



THE ADHESIVE AND SEALANT COUNCIL, INC.

June 16, 2006

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Office of Policy Development and Research, Room 8134  
451 Seventh Street, SW  
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SUBJECT: Progress Report – June 2006

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

Period of Performance: 6/1/06 – 6/30/06

Contractor: The Adhesive and Sealant Council, Inc.  
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Email Attachments which Accompany this Report:

- None

## **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 as identified in the project Work Plan. The status of each task is presented below.

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

Start Date: 04/15/06

Deliverable & Due Date: Matrix identifying code-approved systems and uplift resistance or wind speed approved rating for new and retrofit roof sheathing fastening systems - 08/07/06

Progress and Deliverables:

The primary objective of Task 1 is determining what criteria will be used to identify adhesives which could be used as a roof sheathing fastening system for new and retrofit applications. The main emphasis will be on the structural performance needed to hold down roof sheathing products using adhesives alone or in combination with mechanical fasteners.

In June we continued our efforts to engage ASC members, non-member adhesive manufacturers, and other organizations to learn about similar work which has used adhesives in applications similar to the roof sheathing-to-roof framing focus of this project. The objective of this research is to learn of product specifications for related adhesive applications, related product standards, and related testing standards. Specific activities conducted under this task in June included:

- Conducting an initial conference call with ASC members and other adhesive manufacturers (summary submitted to GTR June 15)
- Performing follow-up research with numerous groups including universities (Arizona State, San Diego State, Clemson, Oregon State, Texas A&M, Virginia Tech, Washington State); research and testing organizations (Factory Mutual Research Corporation, UL, NRC Canada, Architectural Testing Inc.); and trade groups (NRCA, Roofing Consultants Institute, Institute for Business and Home Safety, Roofing Industry Committee on Weather Issues)

The project has generally been met with strong interest. While the collection of directly related data has been somewhat limited to this point, we have been able to identify several related efforts:

- Clemson retrofit study (AFG-01 compliant adhesive applied between rafter/truss and sheathing). We were also told that Clemson looked at new construction applications for adhesives and will research this further.

- NSF-PATH testing of tape-applied adhesive for attachment of shear walls (Washington State University and VA Tech)
- Use of spray-applied foam seal (ITW Foam Seal) and its testing by Blue Sky Foundation of N.C. We just learned of this work and need to acquire more information.

In July we will continue to reach out to these groups as well as additional information sources that we are learning about.

From our research thus far, we are getting a sense of key factors and considerations that will affect the use of adhesives for attaching sheathing to trusses or rafters in residential roof systems. Examples include:

- Environmental conditions: how will exposure to heat, humidity, and UV influence degradation of the adhesive over time?
- Application conditions: cleanliness of surfaces, ambient temperature, ambient humidity, time between adhesive application and setting the sheathing, need to apply some force to sheathing (e.g., with mechanical fasteners) so that it sets into adhesive, ability to access underside of roof deck (especially out by the eaves)
- Physical considerations: How to slide the 4 x 8 sheathing on top of the adhesive without removing adhesive from the top of the framing member? How to get sheathing into H-clips without pushing adhesive off the top of the framing member? How long until adhesive bond is set? How long until it is set enough for people to walk on the sheathing? What are the limitations on the types of surfaces and materials that can be used? Will a particular adhesive work for OSB of all types, plywood, dimension lumber, engineered lumber? Concerns about impacts on roof deck's ability to expand/contract with varying moisture levels.
- Performance during fire events: How will adhesive-based systems perform during a fire?
- Retrofit and re-roofing: Adhesive bonded sheets of sheathing may need to be replaced at some point if they are damaged. Removal of such sheets could be quite difficult due to the bond created at the perimeter of the sheet.

Based on factors of this nature and what we learn from related efforts, at the conclusion of Task 1 we will develop a summary of related applications research. This summary will include an overview of previously tested systems and materials, conclusions from this work, and the implications for this research project. Based on this summary we may recommend a refined focus for this project moving forward.

## **Task 2. Data Collection**

Start Date: 07/15/06

Deliverable & Due Date: Matrix of adhesives with potential to be implemented as a primary or secondary roof sheathing fastening system - 01/08/07

Progress and Deliverables:

Within Task 2, Newport Partners staff will compile information on adhesives used for similar or relevant applications to roof sheathing fastening. This task will involve engaging the ASC membership to review products against the performance criteria identified in Task 1, as well as a scan of research literature, trade press, and manufacturer product data. The output will be a matrix of adhesives with potential to be implemented as a primary or secondary roof sheathing fastening system, as identified by third party sources or manufacturer data. This adhesive matrix will include properties such as: primary fastener potential, secondary fastener potential, field applicable, product rating translates easily to code requirements, etc.

There is no progress to report under Task 2 for June 2006.

**Task 3. Cost Analysis**

Start Date: 11/15/06

Deliverable & Due Date: Summary of basic cost estimates – 02/26/07

Progress and Deliverables:

The marketability of any adhesive roof sheathing fastening system identified within this Task 2 will depend heavily on its initial and installed costs. Task 3 will involve analysis of the costs of using adhesives and identify the benefits for new and retrofit applications.

There is no progress to report under Task 3 for June 2006.

**Task 4. Preliminary Testing of Adhesive Roof Sheathing Fastening Systems**

Start Date: 11/15/06

Deliverable & Due Date: Summary of basic cost estimates – 02/26/07

Progress and Deliverables:

For any innovative building material or system to gain market acceptance and code or standard approval, testing and verification must be performed. From those adhesive systems that have been identified as having the potential to meet or exceed code requirements while presenting an affordable alternative to current practice, a sample set will be chosen to undergo preliminary testing. The primary function of these preliminary tests will be to evaluate the product's performance and determine whether the adhesive system should be further evaluated for inclusion in code or development of a standard.

There was no activity for Task 4 during June, although several of the groups we have spoken with as part of our research have expressed an interest in performing testing.

**SECTION III – OUT OF TOWN TRAVEL AND FUNDING**

***Travel:***

In June 2006 no out of town travel occurred. No out of town travel is expected for June.

We have made preliminary arrangements to attend the ASC Fall Convention in Nashville on October 15-18, 2006. We are also planning to provide a short presentation about the project at the convention, and will consider holding a project meeting there as well to engage participating manufacturers. One or two Newport staff will attend the convention and the associated project meeting, along with ASC staff.