SPFA Attic and Crawlspace Fire Test Proposal

Problem Definition and Solution Development

ICC-ES Acceptance Criteria Hearing
June 3, 2009
Birmingham, AL

Rick Duncan
Technical Director, Spray Polyurethane Foam Alliance

Who is SPFA?

- Spray Polyurethane Foam Alliance
  - Founded in 1987 as Polyurethane Foam Contractors Division of the Society of the Plastics Industry (SPI)
  - Independent trade association for contractors, manufacturers and distributors of polyurethane foam, equipment, protective coatings, inspections, surface preparations and other services.
  - Maintains strong relationship with the American Chemistry Council (ACC) and the Center for Polyurethanes Industry (CPI)

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What does SPFA do?

- Education and Research
  - Accreditation and Education programs
  - Technical Literature and Guidelines
  - "Hotline" for Technical questions (1-800-523-6154)
  - Industry Research Programs
- Promotion and Awareness
  - Regulatory and Legislative Activities
  - Promotional and Marketing Tools
  - Website www.sprayfoam.org
  - Annual Spray Foam Conference and Exposition
  - *Spray Foam* Magazine
  - Directory and Buyers' Guide

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SPF and the International Codes

- Code Sections
  - Separate from ‘traditional’ insulations
  - IBC: Ch 26, Section 2603 Foam Plastic Insulation
  - IRC: Ch 3, R314 Foamed Plastic
- Code Focus
  - Fire Protection
  - Thermal Performance
  - Moisture Control

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Thermal Barriers

- Thermal Barrier Requirement

  [IBC 2603.4 / IRC R314.4]

  - Separates insulation from interior of building
  - Approved 15 minute thermal barrier
    - ½” gypsum wallboard is most commonly used
    - Others to be tested per ASTM E119 and/or full-scale fire tests
  - Exception to Thermal Barrier requirement in Attics and Crawlspaces with limited access for service of utilities

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Thermal Barrier Exceptions

- Attics and Crawl Spaces [IBC 2603.4.1.6 / IRC R314.5.3]
  - Entry is made for service of utilities
  - Ignition barrier is required separating attic/crawlspace space from foam
  - Thermal barrier required between attic/crawlspace and occupied space

courtesy Icynene

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Ignition Barrier Requirements

- Ignition Barrier [IBC 2603.4.1.6 / IRC R314.5.3]
  - Prescriptive ignition barriers include:
    - 1.5” mineral fiber insulation
    - 0.25” wood structural panels
    - 0.375” particleboard
    - 0.25” hardboard
    - 0.375” gypsum board
    - Corrosion-resistant steel having a base metal thickness of 0.016 “
  - Alternative Assemblies by Special Approval Testing

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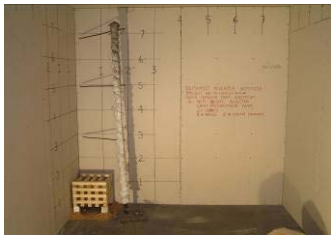
Alternative Assemblies

- Special Approval Tests [IBC 2603.9 / IRC R314.6]
  - NFPA 286 - Contribution of Wall and Ceiling Interior Finish to Room Fire Growth (with the acceptance criteria of Section 803.2/R315.4)
  - FM 4880 - Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, and Exterior Wall Systems
  - UL 1040 - Safety Fire Test of Insulated Wall Construction
  - UL 1715 – Fire test of interior finish material
  - ***End-use fire tests***

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End-Use Fire Testing

- Special Approval for Foam In Attics and Crawlspaces
  - ICC-ES has issued ESRs for this application
    - Qualifies assembly with foam alone or foam with intumescent coating
    - SwRI 99-02 test is used as a comparative test

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Problem Definition

- Some tests performed using improper baseline
  - SwRI 99-02 test performed with asphalt-kraft faced fiberglass
    - Flammable facing towards inside of test module
    - Not a prescriptive ignition barrier
    - Not a code-compliant configuration
    - Against manufacturer installation instructions

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Problem Definition

- Improper baseline brought to attention of industry
  - Meeting between ICC-ES staff and SPFA in Jan 2008
    - ICC-ES requested that industry resolve the issue
    - SPFA proposed interim ‘3/12’ solution effective 6/1/08 to 6/1/09 which was accepted by ICC-ES last year
    - During this interim period, SPFA agreed to develop new test procedure to qualify alternative ignition barrier systems for consideration at this June 2009 hearing

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Industry Solution

- SPFA created an industry-wide task force to address the issue
  - Task force members
    - Open to all SPFA members
    - 43 individual members representing 24 member companies
      - 15 foam supplier companies
      - 3 coating supplier companies
      - Balance contractors, distributors, raw material suppliers and industry consultants
    - SPFA to lead development team to create a new test procedure to qualify alternative ignition barrier systems by 6/1/09

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Industry Solution

$150k Sponsorship from 16 supplier companies and two industry groups

Tier I – Supplier Sponsors

BASF The Chemical Company

BaySystems

BioBased Insulation

CertainTeed
Quality made certain. Satisfaction guaranteed.™

Demilec (USA) LLC.®

Dow

FOAMETIX®
"OUR FOAM IS GREEN"
Burtin Polymer Laboratories

Honeywell

HUNTSMAN
Enriching lives through innovation

ICYNENE INC.

LAPOLLA

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RTC Henry

Tier II – Supplier Sponsors

ALDO Products Company, Inc.

Flame Control Coatings, LLC

PSI
PREFERRED SOLUTIONS, INC.

Industry Association Sponsors

Spray Polyurethane Foam Alliance
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American Chemistry Council℠
Center for the Polyurethanes Industry

Spray Polyurethane Foam Alliance
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Industry Solution

- Highlights of Task Force Program
  - INITIAL MEETING - January 2008
    - Discuss issue
    - Ideas collected for interim solution
  - INTERIM SOLUTION - April/May 2008
    - Proposed interim '3/12' solution for AC-377 Appendix B – (Valid from June 1, 2008 to June 1, 2009)
    - Submitted as comments to Dow proposal during June 2008 hearing process and subsequently accepted by ICC-ES on May 28, 2008.

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Industry Solution

- Highlights of Task Force Program (continued)
  - DISCUSSION OF LONG-TERM OPTIONS - June/July 2008
    - Task force met with SwRI Staff on June 4 and discussed types of tests practical for long-term solution including
      - small-scale: such as cone calorimeter
      - medium scale: room corner tests
      - large-scale: mock-up of unvented attic
    - Hired Mr. Jess Beitel of Hughes Associates as fire testing consultant
    - With consultant input, task force agreed that small-scale tests not be suitable and large-scale tests would take considerable resources and time to develop and may not be repeatable.
    - Medium-scale room-corner test option was chosen

Industry Solution

- Highlights of Task Force Program (continued)
  - SELECTION OF TEST METHOD - August/September 2008
    - Proposed use of a modified room corner burn test (NFPA 286)
    - Development work to be done at SwRI
  - EVALUATION OF TEST PROCEDURE - October 2008 / January 2009
    - Phase I – Exploratory
    - Phase II – Refinement
    - Phase III – Validation (plywood baseline results)
  - DOCUMENTATION PACKAGE - February/March 2009
    - Test procedure document - Appendix X
    - Modifications to AC-377

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Project Timeline

2008								
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP

TASK FORCE FORMED	COLLECTION AND REVIEW OF EXISTING TEST DATA	INTERIM SOLUTION DEVELOPMENT	LONG-TERM SOLUTION DISCUSSED	TEST METHOD PROPOSED	LAB EVALUATION
Discussed attic and crawlspace testing issues Agreed to address as an industry under SPFA leadership	Individual suppliers with ESRs reviewed SwRI 99-02 data Statistical evaluation to develop 3/12 criteria Average flame out door + 3 SD = 3 mins Average burn through floor + 3SD = 12 minutes	Proposed interim '3/12' criteria for AC-377 Appendix B Valid from June 1, 2008 to June 1, 2009 Submitted as comments during June 2008 hearing process Accepted by ICC-ES on May 28, 2008.	Small-scale test (cone-calorimeter) to qualify IBs Large-scale test to demonstrate performance Medium-scale room corner tests most repeatable	Repeatable test protocol similar to existing test methods Room corner burn test was determined to be best approach Selected NFPA 286 as a starting point	Evaluated several fire test labs Selected SwRI

2008			2009					
OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN

INDUSTRY MEMBER FUNDING	PHASE I RANGE-FINDING	PHASE II REFINEMENT	PHASE III VALIDATION	PROPOSAL DEVELOPMENT	PROPOSAL REFINEMENT
Solicited support from SPFA supplier members $150k goal met by 16 supplier members, SPFA and CPI	Phase I – Exploratory Studies: Tested four modules with prescriptive IB (¼" plywood) and alternative IB (intumescent coating) on both LD and MD foams to determine optimal burner regime. Phase II – Refinement Studies; Repeated testing ion four modules using selected burner regime Phase III – Validation Studies: Tested four modules to develop plywood baseline. Agreed on 4:18 criteria			Test procedure written and AC-377 updated Approved by 14-1 majority CPI review Submitted to ICC-ES	Responded to questions from ICC-ES Reviewed program with other members of foamed plastics industry Obtained endorsement from CPI Rigid Foam Committee, PIMA, XPSA and EPSMA