Firestopping and Compartmentation for Life Safety

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Firestopping for Safety

• Discussion Items
  – Contractor Qualifications
  – International Fire Code 2012 - 703.1
  – International green Construction Code
  – Physical Properties of Products & Claims
    • Shrinkage
    • Movement
    • Aging
Firestopping for Safety

Proper ‘DIIM’ Effective Compartmentation Means Reliable Systems...

• **Designed** - A/E, Firestop Consultant
  – Tested and Listed Systems, FCIA Member Mfr’s.

• Properly **Installed**
  – FCIA Member, “FM 4991, or UL QFC Contractors”

• Properly **Inspected**
  – ASTM E 2174 & ASTM E 2393 Inspection –
    By AC 291 Accredited Inspection Agencies

• Properly **Maintained** –
  – FCIA Member
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• Firestopping Industry *Qualifications? Education*
  – **Short Class – 25 - 60 minutes**
    • Some Training
    • Worker educated
    • Short test
    • Administered by salesperson
  – **Worker Education at Shop**
  – **Manufacturer HQ Education**
    • 1-2 Days Education
    • Test – Teach to the Test?
    • Not 3rd Party
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• How do I select a specialty firestop contractor?
  – FCIA Member
  – Insurance – Classification?
    • Specialty Firestop Contractor?
    • Plumber
  – Workforce – Educated as Firestop/Containment Workers
  – Licensed – Not yet...
  – Bonding Capability
  – Project References & Experience
  – Management System reviewed by?
    • FM 4991 and / or UL Qualified?
    • Manufacturer?
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- Firestopping Industry **Qualifications**
  - Manufacturer Contractor Programs
    - ‘Certified Trained?’
    - ‘Accredited?’
    - ‘Approved?’
    - ‘other name’
  - FCIA Contractor Member
  - FM 4991 Standard for Approval of Firestop Contractors
  - UL Qualified Firestop Contractor
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Qualified – Does the Firestop Contractor understand the ZERO TOLERANCE INSTALLATION PROCESS

- “F” Fire & “T” Temperature, “H” Hose
- “L” Smoke
- “W” Water
- Insulation/Integrity
- Movement Capability
- Annular Space Sizes, Gap Sizes
- SYSTEMS DOCUMENTATION
- FM 4991 Approved or UL / ULC Qualified Firestop Contractor
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FM 4991 & UL Qualified Firestop Contractors
Management System Components for Safety

• Office Facility Procedures Audit
• Field Procedures Audit
• Employ a person who passed the UL/FM Firestop Exam, 80% or better
  – If employed by Approved, Qualified Firm,
    • Designated Responsible Individual (DRI)
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FCIA Members - FM 4991 Approved and / or UL Qualified Firestop Contractor Firms

Management Systems Manual

– Investment in Education
– Investment in FCIA Firestop Manual of Practice
  • Project Successful Proven Contractor
  • Education, Training, Accountability
    = Reduced Risk – Life, Property, Business

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**FM 4991 & UL QFC Requirements**

**FM 4991 & UL DRI Personnel**
- Pass Rigorous Firestop Examination
  - FCIA Firestop Manual of Practice
  - Firestop Systems Selection & Protocol
  - Management System Knowledge
- Retested every 3 years (FM Only)
- CEU Requirement – 6 ea. 3 yrs.
- One DRI per Approved Contractor Location
  - Installation & Maintenance
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FM/UL Office Facility Procedures Audit

– Firestop Contractor Management System Manual Procedures

• Employee Training & Education
• Systems Selection
• Communicate systems to Field
• Material Controls
• Systems installation “protocol”
• Labeling
• Record keeping - Variance Procedures
• Non-Conformances
• Documentation
• Project closeout
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Initial Firestop *Firm* Jobsite Audit by FM, UL Personnel

- Verification of firestop systems installation
- Verify Quality Procedures
- Verify “communication”
  - Office to field, field to office
- “Culture of Quality...”
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Annual FM 4991/ UL QFC Audit

• Continued satisfactory performance
  – Quality Manual Implementation
• Documented - Archived record keeping
• Employee Training Documentation
• Jobsite Visit
• DRI CEU Verification
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Result:

– Contractor firestop systems installation to Zero Tolerance Protocol
– Reduced overall installed Cost
– Company Culture of Quality
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• ASTM E 2174 & ASTM E 2393 - “Standard Practice for On-Site Inspection of Installed Fire Stops – Pen’s - Joints”

• “Standard Inspection Procedure”
  • Fire Marshals & Code Officials
  • Inspection Firms
  • Architects
  • Other Qualified Firms

• PASSED at ICC Committee Hearings...
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  - PASSED at ICC Committee Hearings...
    - Buildings 75’ and higher above Fire Department Access
    - Occupancy Type IV, V, Chapter 16 Table
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- ASTM E 2174/ASTM E 2393 -
- “Inspector & Firm Requirements”
  - Inspector firm NOT Related to Installing firm
    - Distributor, Manufacturer, Competitor, Supplier
  - Inspector Personnel meet at least one criteria.....
    - 2 years experience (Construction, Field), education, and credentials acceptable to AHJ
    - Accredited by AHJ
    - Meet ASTM E699
  - NEW Inspector Personnel / Firm Qualification
    - International Accreditation Services IAS AC 291
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- ASTM E 2174/ASTM E 2393 -
- "NEW Inspector & Firm Credentials"
  - IAS Accreditation Criteria AC-291
    - PASS UL/FM Firestop Exam
    - 1 year Quality Assurance
    - Or...
      - PASS UL/FM Firestop Exam, and PE, FPE, Registered Architect, or
      - PASS UL/FM Firestop Exam, and Education by Certified Agency
  - Must Specify IAS, not part of ASTM Standards
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• Maintenance of Firestop Systems, etc.
  – Firestop Systems
  – Fireproofing
  – Fire Doors
  – Fire Dampers
  – Fire Rated Glazing
  – Fire Rated Barrier Walls
  – Fire Rated Floors

• International Fire Code - 2003-2012 – Maintenance, 703.1
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International Fire Code – 703.1

703.1 Maintenance.

• The required fire resistance rating of fire-resistance rated construction
  – Walls
  – Fire stops
  – Shaft enclosures
  – Partitions
  – Smoke barriers
  – Floors
  – Fire resistive coatings
  – SFRM - Sprayed fire resistant materials applied to structural members
  – fire resistive joint systems

• ....shall be maintained.

2012 – “ANNUAL INSPECTION, by owner”
703.1 Maintenance.

- Such elements shall be **visually inspected by the owner annually**, and properly repaired, restored or replaced when damaged, altered, breached or penetrated.
- Where concealed, such elements shall not be required to be visually inspected by the owner unless the concealed space is accessible by the removal or movement of a panel, access door, ceiling tile, or similar moveable entry into the space.

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

- Openings through fire-resistance rated assemblies shall be protected by self closing or automatic-closing doors of approved construction meeting the fire protection requirements for the assembly.

2009 IFC Code Change – “ANNUAL INSPECTION, by owner”
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•  “ANNUAL INSPECTION, by Owner”
  –  Can Owner Subcontract?  YES
  –  Who is Qualified?
    •  FM 4991 / UL Qualified Firestop Contractor –
      –  DRI PASSSED FM/UL Firestop Exam
      –  I AS AC 291, PASSED FM or UL Firestop Exam
  –  What’s Inspection?
    •  Not defined
    •  FCIA Recommended Professional Practice - Survey-2010
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• “ANNUAL INSPECTION, by owner”
  – Physical Plant Personnel
    • In House, if time avails.
    • Know building
    • Training?
    • Efficiency?
    • Zero Tolerance?
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• “ANNUAL INSPECTION, by owner”
  – Options? Trades
    • In Contracting System
    • Training?
    • Efficiency?
    • Zero Tolerance?
    • Success Rate?
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• “ANNUAL INSPECTION, by owner”
  – Options? Firestop Inspection Agency
    • Training?
    • Efficiency?
    • Separate Contract for Repairs
    • Zero Tolerance
    • Credibility
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• “ANNUAL INSPECTION, by owner”
  – Options? Specialty Firestop Contractor
    • Training
    • Zero Tolerance
    • Efficiency
    • Survey & Repairs Simultaneously
    • Credibility
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• “ANNUAL INSPECTION, by owner”
  – What if??
    • Cracking in Firestop Sealant - How?
      – Movement
      – Shrinkage
      – Jarring
      – Vandalism
      – Trades
    – Commissioning, ‘Annual Inspection may discover

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International Green Construction Code & Standards Development

• Chapter 3 – Project Electives Checklist, ref’s.
  – 508.3(1) – Reused, recycled content, recyclable, bio based, and ‘indigenous materials’, (70 or 85%)
    • To what Standard?
  – 508.4.1 – Service Life – 100 or 200 year design?
    • To what Standard?
  – 809.2.3 – VOC emissions-Wall Systems will apply.
    • Firestop System part of the wall...
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International Green Construction Code

• Chapter 3 – Project Electives Checklist
  – 304.1-6 – ‘The reference service life of the building shall ... meet 505.1
  – 505.1 – Building Service Life Plan...’concealed’
  • ‘shall not be less than 60 YEARS’...
    – Exception – 25 years...in some cases.
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International Green Construction Code

• Chapter 5 Building Design Life Categories & Minimum Component Design Life
  – 505.1 – Building Service Life Plan...
    • Service Life based on ‘manufacturers reference service-life data’ or ‘other approved sources’
  – 506.1 – Storage & Handling - ....comply with Mfr’s instructions. ‘Where the manufacturers instructions are not available, ‘approved standards or guidelines shall be followed’.
    • 60 years aged, to what standard?
    • Manufacturers Data Sheets?
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International Green Construction Code

- **Chapter 5 Building Design Life Categories & Minimum Component Design Life**
  - 508.4.1 – Building service life plan project electives
  - Table 508.4.1 – Project Electives for Building Design Life Categories and Minimum Component Design Life

- **Component Minimum Design Life** –
  - ‘structural elements and concealed materials and assemblies’...100 or 200 years’
  - Aged to what standard?
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International Green Construction Code

• *Chapter 9 Commissioning*
  – *Will it apply to Firestopping?*
    • *Initial Commissioning*
    • *Ongoing Commissioning Annually*
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International Green Construction Code

• *Not done yet...*
  – *Committee Hearings*
    • *May 15-21 - Dallas*
  – *Final Action Hearings*
    • *October 30- Nov. 6 – Phoenix*
  – *Stay Tuned...*
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International green Construction Code

*If IgCC Commissioning...AND Annual Inspection, By Owner....

.....then people will be above ceilings.*

- **Movement**
  - *Penetrating Items Move*
    - *Water Hammer*
    - *Temperature Variation*
    - *Vibration*
    - *People Walk on Pipes...Damage*
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• **Shrinkage – All Products**
  – *Installed to Tested and Listed System Thickness*
  – *Time Passes*
  – *How Thick is it?*
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• **Shrinkage – All Products**
  - Performance Affected?
    • *F Rating*?
    • *T Rating*?
    • *L Rating*?
    • *W Rating*?
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• Aging
  – Mathematical Prediction
  – Material Component Only
    • Assembly(s)?
    • Penetrating Item?
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• **Aging**
  – *Does it need to be correlated to actual Retained Sample in fire test assembly, stored, then fire tested?*
  – *What does the building occupant expect?*
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• **Movement, Shrinkage, Aging**
  – *Ongoing discussion....*
  – *UL Standards Technical Panels*
  – *ASTM E-06 Meetings*
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• **Movement, Shrinkage, Aging**
  – Ongoing discussion....
  – UL Standards Technical Panels
  – ASTM E-06 Meetings
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• “TOTAL FIRE PROTECTION”
  Includes Maintenance....
  – Effective Compartmentation -Fire Walls/Floors & Firestopping
  – Fire Dampers, Fire Glass
  – Detection & Alarm Systems
  – Sprinkler Suppression Systems
  – Building Personnel, Occupant and Firefighter Education
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