



# University of Florida

## Residential Roof Covering Investigation of Wind Resistance of Asphalt Shingles



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Prevent, Protect, Respond, Recover

### Homeland Security Challenge:

The research represents a priority area for the National Windstorm Impact Reduction Program which aims to decrease the loss of life and property due to windstorms through R&D on weather phenomena and mitigation techniques. There is an important need to conduct scientific and engineering based research leading to mitigation techniques that will decrease the amount of damage caused by windstorms. Roof coverings represent the single most critical line of defense against property damage from high winds and rain. Although the performance of asphalt shingles has been addressed in recent code modifications, the issue of acceptable performance is far from resolved. At present, a substantive, documented correlation between standard testing procedures and actual hurricane conditions does not exist for aged roofing systems.

### Research Project Solution:

The objective of this research project is to investigate the performance of asphalt roof shingles exposed to windstorm conditions to improve building codes and standards for coastal residential structures. The research will compare the wind resistance of new and aged asphalt shingles, and will evaluate the influence of edge attachments and fastener schedules on the wind resistance of shingles. A phased development effort will be implemented. Phase 1 of the research will establish the framework for this investigation that will include formation of an advisory board, the initial design and development of a wind load simulation system, experimentation to quantify the effects of heat exposure on the mechanical uplift resistance of shingles, the collection and construction of test structures of existing and new roof systems, and establishment of a public information resource on shingle roof systems.

### National Implications:

Results of this research should enhance the design and construction of more resilient and sustainable residential infrastructure. Each year, severe winds from hurricanes, tornadoes, and thunderstorms damage or destroy thousands of homes and businesses, harm vital infrastructure, and, most importantly, threaten human life. Moreover, damages from storms are projected to increase as a greater number of Americans move to coastal areas. Ultimately, the results of this research will help improve the safety of Americans by increasing protection from wind hazards.



Aged specimens of asphalt shingles will be taken from flood damaged homes. Complete panels will be removed for testing at the University of Florida (UF) and at the Institute for Business & Home Safety (IBHS). Collection of these specimens will help provide insight on wind resistance of naturally aged shingles.



Full scale simulation will be done at the Institute for Business & Home Safety (IBHS) Research Center. Project will construct up to 30 ft by 40 ft full-scale shingle roof systems for testing, including roof features such as roof penetrations and flashing details. Constructs will be subjected to turbulent 70 ft by 30 ft wind and rain field.

[www.serri.org](http://www.serri.org)

**For More Information on SERRI, contact;**

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SERRI is managed by the Department of Energy's Oak Ridge National Laboratory for the U.S. Department of Homeland Security