failure due to additional fuel added to fire loading of door.
Swinging Fire Door Assemblies
2 Basic Rules

Rule #1
- All fire door assemblies shall consist of:
  - Labeled door frames
  - Labeled fire doors
  - Labeled or listed hardware & glazing

Rule #2
- Any field modification to a labeled product must be approved by the testing laboratory that labeled or listed the product or component
Inspecting
Swinging Fire Doors with Builders Hardware

A Practical Guide for
AHJs and Facility Management Personnel

Paul Baillargeon, DSSF/ DHI
Installation/Configuration
  ◦ Fire Dampers
  ◦ Smoke Dampers
  ◦ Combination Fire/Smoke Dampers

Operational Test/Inspection

Periodic Test/Maintenance
What is it?

- Labels
Fire Damper Installation

- Installed with sleeves
  - factory or field mounted
  - sleeve requirements
Smoke Damper Construction

- **Type**
  - multi-blade
  - 3-V or airfoil blade
- **Construction**
  - blade and jamb seals
  - *always* with a UL-approved actuator
Smoke Damper Actuators

Mounting
- must be factory mounted
- internal or external

Operation
- spring return
- two position or modulating
Purpose of Fire/Smoke Damper

- Provide the same level of protection as individual fire and smoke dampers.

- Installation guidelines of fire and smoke dampers apply.
Operational Test

NFPA 80
Standard for Fire Doors and Other Opening Protectives

Frequency
“After the installation of a damper is completed, an operational test shall be conducted.”

Test Method
“The damper shall fully close from the open position.”

“The operational test shall verify that there is full and unobstructed access to the fire damper and all listed components.”

“All indicating devices shall be verified to work and report to the intended location.”

“The operational test shall be conducted under non-fire HVAC airflow conditions as well as static flow conditions.”
Operational Test

NFPA 105

Standard for the Installation of Smoke Door Assemblies and Other Opening Protectives

**Frequency**

“An operational test shall be conducted after the building’s HVAC system has been balanced.”

**Test Method**

“The operational test shall be conducted under normal HVAC airflow conditions as well as static flow conditions. The damper shall fully close/seal under both test conditions.”

“All indicating devices shall be verified to work properly and report to the intended location.”

“Combination fire/smoke dampers shall also meet the testing requirements contained in NFPA 80.”
Fire, Smoke, and Combination Fire Smoke Dampers
2015

Barrier management Symposium

Anne Guglielmo, Engineer
Department of Engineering
The Joint Commission
Barrier Management Program: Policy, Permit, Educate and Inspect

- Policy:
  - Define
    - Scope
    - Authority
    - Management process
  - Interim Life Safety Measures
  - Pre-construction Risk Assessment
Deficiency Resolution Options:
- Correct it immediately
- Correct it within 45 days
  - Management process that documents the deficiency and actions to resolve
  - ILSM must be considered
- Plan For Improvement located in the Statement of Conditions™
  - Corrected within 6 months of the Projected Completion Date
  - ILSM must be considered
Order of Standards (LS.01.02.01)
- EP 1 & 2 regardless of ILSM policy
- EP 3 must clearly define the ILSM policy including
  - AFS 10 Process
  - When to implement
  - What to do to protect occupants
  - Both construction related and non-compliance with the LSC
- EPs 4 – 14 align with policy and implementation strategies
Preconstruction Risk Assessment (PRA)

Construction or renovation in occupied healthcare facilities can result in environmental problems such as:

- Noise
- Vibration
- Creation or spread of contaminants
- Disruption of essential services
- Emergency Procedures
- Air quality
Barrier Management Program: Policy, Permit, Educate and Inspect

- Permit
  - Follows policy
  - Define when permits are issued
  - Define criteria for awarding permits
  - Define permit display requirements
  - Define scope of permit: where the work is being done
  - Define time frame for the permit will expire
Barrier Management Program: Policy, Permit, Educate and Inspect

❖ Educate
   ◦ Facilities staff
     • Components of the Barrier System
     • Maintenance of the Components
   ◦ All other staff
     • Barrier System awareness
     • Permit awareness
   ◦ Contractors
     • Barrier Management expectations
Barrier Management Program: Policy, Permit, Educate and Inspect

- Inspect
  - Establish inspection frequencies
    - Hospital experience
    - Reliability Centered Maintenance
  - Document inspection activities
  - Management inspections
    - Verify quality
    - Modify program as needed
George Mills, MBA, FASHE, CEM, CHFM, CHSP, Green Belt
Director

Anne Guglielmo, CFPS, CHFM, CHSP, LEED, A.P.
Engineer

John Maurer, CHFM, CHSP, SASHE
Engineer

Kathy Tolomeo, CHEM
Engineer

James Woodson, P.E., CHFM
Engineer
These slides are current as of 4/13/2015. The Joint Commission reserves the right to change the content of the information, as appropriate.

These slides are only meant to be cue points, which were expounded upon verbally by the original presenter and are not meant to be comprehensive statements of standards interpretation or represent all the content of the presentation. Thus, care should be exercised in interpreting Joint Commission requirements based solely on the content of these slides.

These slides are copyrighted and may not be further used, shared or distributed without permission of the original presenter or The Joint Commission.
M – Maintenance (& Management)
Barrier Maintenance

• **Maintenance**
  – Code Required
  – How??

• **How to keep Track – Barrier Management Initiative**
  – Paper
  – Software
  – Labeling
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. [101:4.6.12.1]
National Fire Protection Association - NFPA 101-2012

• 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.
Barrier Management Begins when new construction ends...
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!!!!
Barrier Management
Policy = Tool

• ASHE Member Healthcare Engineer & Director Communicates...
  – Rules of Engagement in Contracts
    • Internal Contracts
    • External Contracts
  – Pre Construction Meetings
  – Barrier Warnings - Markings
  – Violation Consequences
  – Ongoing Management
  – Staff Education & Incentives
## Sample Project

### Gleeson Powers Graphic

**Demo Hospital**

**Permit No.: 2011-005**

---

**Area:** 3C1/3L1

**LSR ID:** LST-B1-03-007

**Survey ID:**

**Compliance Status:** Non-compliant

**LSR Group:**

---

### Life Safety Details

<table>
<thead>
<tr>
<th>LSR Deta...</th>
<th>Status</th>
<th>Latest Photo</th>
<th>Detail Description</th>
<th>Life Safety T...</th>
<th>Life Safety Sub...</th>
<th>Letters</th>
<th>Numbers</th>
<th>LSR Count</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>Non-compl.</td>
<td><img src="image1.png" alt="Image" /></td>
<td>Firestopping Through Wall Penetration - Firestop</td>
<td>Firestopping</td>
<td>Through Wall Pe...</td>
<td>WL</td>
<td>1000-1999</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>002</td>
<td>Compliant</td>
<td><img src="image2.png" alt="Image" /></td>
<td>Firestopping Through Wall Penetration - Firestop</td>
<td>Firestopping</td>
<td>Through Wall Pe...</td>
<td>WL</td>
<td>1000-1999</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>003</td>
<td>Compliant</td>
<td><img src="image3.png" alt="Image" /></td>
<td>Firestopping Through Wall Penetration - Firestop</td>
<td>Firestopping</td>
<td>Through Wall Pe...</td>
<td>WL</td>
<td>5000-5999</td>
<td>1</td>
<td>EZ Path</td>
</tr>
<tr>
<td>004</td>
<td>Compliant</td>
<td><img src="image4.png" alt="Image" /></td>
<td>Firestopping Through Wall Penetration - Firestop</td>
<td>Firestopping</td>
<td>Through Wall Pe...</td>
<td>WL</td>
<td>3000-3999</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Corrective Action Report

Life Safety Type: Firestopping
Life Safety Sub Type: Through Wall Penetration - Firestop Systems

Penetration Type: EMT or Conduit
Penetration Size: Max 1"
Annular Space: MIN: 0 to .50", MAX:

Date Completed: May-02-2011
Classified System:
Survey #:
Survey Date:

Deficiency Description: No firestopping
Suggested CA Notes: Install UL Listed Firestopping System at penetration/joint

Survey Notes:
CA Notes:

Survey Photo
Side: 37296
Photo ID: 37296

Survey Photo
Side: 37297
Photo ID: 37297

Corrective Action Photo
Side: 1:3C1
Photo ID: 37298
Photo Notes:

Corrective Action Photo
Side: 2:3L1
Photo ID: 37299
Photo Notes:

Documented as part of Closeout

Gleeson Powers Graphic
Barrier Management Policy Tool

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

• Education - Healthcare Staff
  – Fire Doors & Hardware – Simple things…
    • Close & Latch
    • Holes in Door
  – Ladder = ?? Permit Sticker?
  – Fire Rated Walls - Holes
    • Accidental
    • Workers
“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
Continuity

Effective Compartmentation & Features

New UL test standards for Life Safety Dampers will take effect in July 2002
Objective – Share Knowledge

• Barriers are for Safety – DIIM
  • Properly *Designed* and Specified
    – *Tested and Listed Systems* – Directories, Tables
    – *Specified*
  • Professional *Installation* Companies, Workforce
  • Properly *Inspected* – by Companies, Workforce
  • *Maintained* –
    – NFPA 101 - 2000 (TJC, CMS)
    – International Fire Code - IFC 2012 - Annually (Local)

• **Effective Compartmentation for Fire & Life Safety**
ASHE Regions

• Thanks for 2014 and 2015
• Future?
  – 2 Day Symposiums
  – 1 Day Symposiums
Today’s Speakers

• Jonathan Flannery, ASHE
• Anne Guglielmo, The Joint Commission
• Lennon Peake, Koffel Associates
• Bill McHugh, Firestop Contractors International Association
Barrier Management Systems - Symposium

Improving Barriers Nation Wide