FIRESTOPPING & EXISTING BUILDINGS

A CASE STUDY
Dennis J. Hall, FAIA, FCSI

- Design
- Specifications Consulting
- Building Diagnostic Consulting
- QA / Facility Conditions Assessment
- Legal Support
- Field Quality Control

Charlotte ▪ Dallas ▪ Orlando
FIRESTOPPING IN EXISTING BUILDINGS:
A Case Study

- Mixed-Use Center (retail, restaurants, parking structure & apartments)
- Off-Campus Student Apartments
- Urban High-Rise Office Tower
Mixed-Use Center
Retail, Restaurants, Parking Structure & Luxury Apartments

Constructed: 2012
Construction Type:
  Type 1-A  Concrete Podium
  Type III-A  Wood Frame
Fire Suppression: NFPA 13
Stories: 6 (80’-6”)
SQ FT: 214,412

Investigation: 2016 - present
Damage Claims: + $10M
Repairs: 80% Complete
Damage Claims

EXTERIOR

- Water Intrusion
- Window Installation
- Stucco Installation
  - drainage
  - thickness of stucco
  - substitution of specified materials
  - flashing installation
- Installation of WRB
- Roof Scupper
- Balcony Floor Cracks
- Vents in Exterior Walls
- Water Damage to Sheathing/Structural Members
- Fire Rating on Exterior Walls
  - fail to conform to UL design
  - fail to have proper fire rating
Damage Claims

INTERIORS

- Missing Gypsum Board on Rated Walls & Interstitial Spaces
- Missing Gypcrete on floor under tubs
- Structural Framing (shear walls)
- Firestopping
  - Podium Floor
  - Walls in Loading Dock/Trash Room
  - Floor/Ceiling Assembly (residential floors)
  - Dwelling Unit Separation Walls
- Fire Rated Doors
  - electrical rooms
  - mechanical rooms
  - data rooms
Architect’s Instruments of Services

1.1.5 THE DRAWINGS
The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

1.1.6 THE SPECIFICATIONS
The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.
Original Construction Documents gave details provided by Hilti for the firestopping of all penetrations.
PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Fire and hose stream on material: Meet requirements of ASTM E814-06 & UL 1479 for F Rating and T Rating by local code.
   2. Fire tests: Pass requirements when used in assembly tested in accord with ASTM E119-00a.
   3. Smoke and fuel contributed tests on firestopping materials: Meet requirements of ASTM E84-06; Flame Spread 25 or less, Smoke Developed 20.
   4. Tests for fire resistance of building joint systems: Meet requirements of UL 2079.

1.03 SUBMITTALS

A. Product Data:
   1. Submit complete schedule of rated penetrations, locations, and proposed rated materials to fill penetrations.
   2. Submit data for fire or smoke rated insulation; indicate complete installation instructions for maintaining ratings of wall or floor assemblies to meet code requirements.
   3. Manufacturer's instructions:
The purpose of the architect’s instruments of service is NOT to tell the contractor how to construct the building, but to convey design intent.

*The Architect’s Handbook of Professional Practice*
Design Intent is Like a Car Reservation
The Architect’s design intent establishes the performance requirements for the building, thereby ensuring the building is code compliant, safe, and meets the owner’s expectations. However, the important part of the Architect’s design intent is NOT just the conveying of design intent, but it is the holding of the design intent, through inspections and testing.

Dennis J. Hall, FAIA, FCSI
with a little help from Jerry Seinfeld
Firestopping Conditions

Firestopping
- Podium Slab
- Walls in Loading Dock/Trash Room
- Floor/Ceiling Assembly (residential floors)
- Dwelling Unit Separation Walls
Observation of the Podium Slab at Building 1 were performed by HALL March 15, 2018. The focus in this area is penetrations through the podium slab.
Podium: Slab Firestopping

PVC pipe penetration in podium slab. No fire stopping observed.
Podium: Slab Firestopping

PVC plumbing penetration, unit 1227 bathroom. No firestopping observed.
Podium: Slab Firestopping

Pipe penetration in podium slab, unit 1227 bathroom. No firestopping observed.
Podium: Slab Firestopping

Podium slab in bathroom of unit 1227 pipe penetration without firestop sealant.
Podium: Slab Firestopping

PVC pipe penetration through loading dock ceiling. No firestopping observed.
Two PVC pipes penetrating podium slab at loading dock ceiling. No firestopping observed.
Podium: Slab Firestopping

PVC plumbing penetration, in unit 1226 bathroom, through podium slab. No firestopping observed.
Observations of fire stopping in Building 1 Loading Dock were performed by HALL on March 15, 2018. The focus of this area was penetrations in ceiling and side walls of the loading dock area.
Podium: Loading Dock Firestopping

6 inch pipe penetration in rated wall in loading dock area. No fire stopping observed.
Podium: Loading Dock Firestopping

PVC pipe penetration in loading dock wall. No firestopping observed.
Podium: Loading Dock Firestopping

PVC pipe penetration through loading dock wall. No firestopping observed.
Podium: Loading Dock Firestopping

Multiple penetrations through the podium slab, and rated wall. No Firestopping observed.
Pipe penetration through wall in loading dock. No firestopping observed.
Podium: Loading Dock Firestopping

Pipe penetration in loading dock wall. Incorrectly installed firestop sealant.
Pipe penetration through wall in loading dock. No firestopping observed.
Observations of the Dwelling Units on Residential floors 3 through 6 were performed by HALL (insert dates). The two categories of observations performed include: (1) Floor/Ceiling assemblies and (2) Rated Walls. Floor/Ceiling assembly observations include penetrations from the following: (1) Tubs, (2) Sinks, (3) Electrical and (4) Washers. Rated Wall observations involve the electrical outlet boxes (J-Boxes).
Residential Firestopping

PVC plumbing pipe penetration, unit 1304 bathroom. No firestopping observed. Gypcrete missing from floor/ceiling assembly.
Residential Firestopping

PVC plumbing pipe penetration, unit 1407 bathroom. No firestopping observed. Gypcrete missing from floor/ceiling assembly.
Residential Firestopping

Electrical cable penetrations, unit 1407.
Residential Firestopping

PVC plumbing pipe penetration, unit 1521 bathroom. No firestopping observed. Gypcrete missing from floor/ceiling assembly.
Residential Firestopping

Penetrations through exterior closet ceilings. No Firestopping Observed
Residential Firestopping

PVC plumbing penetrations through load bearing walls. No Firestopping Observed.
Utility Room Firestopping
Utility Room Firestopping

Several pipe penetration in utility closet. No firestopping observed at floor penetration.
Utility Room Firestopping

PVC sleeve penetration in utility closet floor. No firestopping observed.
Utility Room Firestopping

Pipe penetration in utility room ceiling. No firestopping observed.
Floor penetration in utility room. No firestopping observed.
Utility Room Firestopping

PVC pipe penetration in wall at utility room. No firestopping observed.
Utility Room Firestopping

Conduit penetration in utility room ceiling. No firestopping observed.
Utility Room Firestopping

PVC pipe penetration in wall at utility closet. No firestopping observed.
Data cable bundle penetration in ceiling at utility room. Incorrect firestopping.
Utility Room Firestopping

Data bundle penetration in utility room closet. Incorrectly installed firestop sealant.
Utility Room Firestopping

Void in floor at utility closet. No firestopping.
Off-Campus Student Apartments

- Constructed: 2010
- Construction Type: V
- Fire Suppression: NFPA 13R
- Buildings: 2
  - Bldg. 1: 4 stories, 115,724 SF
  - Bldg. 2: 3 stories, 80,127 SF
- Investigation: 2016 - present
- Damage Claims: + $15M
- Repairs: None
Damage Claims

EXTERIOR

- Water Intrusion
- Window / Balcony Door Installation
- Brick Installation
- Fiber-Cement Siding
- Installation of WRB
- Roof Installation
- Breezeway
- Water Damage to Sheathing/Structural Members
- Firestopping
- Grading
Damage Claims

INTERIORS
- Fire Rating of Floor/Ceiling Assembly
  - fail to conform to UL design
Firestopping
Mold
Exterior Rated Wall Penetration
Exterior Rated Wall Penetration
Exterior Rated Wall Electrical Penetration
Exterior Rated Wall Electrical Box
Interior Rated Ceiling Penetration
Outlet Boxes in Tenant Separation Walls
Penetrations in Tenant Separation Wall
Penetration in Tenant Separation Wall
Floor Penetration between Dwelling Units
Dryer Vent Penetration in Rated Ceiling
Urban High-Rise Office Tower

Constructed: 1999
Construction Type:
   Type 1-A
Fire Suppression: NFPA 13
Stories: 47
SQ FT: 970,002

Investigation: 2016
Repairs: Complete, building sold
Urban High-Rise Office Tower
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Urban High-Rise Office Tower
Urban High-Rise Office Tower
Urban High-Rise Office Tower
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“You get what you **Inspect** not what you **Expect**!” Firestop inspections for both new construction and existing building are critical to protect the health, safety, and welfare of the public.

Inspection and testing reports are written confirmation of workmanship and compliance with building codes and industry standards.

Properly installed firestopping protects both people and property.

The industry should adopt regulations requirements and enforcement procedures for life safety requirements in existing buildings, include firestop maintenance.
Thank you for your time. Any Questions?