FCIA's 'DIIM': Firestop 101, An Executive Summary

- Design
- Installation
- Inspection
- Maintenance & Management

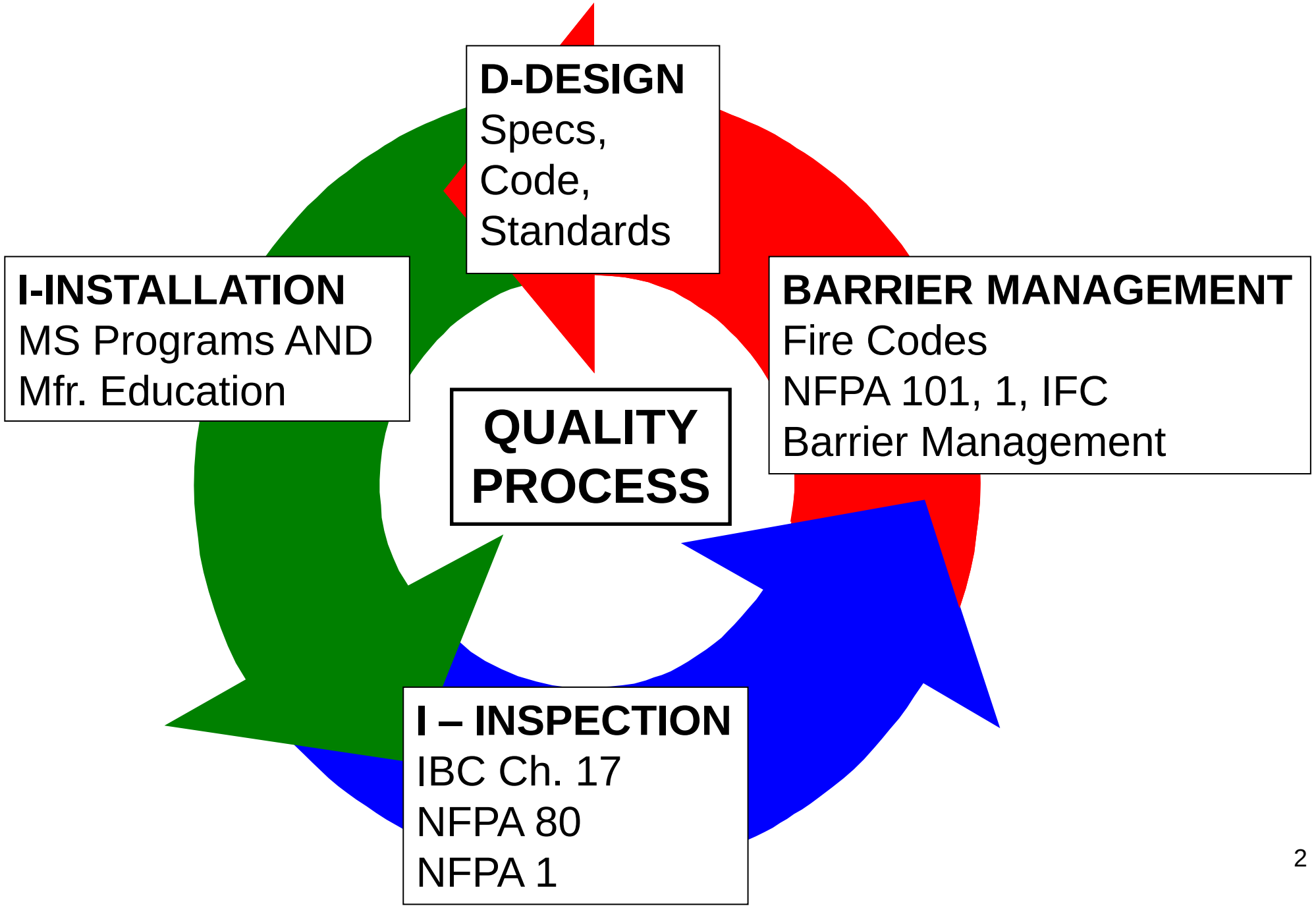
FCIA Virtual 'DIIM' Symposium Canada

Bill McHugh, FCIA

Rich Walke, Consultant to FCIA

FCIA
Firestop Contractors International Association

September 30, 2020


D-DESIGN
Specs,
Code,
Standards
I-INSTALLATION
MS Programs AND
Mfr. Education
BARRIER MANAGEMENT
Fire Codes
NFPA 101, 1, IFC
Barrier Management
QUALITY
PROCESS
I – INSPECTION
IBC Ch. 17
NFPA 80
NFPA 1

“DIIM”

- Fire Resistance & Smoke Resistant Systems
  - Properly ***Designed*** and Specified Firestopping FCIA - 07-84-00 – Specification – ***RSW, CCS***
  - ***Tested and Listed Systems*** – **CAN/ULC-S101, S115, S112, S104, ASTM E2307, E2837….Movement, Smoke (L), Water (W), Movement (M)**
  - Professional ***Installation*** – FCIA Member, ULC Qualified Contractors, FM 4991 Approved
  - Properly ***Inspected*** – to….ASTM E2174 / E2393 Protocol by IAS AC 291 Accredited Inspection Agencies, ULC, IFC, FM Firestop Exams
  - ***Maintained*** – Annually – by FCIA Members – **National Fire Code of Canada http://www.constructioncanada.net/firestopping-and-effective-compartmentation/**

Building & Fire Code Requirements

- National Building Code – Canada (Tony Crimi, Andre Laroche)
- NFPA 5000 – 101- Chapter 8
- UAE Fire and Life Safety Code – Chapter
- International Codes –
  - New and Existing Buildings International Building Code – Chapter 7
  - International Fire Code – Chapter 7

- ***Minimum requirements*** - ***Construction*** & ***Maintaining Protection***

FCIA's 2020 Proposals – National Building Code of Canada

- **Proposed New Requirements**
  - **Firestop Installation Standards DISAPPROVED**
    - ULC Qualified Firestop Contractors or FM 4991 Approved
  - **Firestop Inspection DISAPPROVED – "No Objective"**
    - ASTM E2174 and ASTM E2393 Standards for On-Site Firestop Inspection
- **Add "Breach" Term to the Code…PASSED**
- **Change "Fire Stop to "Firestop"…PASSED**

FCIA's 2020 Proposals – National Building & Fire Code of Canada

- Fire Resistance **"Inventory"**
- Annual Visual Inspection
  - Fire Separations
  - Firestops, Fire Doors, Fire Dampers, Firestop Systems…for building maintenance
- Existing Buildings
  - **Repair Damage** to Fire Separations – Damage?
  - **Require Documentation** of Fire Separations, etc.

Barrier Continuity SYSTEMS

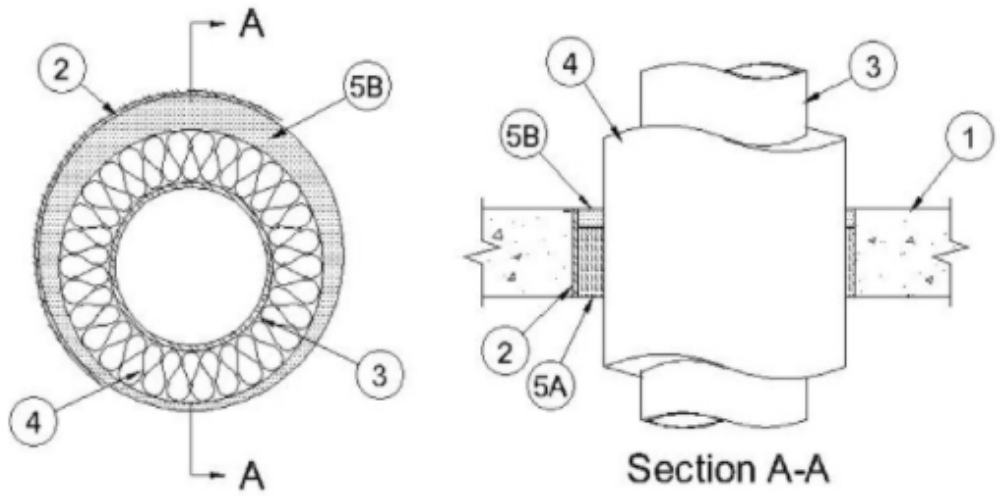
- **Products Become Systems – Test Standards**
  - **Fire & Smoke Barriers – Fire Separations**
    - **CAN/ULC-S101,** ASTM E119, UL 263
  - **Firestopping – CAN/ULC-S115,** ASTM E814 / UL 1479, UL 2079, E1966, E2307, E2837, **…**test methods…”
  - **Swinging/Rolling Fire Doors** – **CAN/ULC-S104, S105 Frames, S113 for 20 minute wood doors**, UL 10B/C….NFPA 252
  - **Fire Rated Glazing – CAN/ULC-S106, S101,** UL 9, ASTM E119, UL 263
  - **Fire/Smoke Dampers** – **CAN/ULC-S112, S112.1,** UL 555, UL 555S
- **SYSTEM Testing = Suitability Statement**

Affinity Firestop Photo

Possible UL System Nos.: C-AJ-5138, C-AJ-5209, W-J-5091, Etc.

F Ratings — 1 and 2 Hr (See Item 3)

T Ratings — 0, 3/4 and 1 Hr (See Item 4)



1. **Floor or Wall Assembly** — Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600 - 2400 kg/m^3) concrete floors or min 3 in. (76 mm) thick reinforced lightweight or normal weight concrete walls. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening 9 in. (229 mm).

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** — (Optional) - Nom 9 in. (229 mm) diam (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Steel sleeve may be installed flush or may project max 2 in. (51mm) beyond the floor or wall surfaces. As an alternate, nom 9 in. (229 mm) diam (or smaller) sleeve fabricated from nom 0.019 in. (0.48 mm) thick galv steel cast or grouted into floor or wall assembly flush with floor or wall surfaces.

3. **Through Penetrants** — One metallic pipe to be installed concentrically or eccentrically within opening. Penetrant to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes may be used:

   A. **Steel Pipe** — Nom 4 in. (102 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.

   B. **Iron Pipe** — Nom 4 in. (102 mm) diam (or smaller) cast or ductile iron pipe.

   C. **Copper Tubing** — Nom 2 in. (51 mm) diam (or smaller) Type L (or heavier) copper tubing.

   D. **Copper Pipe** — Nom 2 in. (51 mm) diam (or smaller) Regular (or heavier) copper pipe.

F Rating is 2 Hr for Penetrants A and B. F Rating is 1 Hr for Penetrants C and D.

4. **Pipe Covering*** — Nom 1-1/2 in. (38 mm) thick (or less) hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with product. Annular space between the pipe covering and periphery of opening or sleeve shall be min 1/2 in. to max 1 in. (13 mm to 25 mm).

   See **Pipe and Equipment Covering - Materials** - (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a smoke Developed Index of 50 or less may be used.

T Rating is 3/4 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for penetrants A and B. T Rating is 1 Hr for nom 1-1/2 in. (38 mm) thick pipe covering for Penetrants C and D. T Rating is 0 Hr for all Penetrants when pipe coverings less than nom 1-1/2 in. (38 mm) thick.

Building & Fire Code Requirements

- **National Building Code – Canada**
- NFPA 5000 – 101- Chapter 8
- UAE Fire and Life Safety Code – Chapter 1, Section 21
- International Codes –

- ***Minimum requirements*** - ***Construction*** & ***Maintenance***

- ***Later…others cover codes…***

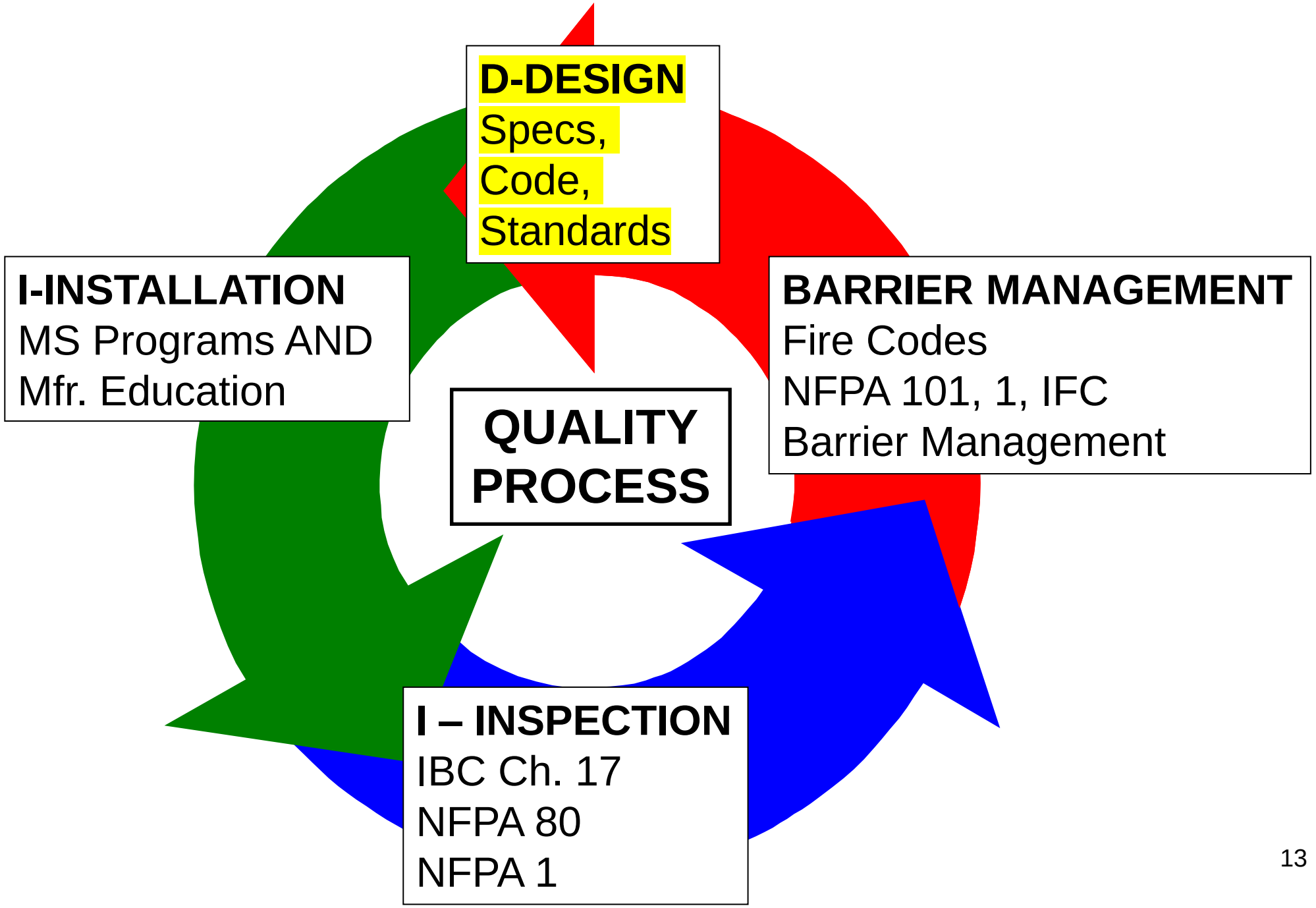
National Fire Code of Canada

National Fire Code of Canada

- ***Division B – Part 2, Building and Occupant Fire Safety***

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

More Thursday…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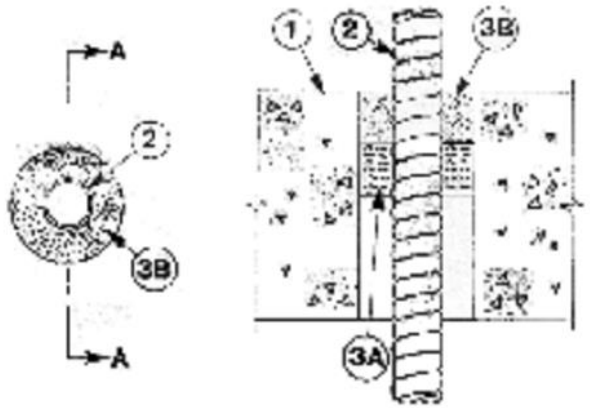
Continuity

Effective Compartmentation Features

Firestopping for Continuity
I – Classified Systems

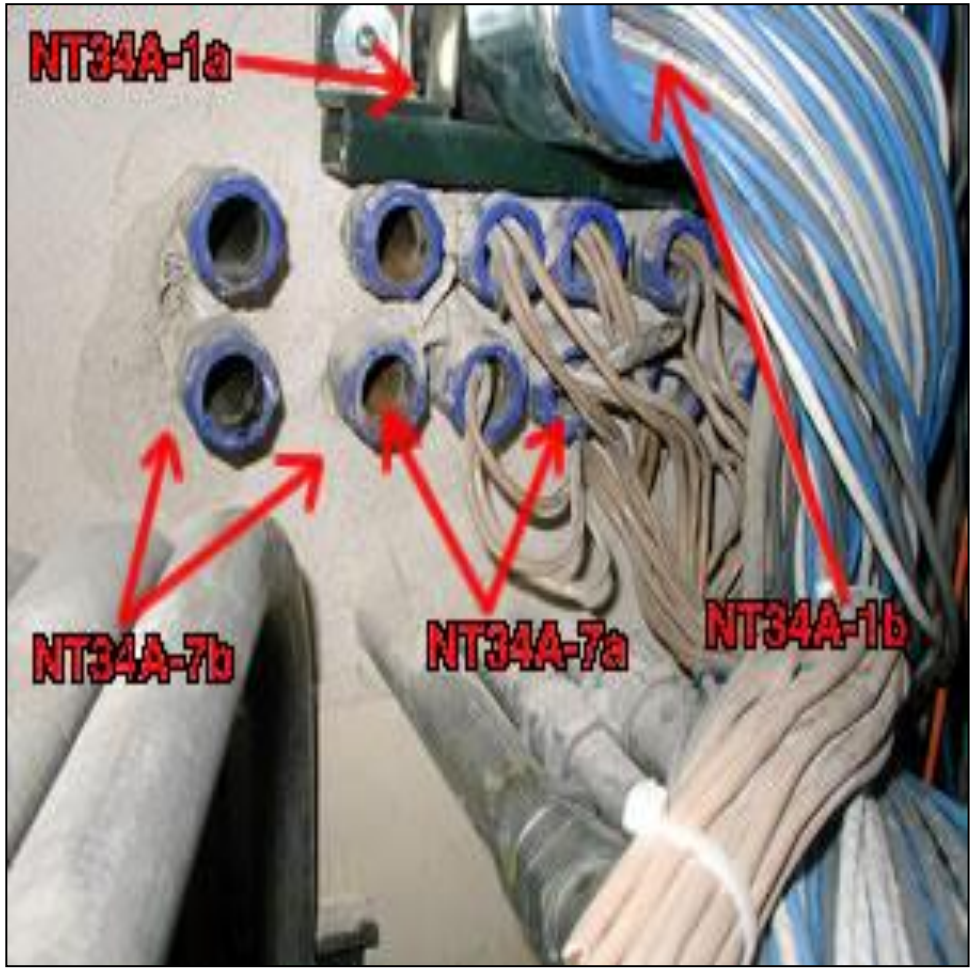
System No. C-AJ-1180
F Rating—2 Hr
T Rating—0 Hr



SECTION A-A

1. Floor or Wall Assembly—Min 4-1/2 in. thick lightweight or normal weight (100 to 150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Diam of circular through opening in floor or wall assembly to be 1/4 in. to 1-1/2 in. larger than diam of flexible metal conduit (Item 2) installed in through opening. Max diam of opening is 6 in.
   See Concrete Block (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrating Product*—Max 4 in. diam (or smaller) steel, or max 3/4 in. diam (or smaller) aluminum Flexible Metal Conduit. Max one flexible metal conduit to be installed near center of circular through opening in floor or wall assembly. Flexible metal conduit to be rigidly supported on both sides of floor or wall assembly.
   Alliance Cable Corp.
3. Packing Material—Min 1 in. thickness of ceramic (alumina silica) fiber blanket or mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed min 1 in. from top surface of floor or from both surfaces of wall.
4. Fill, Void or Cavity Material*—Caulk—Applied to fill the annular space around the flexible metal conduit. In floors, a min 1 in. depth of fill material to be installed flush with top surface of floor. In walls, a min 1 in. depth of fill material to be installed flush with wall surface on both sides of wall assembly.
   Minnesota Mining & Mfg. Co.—CP 25WB+

*Bearing the UL Classification Marking
†Bearing the UL Listing Mark



Firestopping for Continuity
Products become SYSTEMS Based on Testing

- **'Field Erected Construction…Tested to…'**
  - Standards – **CAN/ULC-S115**, ASTM E814 / UL 1479, UL 2079, ASTM E1966, ASTM E2837, ASTM E2307, FM 4990
  - F Rating – Flame
  - FT Rating – Temperature
  - FH Rating – Hose
  - FTH Rating
  - L Rating – Smoke
  - W Rating – Water
  - M Rating – Movement

3M Photo

Conditions of Acceptance
F Rating

- Passage of Flame

Conditions of Acceptance
FT Rating

- Passage of Flame
- 325ºF (180ºC) Temperature Rise

Conditions of Acceptance
FH Rating

- Passage of Flame
- Hose Stream

Conditions of Acceptance
FTH Rating

- Passage of Flame
- 325ºF (180ºC) Temperature Rise
- Hose Stream

L Rating

- Air Leakage Rate at Ambient Temperature
- Air Leakage Rate at 400ºF (204ºC)

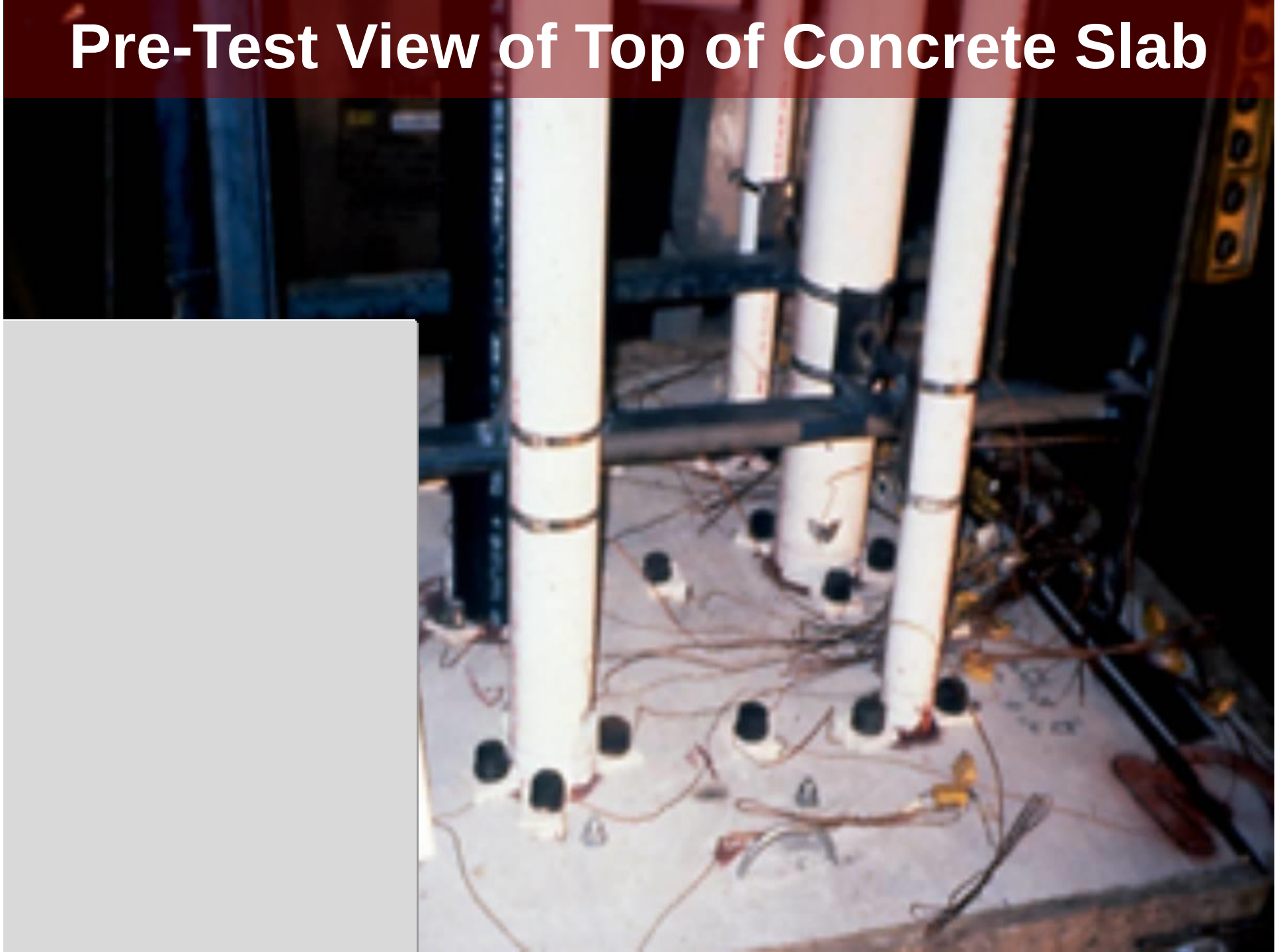
W Rating

- Optional program, applicable to incidental water
- 3 Ft WC (0.91 M WC) Pressure Head / 72 Hr Exposure
- Firestop subjected to water exposure, followed by standard fire and hose stream tests
- Firestop systems assigned a W Rating

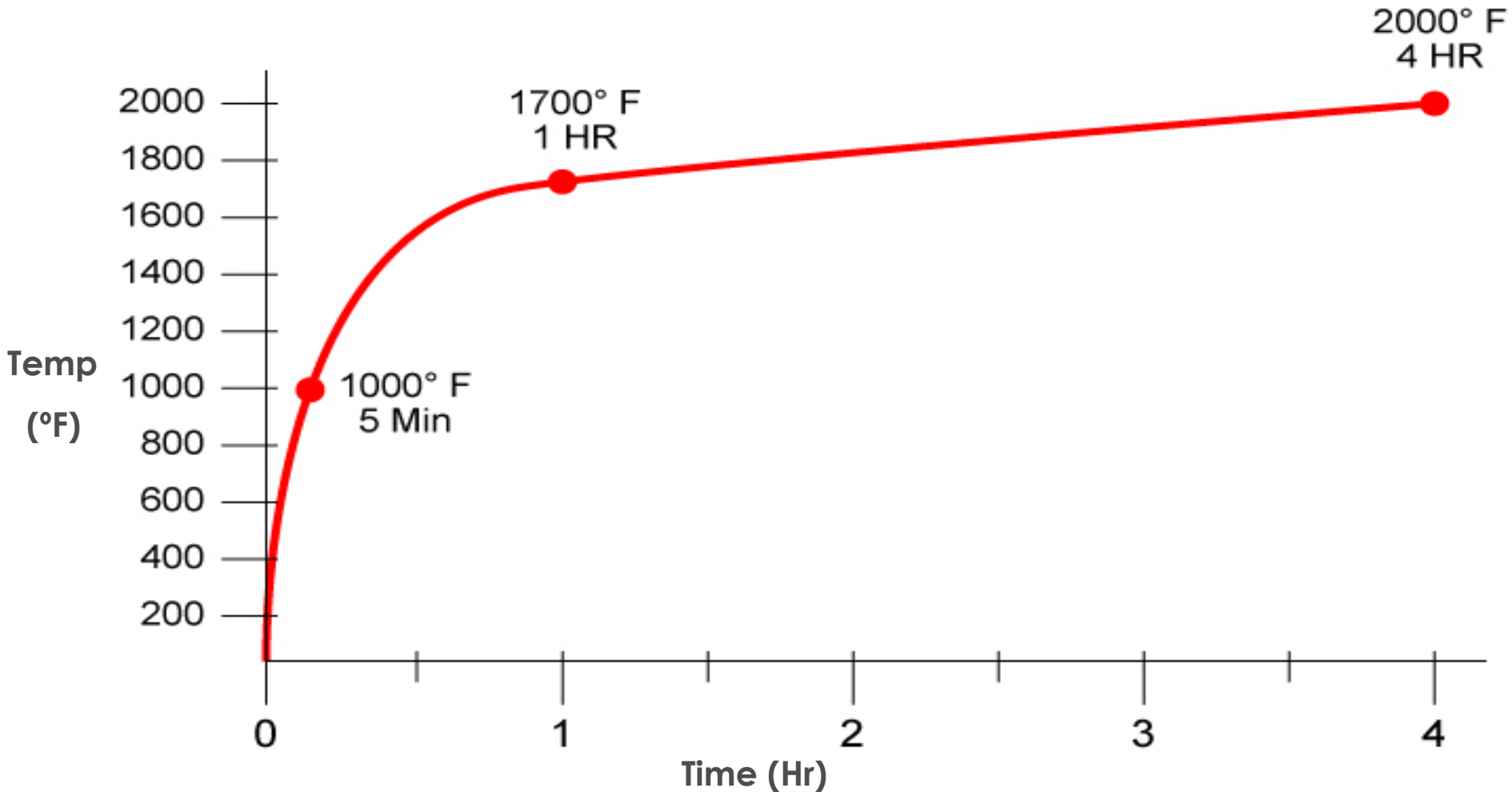
M Rating

- Optional program, applicable to movement of penetrating item
- Penetrating item move perpendicular and/or in plane of barrier in accordance with ASTM E3037
- After movement, firestop system subjected to standard fire and hose stream tests
- Firestop systems assigned a M Rating
  - Rating within plane based on percentage of annular space
  - Rating perpendicular to barrier based on dimension

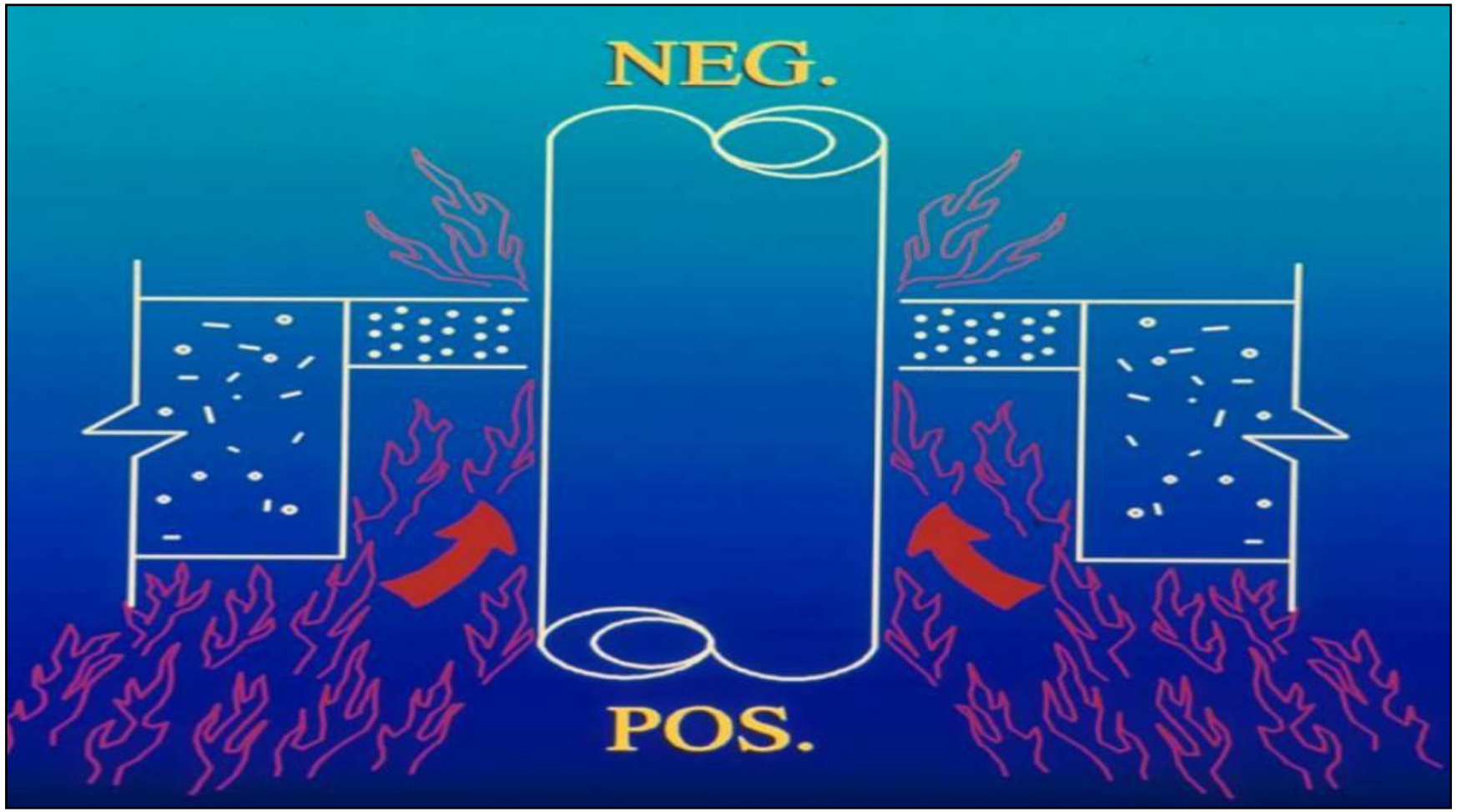
Pre-Test View of Top of Concrete Slab



Time-Temperature Curve



Positive Furnace Pressure



Post-Test View of Bottom of Slab

Hose Stream Test

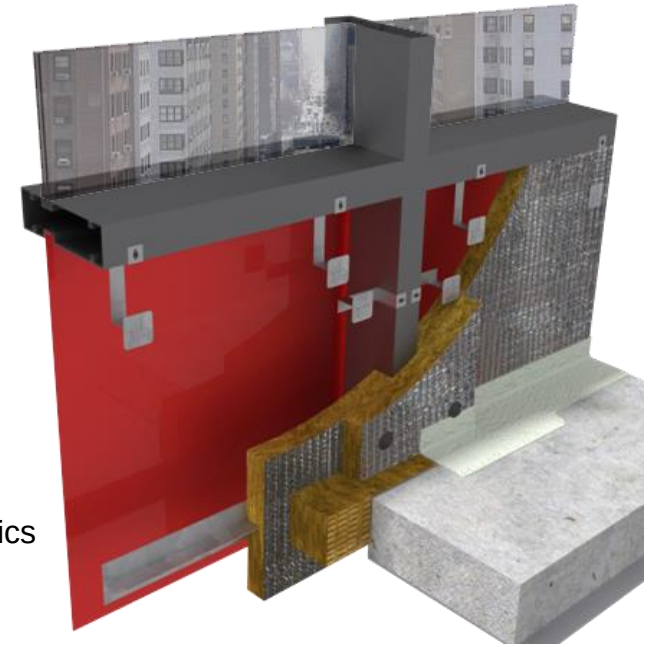
UL Photo

Building & Fire
Worldwide Code Requirements

- *Chemical, Biological, Radiation, Explosion, Germ, etc.*
  - Standards?
    - C – Which Chemicals? Check with manufacturer
    - B – Which Agents? Check with manufacturer
    - R – Nuclear Power Plant Standards? Check with manufacturer.
    - E – Blast Strength? Check with manufacturer
    - G – Germ – Check with manufacturer & industrial hygienist
  - How to Regulate for Unexpected Events?
  - Due Diligence - Review Required by code?

IBC & Curtain Walls

- **ASTM E2307**
- **Prevent Fire Spread – Interior Safing Slot**
  - **Interior Flame**
  - **Exterior Flame Plume from Window**
  - **Time & Temperature**
  - **Tested Systems….**
- **Leapfrog Testing (ASTM E2874)?**
- **More on this by**
  - **Rick Roos, Tony Crimi, Angie Ogino**

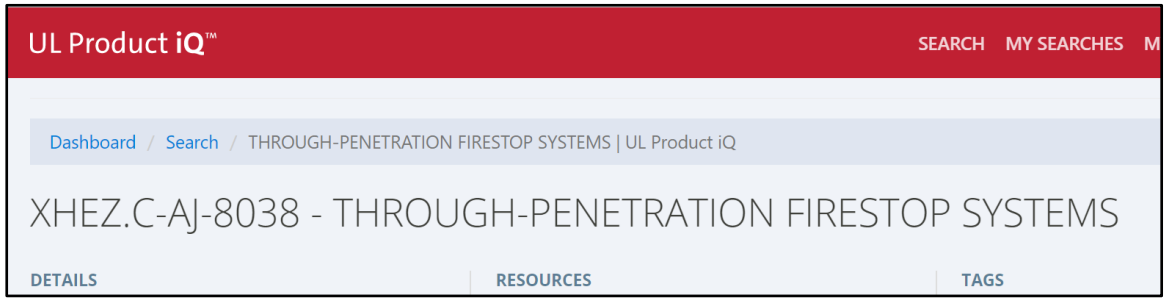


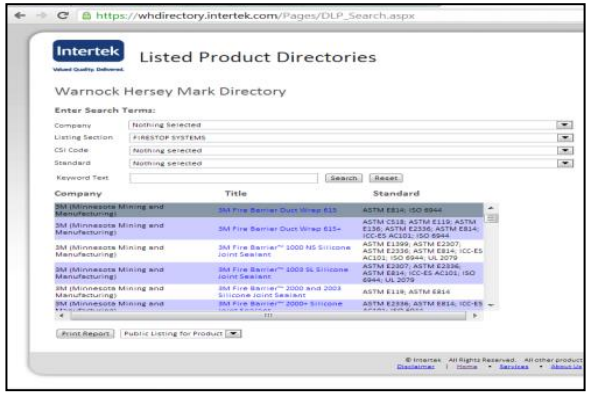
OCF/Thermafiber Graphics

Barrier Continuity
Products become SYSTEMS

- **Fire Rated Systems Directories –**
  - **FM Approvals**
  - **Intertek**
  - **UL/ULC Product iQ Online Directory**

Systems Selection & Analysis…Not as easy as it looks…





Engineering Judgments/EFRRA

- Variances to Systems at Site? – Now What…
  - **First Action in Process**
    - **Find another system** – Same Manufacturer
    - **Find another system** – Different Manufacturer
    - **If no system exists in either case**….
  - **Second Action –**
    - ***Engineering Judgment*** **– "EJ"**
    - ***Equivalent Fire Resistance Rated Assembly – "EFRRA"***
  - ***Based on engineering, IFC Protocol***

Engineering Judgments/EFRRA

International Firestop Council – Manufacturers – www.firestop.org

IFC Guidelines for Evaluating Engineering Judgment Guidelines

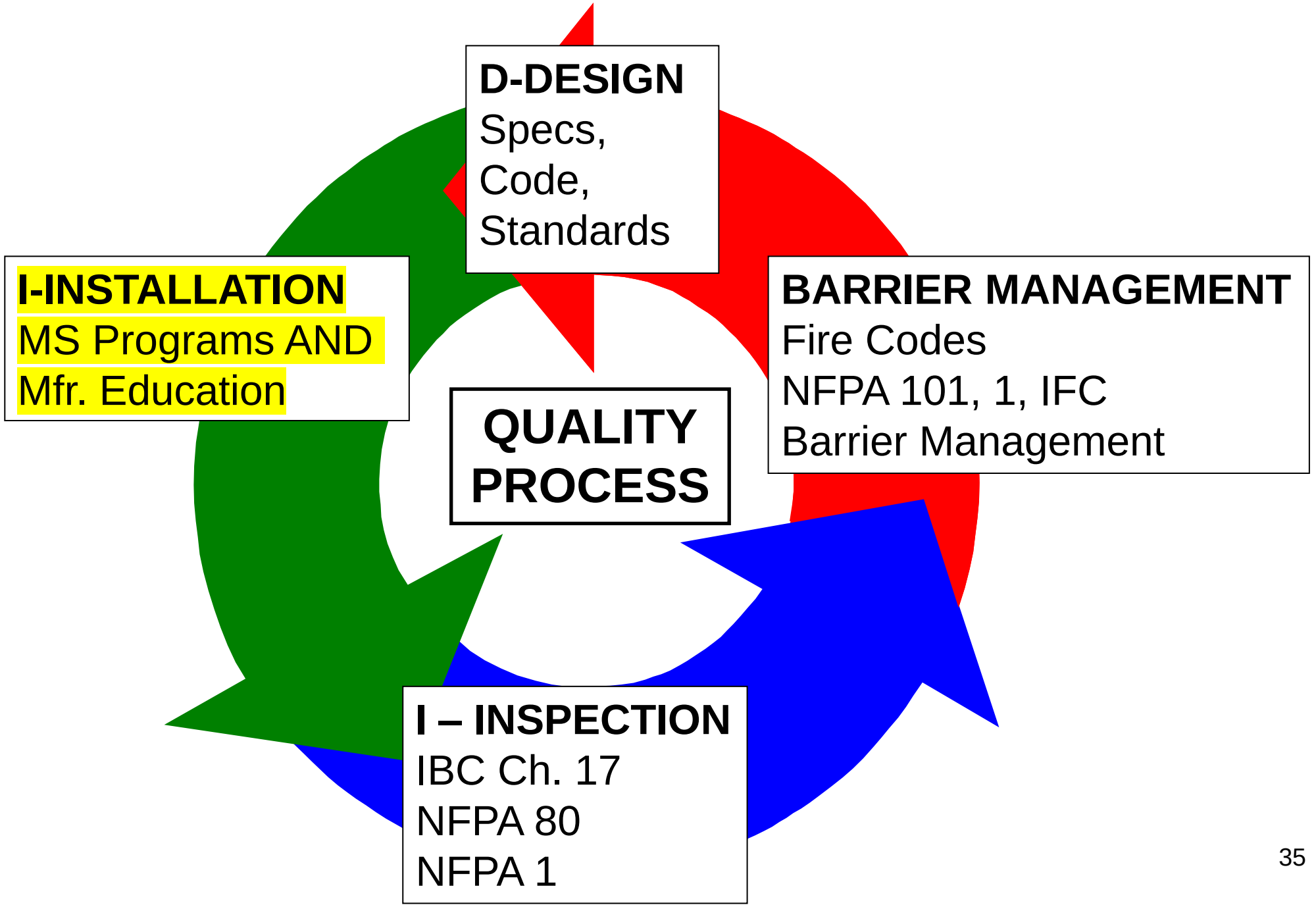
‘Construction industry professionals, building officials, fire officials, firestop contractors and other stakeholders need appropriate guidelines for evaluating and using such judgments.’

As such, IFC developed *Recommended IFC Guidelines for Evaluating FireStop Systems in Engineering Judgments.*

Engineering Judgments/EFRRA

IFC EJ Guidelines - Engineering Judgments for firestop systems should:

- Emphasizes importance of tested designs
- Not a substitute for existing designs
- Should be issued only by those who know the components
- Based on sound engineering practices and knowledge of performance of the designs
- Based on interpolation of previous testing
- Issued only for a specific jobsite
- Presented in clear detail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FIRESTOP SYSTEM INSTALLATION

Firestop Sealant & MW installed to Tested and Listed System Limits = Firestop System

Pack

1

Apply Sealant

2

Tool/Smooth

3

Walls - BOTH SIDES

STI Graphic

Joints and Voids
Head-of-Wall

Firestop Solutions Photo

Joints and Voids
I-Beam to Fluted Deck

Firestop Solutions Photo

Sleeved Pipes

Fire/Smoke Dampers & Firestops

- Dampers – CAN/ULC-S112, S112.1, UL 555, 555S
  - Listings - ***Systems***
  - Installed to manufacturer's written instructions
  - Systems – Angles…no sealants required.
- Firestop sealants – ULC-S115, UL 1479
  - Improper hole sizing or poor installation…

Consult the Damper Manufacturer & the Authority Having Jurisdiction

Greenheck Photo

Firestopping for Continuity – Firestop Products

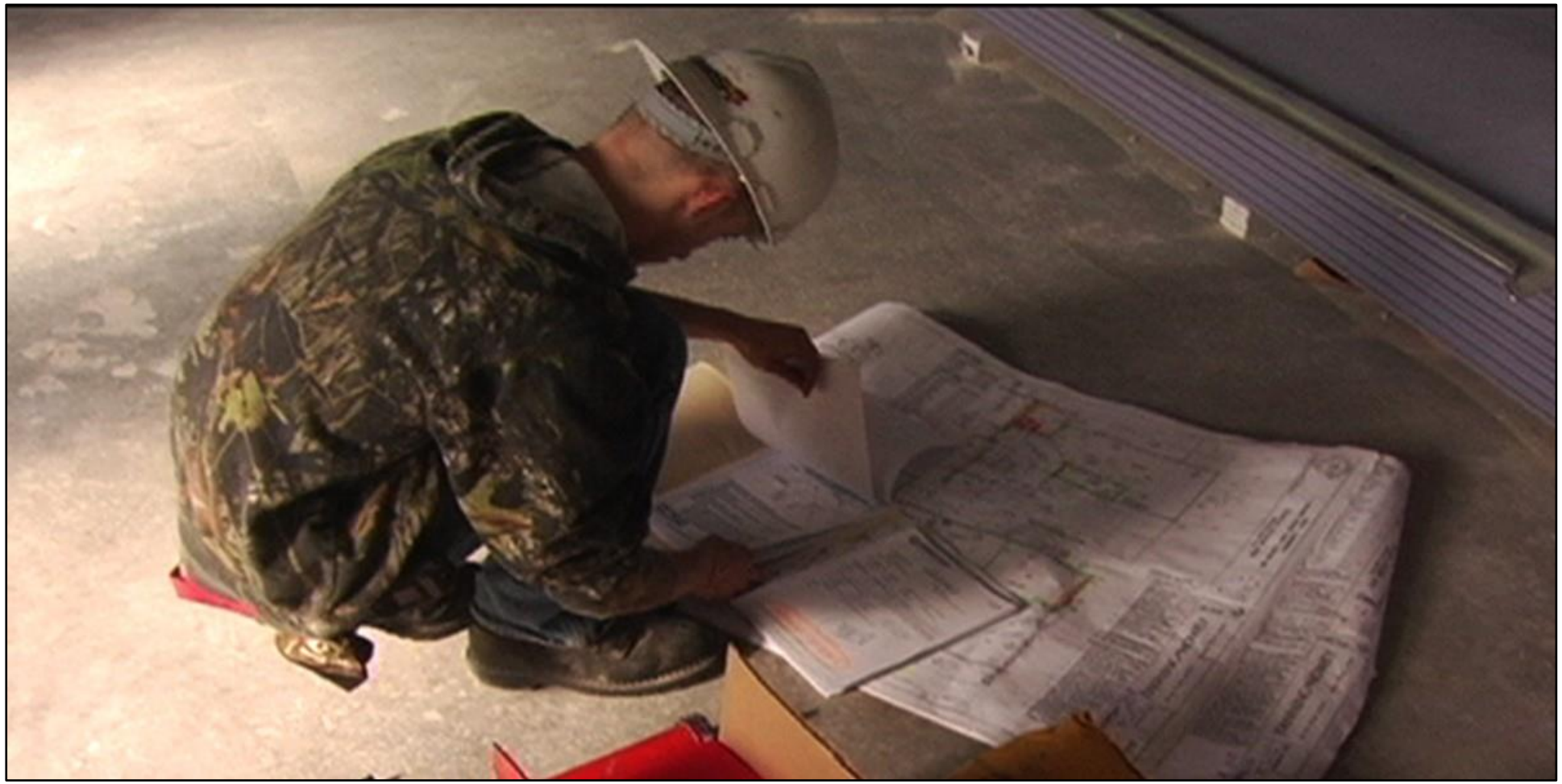
- Sealants
  - Silicone, Latex, Intumescent
- Wrap Strips
  - “Thick, Thin, Wide, Less Wide”
- Putties
- Pillows
- Composite Sheets
- Bricks / Plugs
- Pre Fabricated Kits
- Mortar
- Spray Products
- Tapes






STI, 3M, AD, HILTI, Nelson Photos

Barrier Continuity
I – Installation – Listed Systems



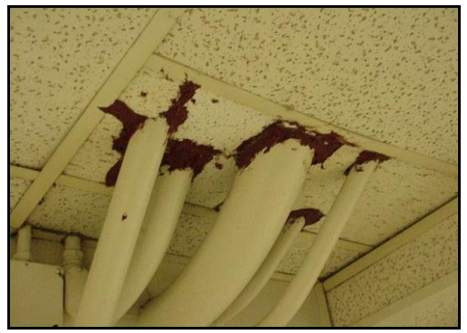
Installation – Who?

- Firestopping wrong, missing
- Systems Documentation?
- As Built Documentation??

Conclusion –

Without Single Firestop Installation Contractor….

Fire & life safety risks



Adler Photo

3 Firestop Installation Methods

- **Each Trade**
  - “He/She who pokes hole, fills hole”
- **Multiple Contracts**
  - Firestop Contractors, Trades
- **Single Source Firestop Contractor**
  - ***FCIA Member in Good Standing***
  - ***FM 4991, UL, ULC Qualified***

Why Contractor Qualifications?

- **Firestopping Ratings - F, FT, FH, FTH, L, W, M**
- **Zero Tolerances?**
  - Annular Space Sizes, Gap Sizes
- **Product Properties**
  - Movement
  - Compatibility
  - Storage, Application, Curing Temps
- **SYSTEMS DOCUMENTATION**

Spec Contractor Qualifications

- **FM 4991 – Standard for the Approval of Firestop Contractors**
- **UL Qualified Firestop Contractors**
- **Other Industries???**
- ***FM 4991 / UL-ULC CONTRACTORS UNDERSTAND SYSTEMS, INVENTORY & DOCUMENTATION***

Underwriters' Laboratories of Canada
Laboratoires des Assureurs du Canada
Qualified Firestop Contractor Program

Why Contractor Qualifications?

- **Built right the first time…**
- **Documentation**
- **SYSTEMS Selection, Analysis, As-Builts**
  - F, T, L, W Rated Systems
  - Tolerances - Annular Space Sizes, Angles
  - Gap Sizes - Undercuts - Framing
  - Anchors - Spacing – Hardware
  - Closers - Activation Sensors, more…

FM 4991 & ULC QFC

- **ULC Firestop Exam @ 80% min.**
- **Management System (MS) Written**
- **MS Procedures implemented**
- **Audit**
  - Contractor Office – Records & Documents
  - Jobsite – Observation, possible destructive
- **DRI – Appointed by Contractor, CEU's**

Listed at www.UL.com – www.FCIA.org

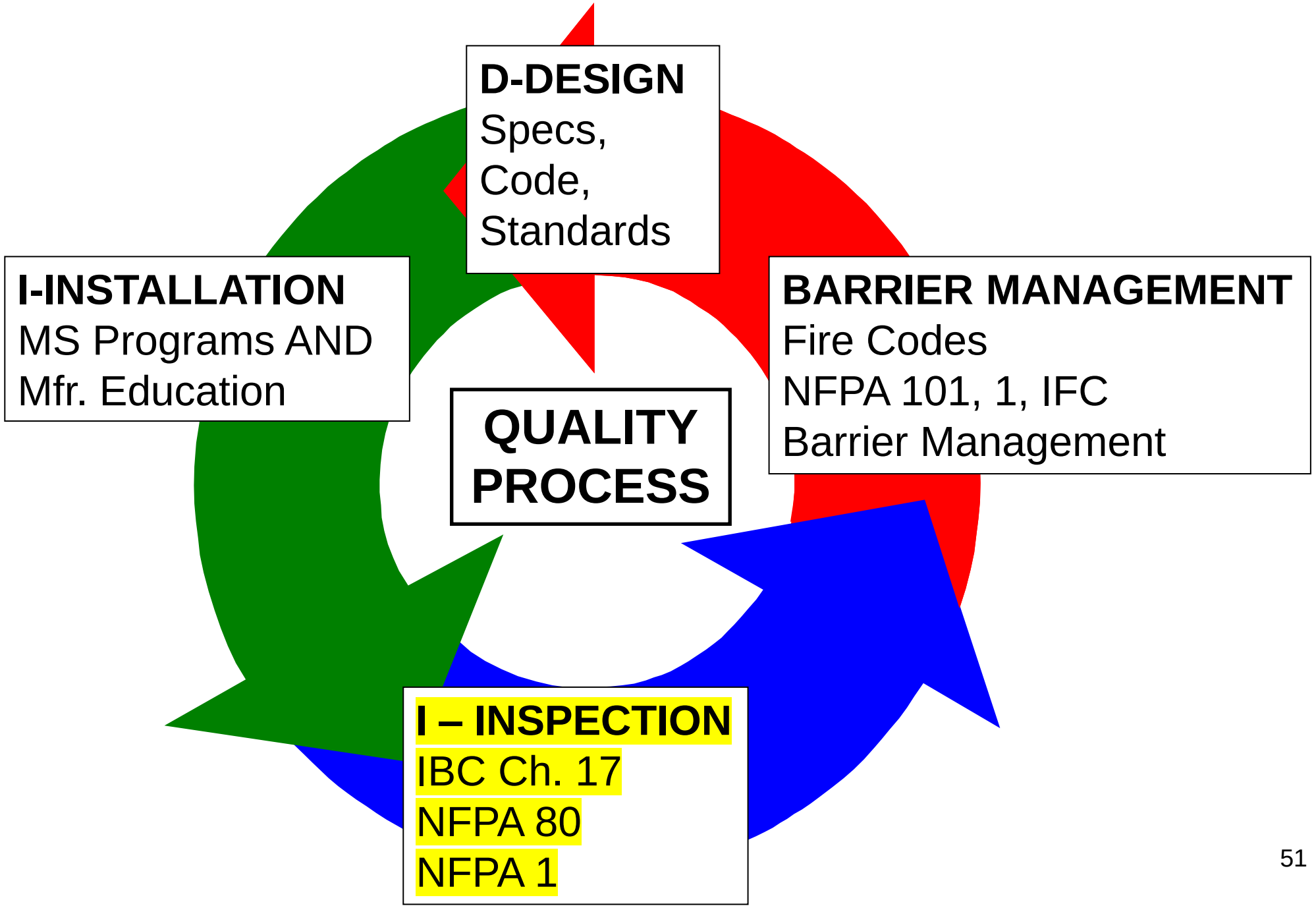
More from UL/ULC's Ruben Sandoval…..

Management System – ULC, FM

- Facility Tour
- Review MS Manual
- Construction Documents Requirements and Review
  - Systems Selection & Analysis
- Procurement
- Storage, Handling, Preservation and Delivery
- Installation, Application and Field Quality Assurance Procedures
  - Systems Installation, Self Inspection/Survey

Management System – ULC, FM

- **Inspection, Testing and Calibration**
  - Tape Measures
- **Control of Nonconforming Product**
- **Training and Qualification of Staff**
  - DRI's, Workforce
- **Corrective/Preventive Action**
- **Quality System Monitoring and Improvement**
- **Documentation and Record Keeping**
  - 7 years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Firestop & Inspection

- ASTM E2174 / ASTM E2393 – *“Inspection Process”*

I – Inspection – Options

- **Contractor Self Inspection**
  - Verify Management System validity
  - Not 2%, 10%
  - Required for FM & UL, ULC Contractors
- **Manufacturer Inspection**
  - Does not exist … Survey, maybe
- **ASTM E2174 & ASTM E2393**
  - Independent 3rd Party
  - Destructive, Non Destructive
  - Specified Frequency

I – Inspection – Scope

- **ASTM E2174 & ASTM E2393**
  - Firestopping
- Other Scopes—Possibilities for IA's
  - Walls, Horizontal Assemblies
  - Fire Dampers
  - Fire Rated Glazing
  - Fire Doors

I – Inspection –
IBC Code Requirements (Not in NBC)

- **Required, International Building Code – Chapter 17**
- **Not Required in NBC**
- **NBC Code Proposal – 2020 … and 2025**

I – Inspection –
IBC Code Requirements

Definitions – Chapter 17, IBC

[A] APPROVED AGENCY. An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been *approved*. [IBC 202 Definitions]

[A] APPROVED. Acceptable to the *building official* or authority having jurisdiction. [IBC 202 Definitions]

I – Inspection –
IBC Code Requirements

SPECIAL INSPECTOR. A qualified person employed or retained by an *approved* agency and *approved* by the *building official* as having the competence necessary to inspect a particular type of construction requiring *special inspection.* [IBC 202. Definitions]

I – Inspection –
Code Requirements

1705.16.1 Penetration firestops. Inspections of penetration firestop systems that are tested and listed in accordance with Sections 714.3.1.2 and 714.4.1.2 shall be conducted by an approved inspection agency in accordance with ASTM E2174.

1705.16.2 Fire-resistant joint systems. Inspection of fire resistant joint systems that are tested and listed in accordance with Sections 715.3 and 715.4 shall be conducted by an approved inspection agency in accordance with ASTM E2393. [IBC 1705.17.1.2]

Firestop Inspection in Codes
ASTM E2174 - ASTM E2393

- NFPA 101 / 5000 - Chapter 8 - Annex
- 2012 – 2018 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

Firestop Inspection in Codes

- **Table 1604.5 – Risk III** – *Buildings and other structures that represent a substantial hazard to human life in the event of failure, include but are not limited to:*
  - *Public* ***Assembly, Occupant Load > 300***
  - *Bldgs. Containing* ***Elem.,2nd'ary', day care, > 250***
  - I-2, > 50, no surgery, emergency
  - I-3
  - Occupancy load > 5,000
  - **Power-gen, H2O treatment,** wastewater treatment, public utilities, not in IV
  - Buildings not in IV, with toxic or explosives [IBC 1604.5]

Firestop Inspection in Codes

- **Table 1604.5 – Risk IV** – *Buildings and other structures designated as essential facilities, including but not limited to:*
  - *Group **I-2 occupancies having surgery or emergency** treatment facilities.*
  - *Fire, **rescue, ambulance/police stations**, emergency vehicle garages.*
  - *Designated earthquake, hurricane or other **emergency shelters.***
  - *Designated emergency prep, communications and operations centers and other **facilities required for emergency response**.*
  - *Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures.*
  - [IBC 1604.5]

Firestop Inspection in Codes

- **Table 1604.5 – Risk IV** – *Buildings and other structures designated as essential facilities, including but not limited to:*
  - ***Buildings and other structures containing quantities of highly toxic materials that:***
    - *Exceed maximum allowable quantities per control area as given in Table 307.1(2) or per outdoor control area in accordance with the International Fire Code, and are sufficient to pose a threat to the public if released.*
    - *Aviation control towers, air traffic control centers and emergency aircraft hangars.*
    - *Buildings and other structures having critical national defense functions.*
    - *Water storage facilities and pump structures required to maintain water pressure for fire suppression.*
    - [IBC 1604.5]

Firestop Systems Inspection
ASTM E2174 - ASTM E2393

- "Standard Practice for On-Site Inspection of Installed Fire Stops – Penetrations - Joints"
  - Standard Inspection Procedure
  - Special Inspection Agency Companies
  - Other Qualified Firms
  - Hired by & Report to Building Owner, Architect, Owners Rep, other than GC.

    = Authorizing Authority

Firestop Inspection Firm & Individual Qualifications – ASTM E2174 - ASTM E2393

- Inspector Firm & Inspectors
  - **‘Independent of, and Divested from** ’ Installing firm, Distributor, Manufacturer, Competitor, Supplier…
  - **‘Not a Competitor** of the Installer, contractor, manufacturer, or supplier ….
  - **Other than the contractor**…
  - **Submit notarized statements** of …

Firestop Inspection Firm & Individual Qualifications – ASTM E2174 - ASTM E2393

- Inspector Personnel meet at least one criteria…..
  - 2 years experience (Construction, Field), education, and credentials acceptable to AHJ
  - Accredited by AHJ
  - Meet ASTM E699

- **Inspection Agency *Company* Qualification – IAS AC 291 – w / Individual Certs.**

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Firestop Inspection Firm & Individual Qualifications – IAS AC 291

- **Inspection Firm shall have staff..**
  - PASS UL or FM Firestop Exam, IFC Exam
  - 1 year Quality Assurance

    Or…
  - PASS UL/FM Firestop Exam, IFC Firestop Exam, *and* PE, FPE, Registered Architect, or
  - PASS UL/FM Firestop Exam, IFC Firestop Exam, *and* Education by Certified Agency

Firestop Inspection Firm and Individual Qualifications – IAS AC 291

- **Specify IAS AC 291 –**
  - Quantified Qualifications
  - Helps AHJ with “Approved Agency”
  - Not in ASTM Standards, Code
- **Specify Individual Certifications**
  - 3rd Party, Independent Exams verify Knowledge
    - FM Firestop Exam,
      - OR
    - UL Firestop Exam,
      - AND
    - IFC Exam


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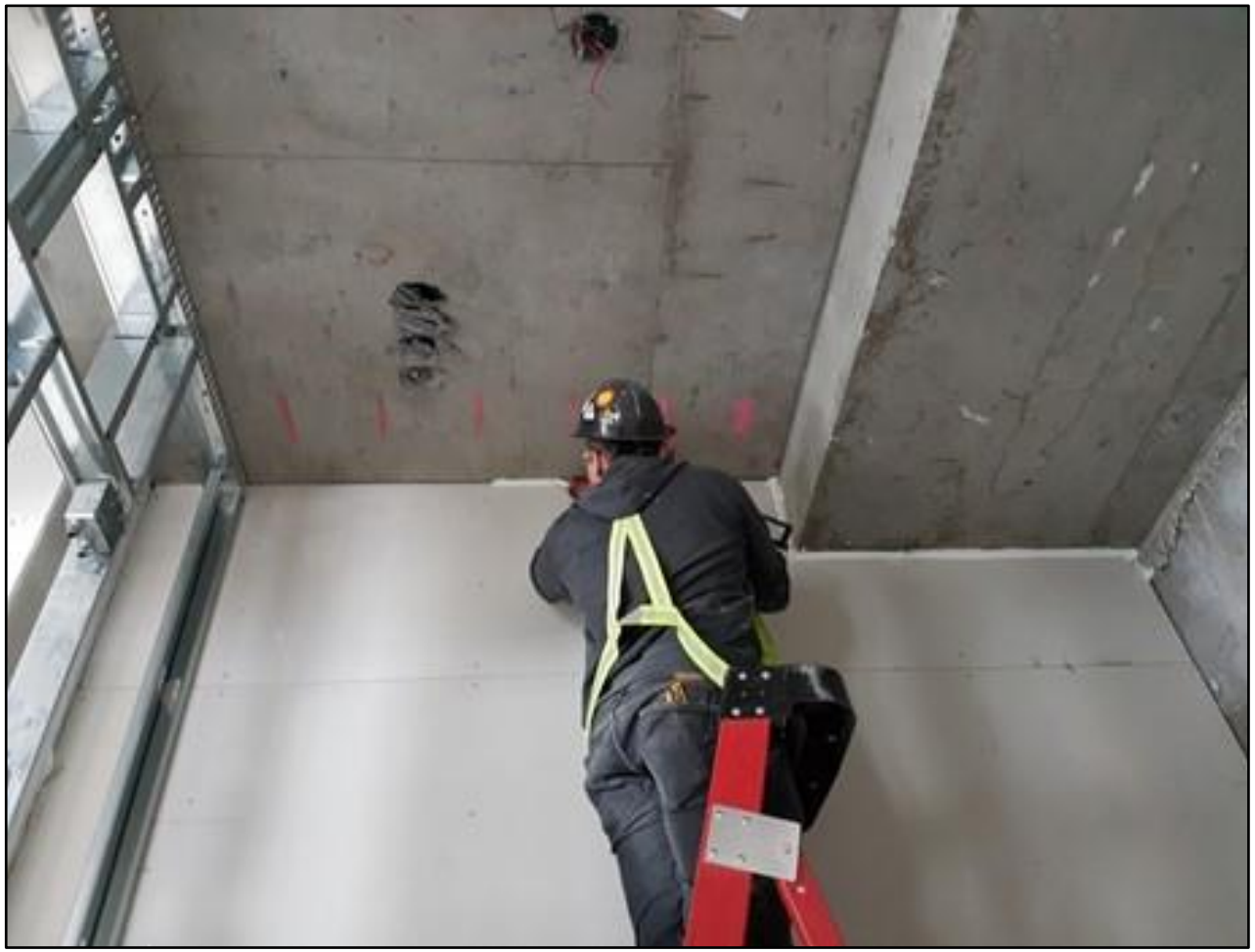
Professional Installations



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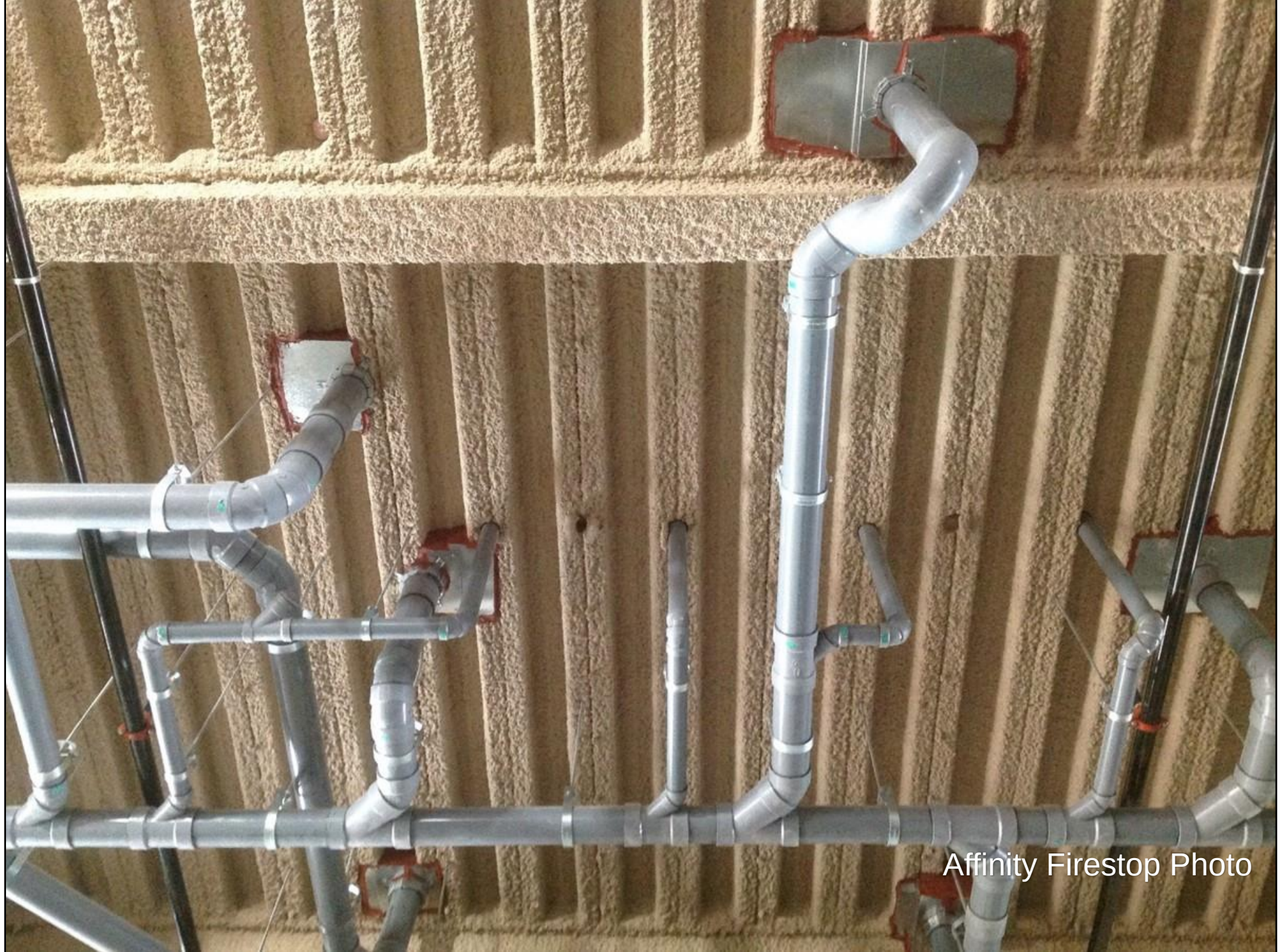

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Firestop Inspection Process

- Inspection Agency & Inspector
  - Independent
  - Hired after systems submitted, etc.
  - Hired by building owner and manager or representative
  - Scope of work directed by AA
  - AHJ approval

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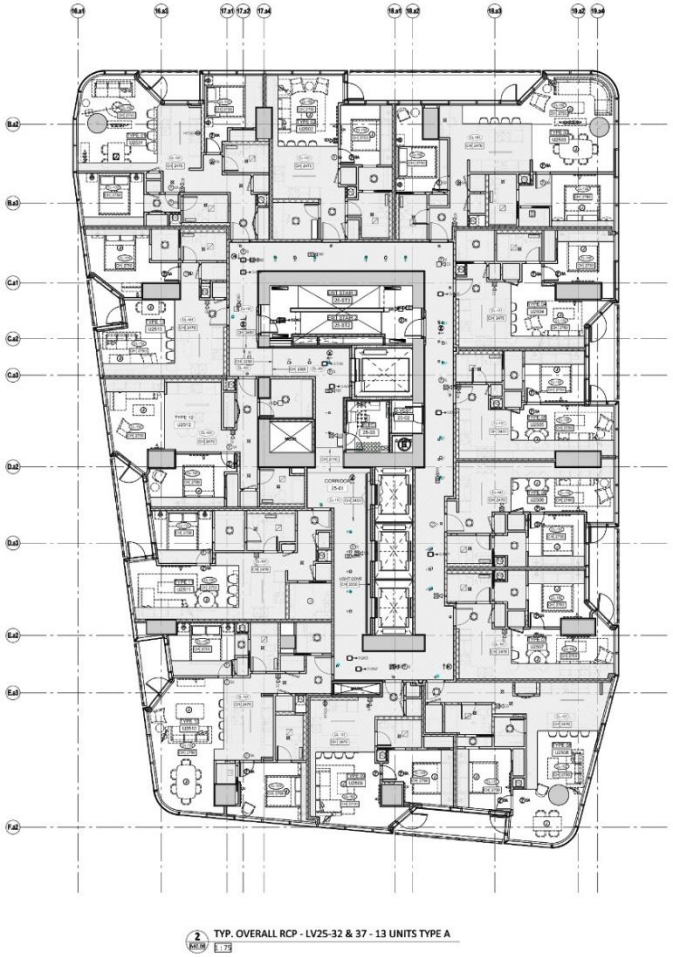
Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Pre-Construction Meeting
  - Review Documents
  - Identify Conflicts
  - Review Materials
    Systems
    - **CAN/ULC-S115, ASTM E814 or UL1479, FM 4990, ASTM E1966, UL 2079, ASTM E2307 Systems**



Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Inspection Documents
  - Specifications and Drawings
  - Manufacturer Product Data Sheets and Installation Instructions
  - Listed Systems and EJ's/EFRRA's

Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Pre-Construction Meeting
  - Mock Up Review
  - Observation or Destructive Review (Testing)
  - Inspection Type Methodology
    - Frequency of reviews
    - Description of reviews
    - Specification and drawings
- Meeting(s) are required
  - During and Post Inspection

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Inspection Schedule
  - Notifies Inspector
  - Inspections within 2 days
  - Inspector verifies installation
    - Is in accordance with Documents
    - Meets Manufacturers Installation Instructions

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Observation Reviews
  - **Performed during construction**
  - **Witnessed randomly of the installed systems on each floor**
  - **E2174 - 10%, each type** of Service Penetration Firestop System
    - **Type = By System, By Contractor**
  - **E2393 - 5% of Total Lineal Feet** for each type of Fire Resistance Rated Joint System
    - **Type = By System, By Contractor**

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Destructive Reviews (Testing)
  - Performed Post-Construction
  - E2174 - Minimum 2% , no less than 1, each type per 930 m^2 (10,000 SF) of floor area
    - **Type = By System, By Contractor**
  - E2393 - Minimum 1 / 152 LM (500 LF) of Joint Area, by type, mandatory; Exception mechanical joints
    - **Type = By System, By Contractor**

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Variances / Deviations
- ASTM E2174 & ASTM E2393
    - FS Contractor is notified of any deficiencies within one day
- IBC 1704.2.4
    - Work is in conformance to the documents
    - Otherwise it is immediately brought to the attention of the FS Contractor
    - If not corrected, AHJ and AA will be informed to take action

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Both Methods
  - If any type does not comply
    - Repair
    - Replace
    - 1 additional inspection
  - If 10% variance per firestop type
    - Inspection stops
    - Installer inspects, repairs
    - Inspector re-inspects
- Document all Deficiencies

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Inspectors shall
  - **Not supervise or direct FS Contractors**
  - Commence reviews at the start of FS installation
  - Review installation based on manufacturers and system requirements

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Firestop Inspection Process
ASTM E2174 - ASTM E2393

- Equipment –
  - Tapes
  - Tablets w/Systems
  - Borescope to explore areas that are concealed or partially
  - NOT MICROMETERS

Firestop Evaluation & Repairs

- Evaluations of Manufacturers Installation Instructions
  - Manufacturers instructions evaluating installed systems
  - Acceptable methods to review installed systems
  - Listed SYSTEM requirements for installations
  - ***IFC Document on Sealant Thickness Measurement***

Firestop Repairs

- Repairs
  - Instruction requirements by manufacturer
  - Listed systems
  - Patch/infilling
    - Adhesion
    - Movement
    - F, FT, FH, FTH, L, W Ratings
    - ***As recommended by MFR***

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Firestop Inspection Forms
Variance Notices

- Minimum one FS system for each type;
- ***(By Type of System, By Contractor)***
- ASTM E2174 and ASTM E2393 require reports to be submitted to AA one day after review
- **IBC requires IMMEDIATE NOTICE**
- Numbered – Controlled
- Required – During/post construction methods

Firestop Inspection Final Report
ASTM E2174 - ASTM E2393

- Project name and location
- Project team contact info
- Firestops reviewed (inspected)
  - Type and quantity
  - Verification method
  - Percentage of total deficiencies
- All documents submitted to AA

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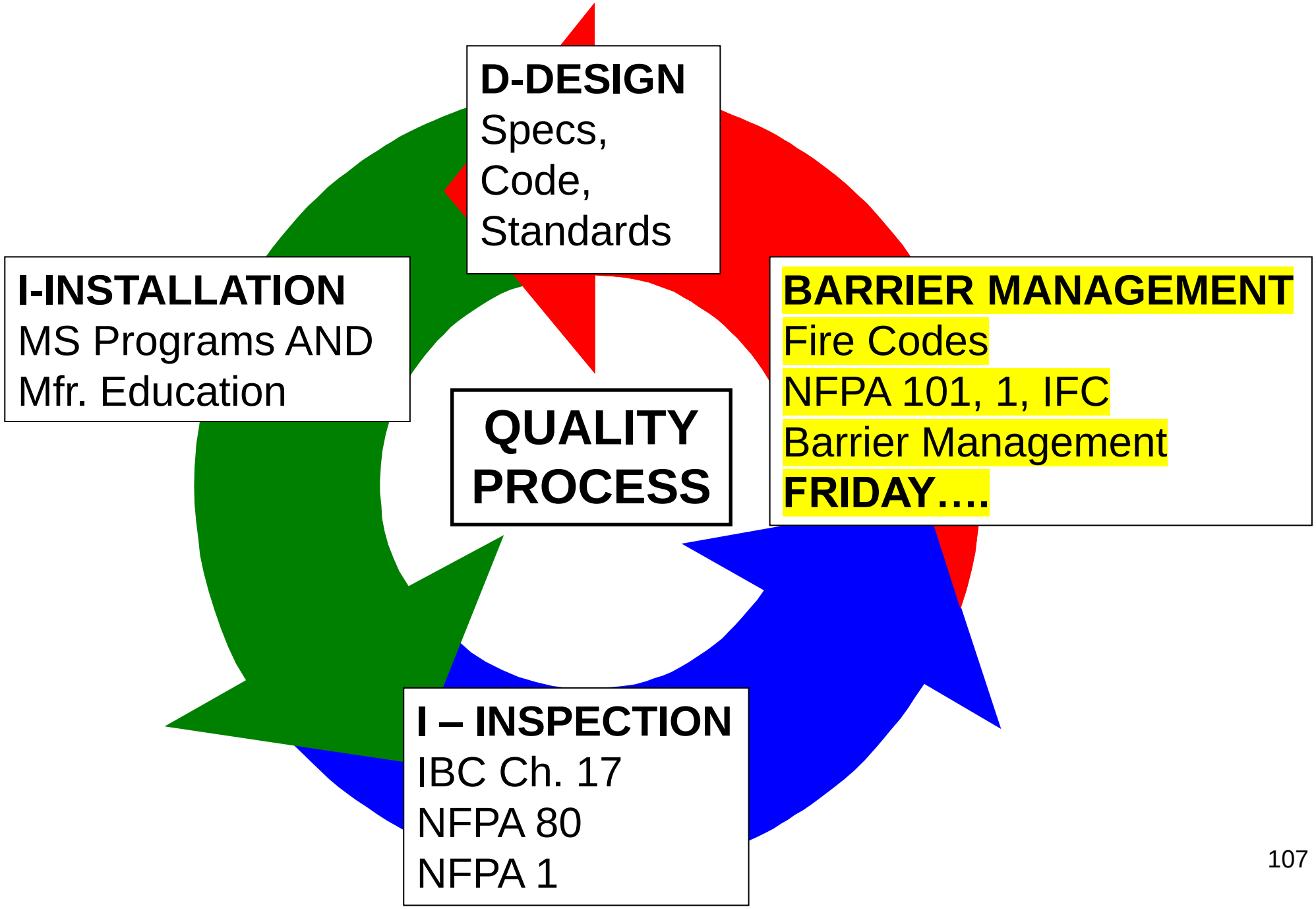
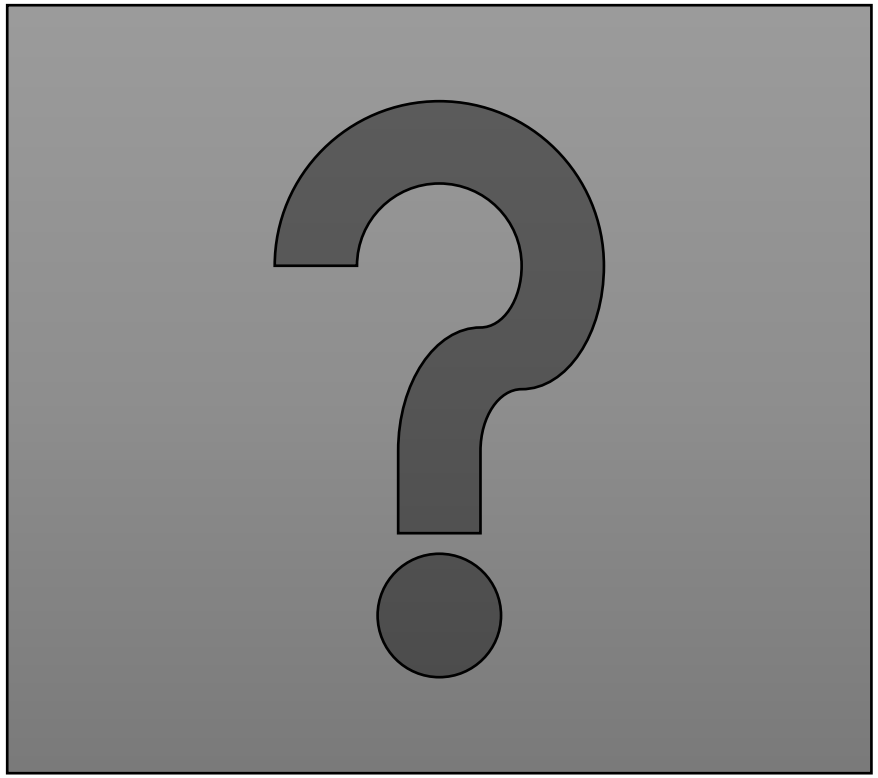
Firestop Special Inspection
ASTM E2174 - ASTM E2393

- Inspection Documents
  - Identify System, Materials
- Identification Systems (Labels)
  - Firestop Contractor Installed
  - Speeds System Evaluation


D-DESIGN
Specs,
Code,
Standards
I-INSTALLATION
MS Programs AND
Mfr. Education
BARRIER MANAGEMENT
Fire Codes
NFPA 101, 1, IFC
Barrier Management
FRIDAY….
QUALITY
PROCESS
I – INSPECTION
IBC Ch. 17
NFPA 80
NFPA 1

Questions??



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