



THE ADHESIVE AND SEALANT COUNCIL, INC.

October 19, 2008

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U.S. Department of Housing and Urban Development
Office of Policy Development and Research, Room 8134
451 Seventh Street, SW
Washington, DC 20410

SUBJECT: Progress Report for September 2008

Contract No. H-21521CA, Investigation of Adhesive Applications for Strong and More Disaster-Resistant Roof Assemblies – Phase 1

Period of Performance: 4/7/06 – 11/28/08

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SECTION I – INTRODUCTION

The HUD Office of Policy Development and Research has been extensively involved in supporting research and development on building technology innovations, construction systems, products, standards, regulations, and code issues which affect the affordability, safety and livability of the nation's housing. As the interrelationships of these topics become more complex, the continued need to conduct research and demonstrations becomes even more critical.

In addition to the research and demonstration efforts administered directly by the Office of Policy Development and Research, HUD administers the Partnership for Advancing Technology in Housing (PATH) program. PATH provides private and public sectors for the U.S. housing industry an unprecedented opportunity to advance state of the art practices in the design and construction of affordable housing for the public by accelerating the process of developing and introducing new and innovative technologies and new materials through demonstrations and pilot projects throughout the nation.

This cooperative agreement with the PATH program will investigate and characterize the use of adhesives to fasten roof sheathing materials to underlying roof structures in residential buildings. This application of adhesives holds the potential for improvements in roof system durability and disaster resistance, and applies to both new and existing construction.

SECTION II – PROGRESS AND SCHEDULE

Phase 1 of this project consists of 4 tasks. The status of each task is presented below.

Task 1. Assess Performance Requirements and Develop Criteria for Adhesive Consideration

Completed

The results of these research efforts are presented in the Task 1 summary report submitted to HUD in August 2006.

Task 2: Assessment of Industry and Market Factors

Completed

In March 2007, a summary report title “Insurance Incentives for Wind Mitigation Measures” was submitted.

As a second part of this task, we have assessed jobsite factors which need to be considered for the successful use of adhesives in both new and retrofit applications. A summary of jobsite factors was submitted in the monthly report dated April 19, 2007.

Task 3: Code Evaluation and Preliminary Tests

Phase I Testing - Completed

Task 3 Deliverables:

- Summary of preliminary testing
- Summary of relevant code issues and strategies for compliance

Testing activities are laid out in Phase I and Phase II activities below. Phase I activities allow us to better understand the application and potential market segments where it would provide the most value for housing durability. Phase II testing needs, which are subject to additional project funding by HUD, will provide more complete technical performance data, which will enhance the likelihood of integrating this application into regulatory and insurance programs.

Phase I Testing & Evaluation

1. Field Trial of Applying Adhesives in Site Built Single-Family Housing - Completed

- Summary of field trial for new construction was submitted August 2007 to HUD.

- As an addition to this subtask, we conducted a case study on the use of adhesives in a retrofit project. In April 2008, Newport Partners conducted a case-study in Florida with a commercial provider of a spray-applied spray foam system. A case study report was submitted to HUD in May 2008.
2. Explore potential applications in the factory-built housing segment - **Completed**
 - Conduct in-house factory assessment using adhesives in roof systems, and assess performance enhancements (e.g. reduced damage during transport) and product implications.
 - In 2007, Newport Partners met with a modular home builder at their production facility in Pennsylvania. The meeting summary was provided in the monthly report dated July, 18, 2007.
 3. Research of traditional construction techniques - **Completed**
 - Conduct background research and preliminary field testing as deemed necessary on the reliability of typical roof deck installations (e.g. nail misses, adherence to spacing requirements)
 - The findings are summarized in the May 2008 monthly report.
 4. Demonstration of enhanced roof systems using adhesives - **Ongoing**
 - We are planning to conduct this demonstration project in October 2008. The builder is interested in using a tape adhesive system on a trial basis to adhere wood sheathing roof decking to the roof framing in a new residential construction project. This field trial would address the application of tape adhesives to the roof truss-sheathing connection in Maryland. The field trial would gather information on the process of roofing a new home when applying tape adhesives (in addition to traditional nailing) to the roof trusses. The adhesive will be applied to a portion of the structure to help compare the roofing process when applying adhesives to when not applying adhesives. Information on the application process, constructability issues, impacts on other building systems, and stakeholder perceptions will be gathered by documenting the construction process and conducting pre- and post-interviews with the construction crew.

Phase II Testing (Subject to Additional HUD Funding in Phase II)

5. Examine one or more of the following technical performance issues. Funding levels and manufacturer input will help form final priorities:
 - Long-term performance of adhesives in an attic environment. What are the impacts on uplift resistance from temperature and humidity cycling?
 - Long-term performance of mechanical (nail) fasteners in an attic environment. What are the long-term issues with connection strength and nail withdrawal?
 - Effectiveness of adhesives as a redundant system to make up for inconsistent fastener application. How effective are adhesives, used in either new or existing construction, in mitigating the reduction in uplift strength caused by nail misses or other shortcomings of standard installations?

- Improved tooling for retrofit installations. Explore tooling solutions that allow installation of adhesives all the way out to the edges of the roof?
- Investigation of adhesives applied at roof deck seams for waterproofing as well as improved uplift. Is there a minimum deck thickness required to prevent warping of deck panels as moisture content of framing and panels equilibrates? What happens to seam-applied adhesives when the adjacent wood becomes saturated?

Task 4: Analysis and Outreach

Complete by November 1, 2008 (per project extension)

The objectives of this task are to:

- Develop a primer on using adhesives to strengthen roof systems for home owners (retrofit applications). Primer was submitted to HUD in August 2008. - **Completed**
- Summarize, based on results of Task 3, current “gaps” in adhesive-based roof sheathing attachment systems in three core areas: 1) performance testing, 2) codes, and 3) solutions to constructability issues. – **Draft Underway**

Deliverables:

- Primer on using adhesives to strengthen roof systems
- Report on findings and remaining information gaps

Task 4 Progress:

We are also finishing preliminary background research on the long-term performance of roof deck-to-roof framing connections in attic environments, to determine what data exists on nails-only or adhesive connections. A draft of this document is being submitted with this monthly report.

A conference call with ASC manufacturer consortia members was held on September 24, at 11 a.m. Eastern. During this call we updated the group on the Primer and discussed potential follow-up activities if a Phase 2 for the project is feasible. The group was interested in future research, especially quantifying the potential strength increases provided by tape and caulk adhesives. The group also discussed the potential for in-field application errors that could reduce the effectiveness of adhesives.

Newport is planning on attending ASC’s Convention and Expo in October. This event will provide a good opportunity to meet industry leaders and discover the direction of research. In particular, Newport staff will attend one or two educational sessions related to the use of adhesives in residential building systems.

SECTION III – PLANNED EFFORT

Activity for October 2008 will include planning and conducting a field trial of tape-based adhesives for new residential construction in Maryland and submitting a draft of the background research document. We will also commence work on the final Task 4 deliverable – a summary of codes, testing, and constructability gaps with the adhesives application for residential roof systems.