


FIRESTOPPING

Responsibilities For Building And Fire Departments

ICC Annual Conference, October 1st and 2nd, 2013


Presented by: Brice Miller

This presentation may not be modified and presented without the expressed written consent of the IFC.

 *Saving Lives and Property
Through Fire and Smoke Containment* ©2012 IFC


Outline of Presentation

- Importance
- Code Requirements and Testing
- Firestopping in Existing Buildings
- Penetration Firestop Systems
- Joint Systems
- Perimeter Fire Containment Systems
- Plan Review / Inspection of Firestopping
- Firestop Inspection Standards
- I-Code firestop hot topics

 *Saving Lives and Property
Through Fire and Smoke Containment* ©2012 IFC

Why is Firestopping Required?

- Mandated by the Codes
- Life safety and property protection
- To provide time for first responders to perform their duties
- To compartmentalize and prevent the spread of flame and smoke through a structure during a fire



 *Saving Lives and Property
Through Fire and Smoke Containment* ©2012 IFC

Fire Statistics – Why We Must Contain Smoke and Toxic Gases



3/4 of all fire deaths are caused by smoke inhalation.

Source: Hall, Jr. John R. NFPA Fire Analysis & Research, Quincy, MA. "Burns, Toxic Gases, and other Hazards".

Fire Statistics:

Visibility: **47%** of survivors caught in a fire could not see more than **12 feet**

Source: NFPA Fire Protection Handbook, 18th Ed. Table 1-1P. Pg. 1-15.

Approximately **57%** of **people killed** in fires are **not in the room** of the fire's origin

Source: NFPA Fire Protection Handbook, 18th Ed. Table 8-1P. Pg. 8-17.

Smoke travels **120-420 feet per minute** under fire conditions

Source: Estimate based upon ceiling jet velocity calculations for typical ceiling heights and heat release rates.



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Balanced Fire Protection

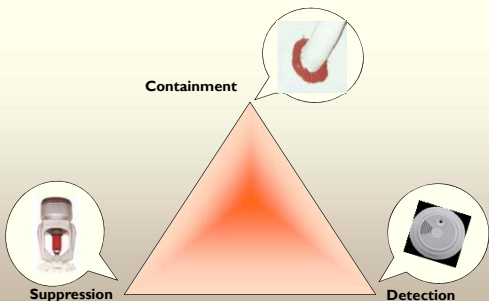
- An integrated system of fire and smoke protection elements in the construction environment composed of detection, suppression and containment features designed to provide an acceptable level of protection for people and property



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Fire Protection Triad



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Finding The Right Balance

Active Protection
(Sprinklers and Alarms)

Passive Protection
(Fire-resistive Assemblies)

Saving Lives and Property Through Fire and Smoke Containment 7 ©2012 IFC

What Can We Do?

- Examine the cumulative effects of trade-offs
- Increase awareness of code violations during fire investigations
- Write and submit code change proposals
- Help shape codes and standards by participating in International Code Council Hearings
- **Attend the Public Comment Hearings October 2–10, 2013, Atlantic City Convention Center and make YOUR voice heard at the microphone**

Saving Lives and Property Through Fire and Smoke Containment 8 ©2012 IFC

Lets review some code proposals that will impact the fire service

Saving Lives and Property Through Fire and Smoke Containment ©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

- In 2010, ICC and the American Society for Healthcare Engineers (ASHE) partnered to form the Ad Hoc Committee on Healthcare. The objective of the committee is:
"To develop code change proposals to the I-Codes which will result in the most contemporary, effective and efficient provisions for hospital and ambulatory care ensuring the highest level of safety for users."
- **Unfortunately, that has not been the outcome of their work so far !**



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

- According to the latest NFPA Report on Fires in Health Care Facilities published November 2012, between 2006 and 2010, U.S. fire departments responded to an average of 6,240 structure fires in health care properties per year in 2006-2010.
- Sprinklers were present in 55% of reported health care fires.



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

These Healthcare fires caused annual averaged of:

- 6 civilian deaths
- 171 civilian injuries
- \$52 million in property damage



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

Instead, the proposal being submitted are designed to:

- Eliminate all existing fire resistance rated corridor walls, even without sprinklers being retrofitted (IFC 1105.3.2, F239)
- Allow unprotected openings in corridor smoke partitions (IFC 1105.3.4, F239)
- Discontinue maintenance of existing fire resistance rated egress corridors after sprinklers are retrofitted (IFC 1103.1, F212, EB26)
- Treat existing smoke barriers as ½ hour rated, thus eliminating the need for fire stopping and opening protectives (IFC 1105.5.2, F241)
- Consider glass walls in sprinkled buildings to be 1 hour rated (IFC 1103.4.1, F218, F219)

These, coupled with changes to the 2015 IBC, represent massive downward shifts in the level of fire and life safety protection afforded to patients.

ICC Code Development - Adhoc Healthcare Proposals

Fire Data supports the fact that Sprinklers are not infallible:

Sprinkler Systems in Reported Health Care Structure Fires
Excluding Fires in Properties in Construction and
Fires in Which Automatic Extinguishing Equipment Was Present but Not in Fire Area
2006-2010 Annual Averages

Share of reported health care fires with sprinklers present	55%
When present, operated in fires large enough to activate*	88%
When operating, effective in controlling fire*	98%
When present and fire large enough, operated and effective*	86%

Source: NFPA "Fires in Health Care Facilities" Author: Marty Ahrens Issued: November 2012



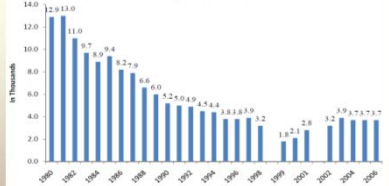
Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

The fact of the matter is that current fire safety practices have been effective :

Figure 1. Structure Fires in Medical, Mental Health and Substance Abuse Facilities, by Year 1980-2006



Source: Structure Fires in Medical, Mental Health, and Substance Abuse Facilities, Jennifer D. Flynn, February 2009, National Fire Protection Association Fire Analysis and Research Division



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

The fact of the matter is that ... :

- The data clearly supports the fact that, since 1980, Codes requirements relating to fire and Life safety in Healthcare Facilities have been doing the right things for Patient safety!
- So, the real question is . . . are these proposals taking us a step backwards with regards to hospital fire safety?



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Increasing national attention to this issue



<http://tinyurl.com/oxgkkl3>



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

ICC Code Development - Adhoc Healthcare Proposals

1. The Code Enforcement community **NEEDS** to **SPEAK OUT** for patient fire safety in Atlantic City, NJ on October 2-10, 2013
2. Group B Proposed changes affect International Fire Code, IBC, and IEBC for 2015 Editions.





Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Containment in Construction

- Fire-resistance-rated assemblies
 - Fire Walls
 - Fire Barriers
 - Fire Partitions
 - Smoke Barriers
 - Horizontal Assemblies
- **Through- and Membrane-Penetrations**
- **Fire-resistant joint systems (i.e. construction joints and perimeter joints)**
- Opening protection (i.e. fire-rated doors and windows)
- Air ducts and air transfer openings (i.e. dampers)







Saving Lives and Property
Through Fire and Smoke Containment

19 ©2012 IFC

Containment In Construction

Through-Penetrations







Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Containment In Construction

Membrane-Penetrations





Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Containment In Construction

Construction Joints

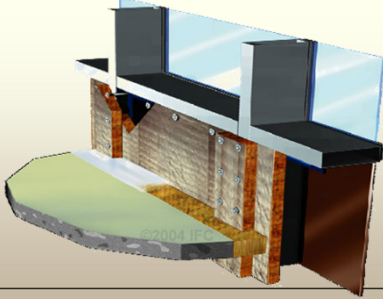


IFC Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Containment In Construction

Perimeter Containment



IFC Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Containment in Construction For New Construction and Existing Buildings

IFC Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Code Requirements – Firestopping

Minimum requirements for New Construction & Maintenance

- International Building Code – Chapter 7
 - New Construction
- International Fire Code – Chapter 7
 - Existing Buildings
- NFPA 101 – Chapter 8
 - Health Care

FIRESTOPPING AND THE INTERNATIONAL BUILDING CODES

- Submittals -107
- Inspection-110
- Through Penetrations-714
- Membrane Penetrations-714
- Joints-715
- Perimeter Barriers-705 & 715
- Firestop Special Inspection (2012)-1705

FIRESTOPPING AND OTHER CODES AND STANDARDS

- MAINTENANCE - International Fire Code-703
- ASTM E 2174 – Inspection of Penetrations
- ASTM E 2393 – Inspection of Joints
- ASTM E814 and UL 1479 - Testing of Penetration
- UL 2079 and ANSI 2079 - Testing of Joints
- ASTM E2307 - Testing of Perimeter Barriers

Existing Buildings

Maintenance

- **703.1 Maintenance.** The required fire-resistance rating of fire-resistance-rated construction (including 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.
- **In 2009 IFC added provisions requiring building owners to annually inspect all fire-resistance-rated construction including firestops and joint systems**
 - Firestop systems needs to be documented and labeled with procedure to re-firestop holes that the "cable guy" or others made.
 - Firestopping needs to be properly repaired, restored or replaced when damaged, altered, breached or penetrated.



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

IFC Video

- **"CLOSE ENOUGH IS NOT GOOD ENOUGH": A Demonstration of Proper vs. Improper Firestopping**



www.firestop.org



Saving Lives and Property
Through Fire and Smoke Containment

29 ©2012 IFC

Firestopping For Existing Buildings

- Breaches in Fire rated assemblies must be repaired with an approved system to restore the original design rating of the assembly



Saving Lives and Property
Through Fire and Smoke Containment

30 ©2012 IFC

Key Questions for Fire officials

- Do you need to count on that floor or wall?
- What is protecting you from below during search and rescue?
- What allows you to advance a hose line down a hallway?



*Saving Lives and Property
Through Fire and Smoke Containment*

©2012 IFC

Key Questions Cont.

- What can I do to better protect myself and my colleagues?
- Are you being asked to do more inspections?
- Do you think these inspections are effective?
- Do you know what you are looking for?



*Saving Lives and Property
Through Fire and Smoke Containment*

©2012 IFC

Compartmentation

- Use of fire-rated construction to divide a building into smaller areas
- Key to minimizing path of travel



*Saving Lives and Property
Through Fire and Smoke Containment*

©2012 IFC

Why is building fire compartmentation important?

- Fire should not get behind you
 - From below
 - From the side
- Fire should not get ahead of building occupants in the path of egress
- Prevents multi-story fire spread

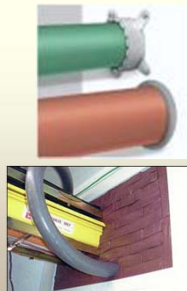
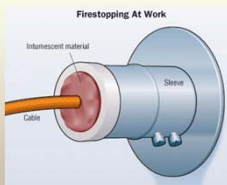
???

If a building has sprinklers, is compartmentation still needed?



How Do Firestop Products Work?

Filling the voids around penetrations and joints



When Inspecting Existing Buildings

- Understand occupancies with fire-rated (protected) corridors, separation walls and floors

Fire walls

FW

Fire floors

FF

FW = Fire Rated Wall FF = Fire Rated Floor

Saving Lives and Property Through Fire and Smoke Containment ©2012 IFC

When Inspecting Existing Buildings

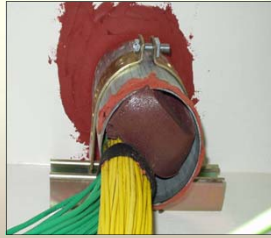
- You will walk past problems
 - Poor original installations
 - Building changes over time

Fire-rated corridor:
The way you might find it

Fire-rated corridor:
The way it should be

Problem vs. problem solved

Improper Firestop Installations



IFC Saving Lives and Property
Through Fire and Smoke Containment

40 ©2012 IFC

Where To Look In Existing Buildings



- Check electrical/mechanical closets
- Spot check by popping ceiling tiles
- Check walls between occupancies
- Look for rated doors
- Look for concrete block walls
- Look for fire/smoke dampers in ducts
- Walls with wire glass

IFC Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

When inspecting Existing Buildings

- Ask to walk with someone who knows the building



IFC Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

When Inspecting Existing Buildings Cont.

- Report/discuss the problems you see
 - Refer to your fire prevention bureau
 - Refer to the building department
- Chapter 7 of the International Fire Code mandates maintenance inspections

When your jurisdiction considers building or fire code changes

- You can make a difference!
- Tell your representatives to get involved
 - Attend code change hearings (local, state, national)
- Request that your Chief get involved
- Make yourself available (city, state, national)



Third Party Testing Labs

- Underwriters Laboratories Inc.
- FM Global (Factory Mutual)
- Intertek Testing Services (ITS)
- Southwest Research Institute

Labs Test to Standards

- American Society of Testing and Materials (ASTM)
- Underwriters Laboratories Inc. (UL)

Ratings

- F - Flame Occurrence
- T - Heat Transmission
- L - Leakage
- W - Water Leakage (Optional)

Penetration Firestop System

Consists of:

- Assembly being penetrated
- Penetrating item
- Fill, void or cavity materials (firestopping materials)



Sprinkler Pipe Considerations

Sprinkler Pipe Considerations

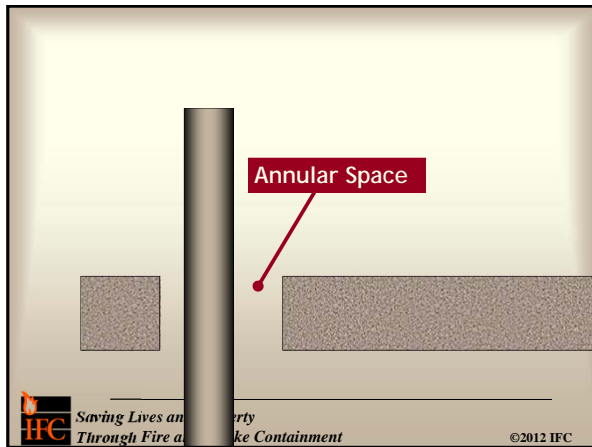
Metallic Sprinkler Pipe Penetrations:

- NFPA 13 Annular Space Limitations
 - If Pipe < 3.5" then annular = 1"
 - If pipe > 3.5" then annular = 2"
- Pipe Movement
 - Seismic Movement
 - Water-Hammer from Testing



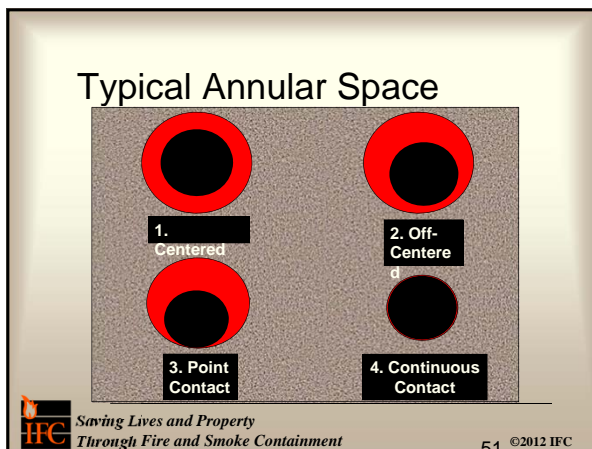
Saving Lives and Property
Through Fire and Smoke Containment

49 ©2012 IFC



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC



Saving Lives and Property
Through Fire and Smoke Containment

51 ©2012 IFC

Types of Joint Systems

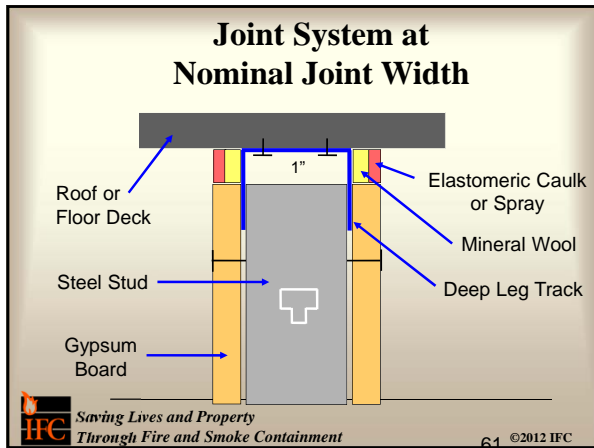
- Floor-to-Floor (Expansion Joint)
- Floor-to-Wall (Edge of Slab)
- Head-of-Wall (Top of Wall)
- Wall-to-Wall (Vertical Control Joint)

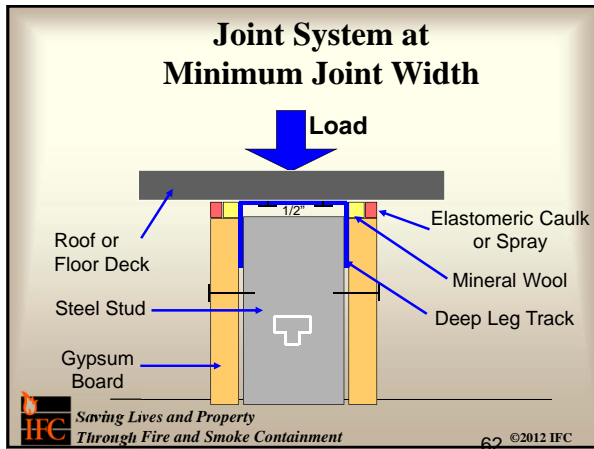
Categories of Fire-Resistive Joints

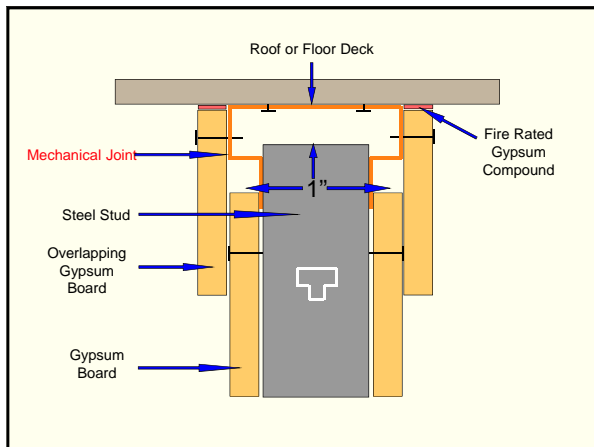
- Sealant Systems (Caulks)
- Sprayed /Elastomeric Membranes (Sprays)
- Mechanical Joints

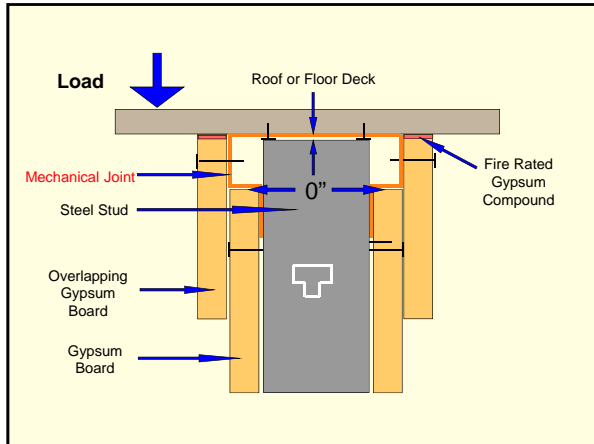
Construction Joint Terminology

- Nominal Joint Width
- Assembly Rating
- Movement
- Extension
- Compression
- Percent (%) Extension / Compression
- Mineral Wool Compression
- Sealant Depth










UL Nomenclature Cont.

Navigating the UL Directory: **HW - D - 0060**

JOINT SYSTEMS (XHBN)


Third Alpha Character identifies the movement capabilities of the system:

- D = Dynamic (movement capabilities)
- S = Static (no movement capabilities)

 Saving Lives and Property
Through Fire and Smoke Containment 65 ©2012 IFC

Plan Review of Joint Systems

- What type of joint is being protected?
- What is the required hourly rating?
- What is the width of the joint (nominal installed width)?
- How much movement is required?
- Is an L Rating required?

 Saving Lives and Property
Through Fire and Smoke Containment 66 ©2012 IFC

Recommended Joint System Correction Notice

- Deflection is required to be installed with an approved joint system per Section 715 of the IBC. The assemblies need to be designed to allow joints to compress and extend with movement of structure while maintaining the fire-rating of the assemblies.
- Please clarify building deflection to determine movement capabilities of assembly and identify listed assemblies for all joint systems.



Saving Lives and Property
Through Fire and Smoke Containment

67 ©2012 IFC

Inspection of Joint Systems

- Inspect joint systems during framing inspection
- Contractor to provide you with the UL listed assembly as shown / approved on the plans
- Confirm all joints provide required movement
- For Mechanical Joints observe the ceiling runner for the UL label located on the side of the runner

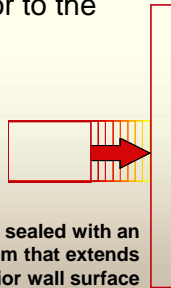


Saving Lives and Property
Through Fire and Smoke Containment

68 ©2012 IFC

Extending the Rated Floor to the Wall...

MANDATORY!



The perimeter joint must be sealed with an approved material or system that extends this rating to the exterior wall surface



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Curtain Wall Fire Containment Six Basic Design Principles

- 1 Reinforcement Member
- 2 Mineral Wool Insulation
- 3 Mechanically Attached
- 4 Compression Fit Siding
- 5 Protect Mullions
- 6 Smoke Barrier

IFC Saving Lives and Property
Through Fire and Smoke Containment 70 ©2012 IFC 70

Typical Curtain Wall System Cont

- To allow for movement between the slab and wall mineral wool must be inserted perpendicular to the joint and compressed to the proper %

IFC Saving Lives and Property
Through Fire and Smoke Containment STI Graphic ©2012 IFC

Inspection of Perimeter Fire Containment cont.

- Should a separate inspection be required for mineral wool
- Was the mineral wool installed to the correct compression and according to the correct orientation

IFC Saving Lives and Property
Through Fire and Smoke Containment STI Graphic ©2012 IFC

Engineering Judgments

- An Engineering Judgment is a letter or report issued by some knowledgeable party which evaluates the construction of some site-specific application which deviates from a tested design, system or assembly and concludes with a judgment of the applicable rating of that assembly
- Typically, an Engineering Judgment is used when a tested design, systems or assembly is unavailable



Saving Lives and Property
Through Fire and Smoke Containment

73 ©2012 IFC

IBC References Justifying Engineering Judgments

- IBC 104.11 Alternative materials, design and methods of construction and equipment
- IBC 703.2 Fire-resistance ratings
- IBC 703.3 Alternative methods for determining fire resistance



Saving Lives and Property
Through Fire and Smoke Containment

74 ©2012 IFC

Who Issues Engineering Judgments?

- Professional engineer
- Fire protection engineer
- Manufacturer
- Testing laboratory
- Must be acceptable to the Building Official or the AHJ



Saving Lives and Property
Through Fire and Smoke Containment

75 ©2012 IFC

Important Points of an Engineering Judgment

- No guidance from the International Code Council or the various I-Codes
- No guidance from UL
- Best documents available are from the International Firestop Council (IFC) – www.firestop.org

General Discussion

- When should Engineering Judgments be used?
- What criteria should a Building Official use to accept an EJ and should the fire official be involved
- Should fire/building inspectors approve Engineering Judgments?
- Other issues with Engineering Judgments?





And this is what you often receive !!!

Firestopping in the Real World

- Firestop system details are hardly ever on plans
- Code Officials generally do not ask for copies of approved firestop systems
- Tested/Listed systems rarely installed correctly
- Joints are generally not inspected during the framing inspection and installed to provide movement
- Engineering judgments are being used when there are tested and listed systems available
- Existing building inspections are not inspected properly
- Firestopping considered beneath contractors
- Most users are untrained
- No Licensed firestop contractors



*Saving Lives and Property
Through Fire and Smoke Containment*

©2012 IFC

Pre-Construction Meeting

- Review Design Drawings Submittals
- Obtain Pre-Approved Engineering Judgments
- Establish inspection guidelines and expectations
- Review qualifications/experience of firestop installers
- Schedule firestop Inspections




*Saving Lives and Property
Through Fire and Smoke Containment*


©2012 IFC

PROCESS

Building Department Submittals



- 107.1.1 - Construction documents shall be of sufficient clarity to indicate the location, nature and extent of the work proposed and show in detail that it will conform to the provisions of this code




Saving Lives and Property
Through Fire and Smoke Containment

82 ©2012 IFC

Plans Examination/Review

- Firestop systems details should be included on the plans and specifications
- For unique conditions have policy for Engineering Judgments
- The structural engineer should provide the amount of movement required for all joints




Saving Lives and Property
Through Fire and Smoke Containment

83 ©2012 IFC

Recommended Plan Review Firestopping Correction Notice

- All firestop systems for fire rated construction need to be reproduced on the plans as tested by an approved testing laboratory. If an engineering judgment is needed, it must be noted on the plans and this system must be approved by the Building Official.



Saving Lives and Property
Through Fire and Smoke Containment

84 ©2012 IFC

Plans Examination Firestop Review

- Consider requiring special inspection for firestopping on large projects
- Recommended correction notice:
 - Per section 1704 of the IBC and to eliminate delays on your project we are requiring the firestopping to be reviewed and inspected by a 3rd party firestop inspector approved by the building official.

Inspection Practices for Firestopping

- Inspections typically done by AHJ, but may be inspected by approved agency or individual
- Require construction documents that detail all firestop locations and systems
- During framing inspection observe that joints are installed in manner that required movement can be achieved

Inspection Practices for Firestopping Cont.

- Observe the products, empty containers or boxes for label with approved testing agency
- Have your inspection tools such as a flashlight, coring device, wire, tape measure and other appropriate tools

Inspection Practices for Firestopping Cont.

- Verify firestopping was installed in accordance with the published system
- Verify who did installation of systems to determine reasonable verification
- When necessary destructive evaluation will be made on various types of systems
- During inspection have person follow-up to repair systems after destructive testing



Saving Lives and Property
Through Fire and Smoke Containment

88 ©2012 IFC

Barrier Identification



Saving Lives and Property
Through Fire and Smoke Containment

89 ©2012 IFC

IBC 2009/2012 Code Changes

- 2009 IBC Section 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.*



Saving Lives and Property
Through Fire and Smoke Containment

90 ©2012 IFC

IBC 2009/2012 Code Changes

Be located in accessible concealed floor, floor ceiling or attic spaces.

- 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
- 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



Saving Lives and Property
Through Fire and Smoke Containment

Q1 ©2012 IFC

International Fire Code (IFC)

Inspection and Maintenance of buildings

- **703.1 Maintenance.** The required fire-resistance rating of fire-resistance-rated construction (including 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.
- **In 2009 IFC added provisions requiring building owners to annually inspect all fire-resistance-rated construction including firestops and joint systems**
 - Firestop systems needs to be documented and labeled with procedure to re-firestop holes that the "cable guy" or others made.
 - Firestopping needs to be properly repaired, restored or replaced when damaged, altered, breached or penetrated.



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Special Inspections

- **1704.15 Special Cases.** Special inspections shall be required if in the opinion of the building official the proposed work is unusual in its nature.
- Typically only needed for large and complicated projects
- If special inspection is required for firestop systems, the inspector shall be a qualified person who demonstrates competence for inspection of these systems.



Saving Lives and Property
Through Fire and Smoke Containment

Q3 ©2012 IFC

Firestopping Special Inspections Approved for 2012 IBC

- **1705.16 Fire-resistant penetrations and joints.** special inspections for through-penetrations, membrane penetration firestops, fire resistant joint systems, and perimeter fire barrier systems that are tested.....
- Required for buildings over 75 ft. and for Category 3 and 4 buildings
- ASTM Inspection Standards ASTM E 2174 and ASTM E 2393 are required



Saving Lives and Property
Through Fire and Smoke Containment

Q4 ©2012 IFC

Firestop Inspection Standards For New Construction

- ASTM E 2174 –Standard Practice for On-Site Inspection of Installed Firestops (Penetrations)
- ASTM E 2393 –Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers



Saving Lives and Property
Through Fire and Smoke Containment

Q5 ©2012 IFC

Firestop Inspection Standards ASTM E 2393 and ASTM E 2174

- Addresses all types of firestop systems
 - Covers inspector qualifications, inspection documents, materials and systems used, and reports
 - Has an inspection form that can be used to record information
- Documents must go through a plan review
Recommended for large projects by entities such as building and fire code officials, Architects and Engineers



Saving Lives and Property
Through Fire and Smoke Containment

Q6 ©2012 IFC

ASTM E 2174 and ASTM E 2393

Firestop Inspector Qualifications

- Have a minimum of 2 years experience in construction field inspection and have education, credentials, and experience acceptable to the AA. OR
- Be a Quality Assurance Agency accredited by the AHJ. OR
- Meet the criteria contained in ASTM E699 "Standard Practice for Evaluation of Agencies Involved in Testing Quality Assurance, and Evaluating of Building Components"

NOTE: Authorizing Authority (AA) is a designated person charged with administration of the ASTM Inspection Standards. This person could be an architect, Engineer or owner



*Saving Lives and Property
Through Fire and Smoke Containment*

07 ©2012 IFC

Inspector Qualifications

Recommendations

- How do code officials determine if third party firestopping special inspectors are qualified and they meet qualifications of ASTM standards in Section 6
- Inspector should Understand:
 - All aspects of this IFC Training Program
 - ASTM Inspection Standards
 - Ratings such as "F" , "T" and "L"
 - UL Firestop systems
 - Movement Capability
 - Common Firestop products (Training)



*Saving Lives and Property
Through Fire and Smoke Containment*

08 ©2012 IFC

Inspector Qualifications

Recommendations

- To Require Firestop Inspector Certifications
 - International Firestop Council
 - International Accreditation Service (IAC) AC 291
Which is for the firestop company
 - International Code Council (ICC) – Need to approve ICC firestop inspector certification.



*Saving Lives and Property
Through Fire and Smoke Containment*

09 ©2012 IFC

International Accreditation Service AC 291

- Special Inspection Agency's
 - ISO 17020:1998 General Criteria for Performing Inspection
 - Current business license issued
 - IAS Conduct office and field audits
 - Comply with Inspector qualification



Saving Lives and Property
Through Fire and Smoke Containment

100 ©2012 IFC

ASTM E 2174 and ASTM E 2393 General Requirements

- Inspection documents submitted 10 days prior to field inspection
- Installer and inspector must agree upon schedule
- If mechanical systems are used they need to be inspected after installation
- Inspector **shall** provide visual and destructive testing



Saving Lives and Property
Through Fire and Smoke Containment

104 ©2012 IFC

ASTM E 2174

- **Onsite Inspection of Installed Firestop Penetrations**
 - 2 Different type of inspections
 - Visual Inspection: randomly witnessing a minimum of 10% of each type of firestop installed
 - OR*
 - Destruction Testing: destructively sampling 2% of like firestop systems within a 10,000 sq ft. area or less



Saving Lives and Property
Through Fire and Smoke Containment

102 ©2012 IFC

ASTM E 2393

On-site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers

- 2 Different Type of Inspection
 - ❖ Visual Inspection: observing installation process of a minimum of 5% of the total lineal ft. OR
 - ❖ Destructive Inspection: destructively sampling a minimum of one sample per type of joint system per 500 lineal ft.



Saving Lives and Property
Through Fire and Smoke Containment

103 ©2012 IFC

ASTM E 2174 and ASTM E 2393 Reporting/Inspection Forms

- Inspection Date
- Inspectors Name
- Project
- Reference No.
- Firestop type per Inspection
- Quantity of Firestop type on Project
- Quantity Inspected (the day of Inspection)
- Total Quantity Inspected to Date
- Locations of Inspected Firestop
- Deficiency (if non-compliant)



Saving Lives and Property
Through Fire and Smoke Containment

104 ©2012 IFC

ASTM E 2174 and ASTM E 2393 Final Report

- Report should contain:
 - Cover Page
 - Name and Address of Inspector
 - Name and Address of each firestop Installer, as well as the prime contractor
 - Name and Address of the AA
 - Name and Address of the AHJ
 - Executive Summary outlining verification method used to ascertain compliance
 - Notarized written statement of Conflict of Interest
 - Summary of contain percentages of deficiencies
 - All daily inspection reports



Saving Lives and Property
Through Fire and Smoke Containment

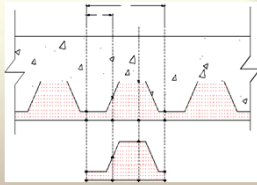
105 ©2012 IFC

Firestop Destructive Testing Inspection Techniques

- [Recommended Guidelines on IFC Website firestop.org](http://www.firestop.org)
- Need to measure at multiple locations
- Measure sealant depth at all points of adhesion

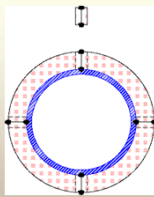
Firestop Destructive Testing Inspection Techniques Joints

- For coatings applied in joint systems need to take measurements within 12 inch for every 500 lineal feet



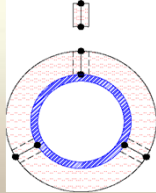
Firestop Destructive Testing Inspection Techniques Penetrations


- For Penetrations 6 inches in Diameter and larger will need to measure in 4 locations



Firestop Destructive Testing Inspection Techniques Penetrations

- Penetrations 6 inches or less but greater than 2 inches measure in 3 locations

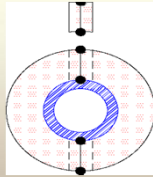



 Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Firestop Destructive Testing Inspection Techniques Penetrations

- Penetrations less than 2 inches measure in two locations




 Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Firestop Destructive Testing Inspection Techniques Cont.

- Pre-formed firestop devices (Collars)
- Mechanical Joints
- Firestop sealant shrinkage
 - Wet sealant depth
 - Dry sealant depth

 Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

Other Firestop Inspection issues

- Movement during Cure and the life of the building
- Aging of firestop material
- Painting firestop material

Firestop Inspection Recommendations

- Per Construction Firestop Meeting with all Trade firestop installers to make sure the inspection process works properly.
- Have clearly marked set of drawings highlighting fire and smoke walls along with approved firestop submittals

Firestop Inspection Recommendations Cont.

- Have contractors Identify all firestop systems by labeling or other methods.
- Have firestop mock ups meeting field conditions.

FM 4991 Approved or UL Certified Contractor

- Programs that certify a company has the knowledge and quality control procedures to properly install firestopping
 - > Min. 2 years in firestop installation business
 - > Designated Responsible Individual (DRI) is formally tested by FM or UL at regular intervals



*Saving Lives and Property
Through Fire and Smoke Containment*

©2012 IFC

Question for your
Building or Fire Official

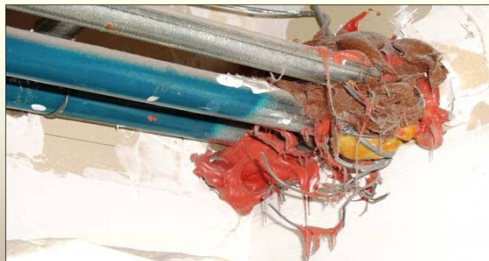
- **What is our Department's Plan Review and Building Inspection Policy and Procedure for Firestopping?**



*Saving Lives and Property
Through Fire and Smoke Containment*

116 ©2012 IFC

Improper Firestop Installations




*Saving Lives and Property
Through Fire and Smoke Containment*

117 ©2012 IFC

Correct Firestop Installations




 **Saving Lives and Property
Through Fire and Smoke Containment**

119 ©2012 IFC

Reference Materials

- ASTM E 2174 – “Standard Practice for On-Site Inspection of Installed Fire Stops”
- ASTM E 2393 – “Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers”
- IFC Video “Inspecting Firestop for Compliance” and new side by side video
- IFC Pocket Guide for Inspectors

 **Saving Lives and Property
Through Fire and Smoke Containment**

119 ©2012 IFC

Available Resource From ICC and IFC



 **International Firestop Council**

- Product Information - manufacturer's websites
- International Firestop Council (IFC) - www.firestop.org

Saving lives through passive fire containment



- ICC/IFC Inspection Guidelines for Through-Penetration and Fire Resistive Joint Systems in Fire Resistance Rated Construction

 **International Firestop Council**
International Firestop Council
25 W. Broadway
Columbus, OH 43215
(614) 432-0400 Fax: (614) 432-1541
www.firestop.org

 **Inspector Field Pocket Guide**

Firestopping Inspection Manual

- For Through Penetration Firestop Systems
- For Fire Resistive Joint Systems
- For Perimeter Fire Barriers (Concrete Walls)

 **International Firestop Council**

All rights reserved. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without the prior written permission of the International Firestop Council, 25 W. Broadway, Columbus, OH 43215.

Available Resources

- International Firestop Council (IFC)
www.firestop.org
- Firestop Contractors International Association
www.fcia.org
- Alliance for Fire & Smoke Containment & Control, Inc.
www.afscc.org
- ASTM International standards
www.astm.org



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC

THANK YOU

The *International Firestop Council (IFC)* is a not-for-profit association of manufacturers and industry partners of fire protective materials and systems.

IFC's mission is to promote the technology of fire containment in modern building construction through research, education and development of safety standards and code provisions.

Website - www.firestop.org

Email - Info@firestop.org



Saving Lives and Property
Through Fire and Smoke Containment

©2012 IFC
