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)
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](http://www.sprayfoam.org)
  – Annual Spray Foam Conference and Exposition
  – *Spray Foam* Magazine
  – Directory and Buyers' Guide
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
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 Crawlspace with limited access for service of utilities
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
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
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*
End-Use Fire Testing

• Special Approval for Foam In Attics and Crawlspace
  – 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
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
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
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
### Industry Solution

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

#### Tier I – Supplier Sponsors

<table>
<thead>
<tr>
<th>Company Name</th>
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<td>BaySystems</td>
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<td>Foametix &quot;OUR FOAM IS GREEN&quot;</td>
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#### Tier II – Supplier Sponsors

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<td>Flame Control Coatings, LLC</td>
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<tr>
<td>Preferred Solutions, Inc</td>
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#### Industry Association Sponsors

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<td>SPFA</td>
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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.
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
### Project Timeline

#### 2008

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<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
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<tr>
<td><strong>TASK FORCE FORMED</strong></td>
<td><strong>COLLECTION AND REVIEW OF EXISTING TEST DATA</strong></td>
<td><strong>INTERIM SOLUTION DEVELOPMENT</strong></td>
<td><strong>LONG-TERM SOLUTION DISCUSSED</strong></td>
<td><strong>TEST METHOD PROPOSED</strong></td>
<td><strong>LAB EVALUATION</strong></td>
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<tr>
<td>Discussed attic and crawlspace testing issues</td>
<td>Individual suppliers with ESRs reviewed SwRI 99-02 data</td>
<td>Proposed interim ‘3/12’ criteria for AC-377 Appendix B Valid from June 1, 2008 to June 1, 2009</td>
<td>Small-scale test (cone-calorimeter) to qualify IBs</td>
<td>Repeatable test protocol similar to existing test methods</td>
<td>Evaluated several fire test labs, Selected SwRI</td>
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<td>Agreed to address as an industry under SPFA leadership</td>
<td>Statistical evaluation to develop 3/12 criteria</td>
<td>Submitted as comments during June 2008 hearing process</td>
<td>Large-scale test to demonstrate performance</td>
<td>Room corner burn test was determined to be best approach</td>
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<td>Average flame out door + 3 SD = 3 mins</td>
<td>Accepted by ICC-ES on May 28, 2008.</td>
<td>Medium-scale room corner tests most repeatable</td>
<td>Selected NFPA 286 as a starting point</td>
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<td>Average burn through floor + 3SD = 12 minutes</td>
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<tr>
<td><strong>INDUSTRY MEMBER FUNDING</strong></td>
<td><strong>PHASE I RANGE-FINDING</strong></td>
<td><strong>PHASE II REFINEMENT</strong></td>
<td><strong>PHASE III VALIDATION</strong></td>
<td><strong>PROPOSAL DEVELOPMENT</strong></td>
<td><strong>PROPOSAL REFINEMENT</strong></td>
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<td>Solicited support from SPFA supplier members</td>
<td>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.</td>
<td></td>
<td>Test procedure written and AC-377 updated</td>
<td>Responded to questions from ICC-ES</td>
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<td>$150k goal met by 16 supplier members, SPFA and CPI</td>
<td>Phase II – Refinement Studies; Repeated testing ion four modules using selected burner regime</td>
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<td>Approved by 14-1 majority</td>
<td>Reviewed program with other members of foamed plastics industry</td>
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<td>Phase III – Validation Studies: Tested four modules to develop plywood baseline. Agreed on 4:18 criteria</td>
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<td>CPI review</td>
<td>Obtained endorsement from CPI Rigid Foam Committee, PIMA, XPSA and EPSMA</td>
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