

Scope of Work

Tile Roof Underlayment Performance in Extreme Wind Events

Florida Department of Business and Professional Regulation

Florida Building Commission

And

Laboratory for Wind Engineering Research (LWER), Extreme Events Institute (EEI)

Florida International University (FIU)

Project Lead: Ioannis Zisis

1. Introduction

Tile roof systems are commonly used in various regions, including high velocity hurricane zones (HVHZs) such as Miami-Dade and Broward Counties in Florida. During extreme wind events, roof tiles are susceptible to being pulled out of the roof, leaving underlayment sheeting to convert from a secondary water barrier to the main and only defense against water intrusion. In such cases, underlayment sheeting resistance to uplift forces from wind will be a key in minimizing potential extensive property interior damages and the displacement of buildings' occupants in the event of a roof covering failure. Moreover, the tile-underlayment-sheathing system needs to be examined as a whole and be evaluated for scenarios like those described in current building codes (i.e. HVHZ).

Hence, it is proposed to initiate an experimental campaign that aims to address this challenge by conducting full-scale wind tunnel tests at FIU's Wall of Wind (WOW) Experimental Facility to examine the vulnerability of the underlayment materials under hurricane wind conditions and provide recommendations for enhancing standards.

The proposed work includes the experimental setup of full-scale roof models at WOW, underlayment testing and failure assessments, analyzing the collected data, and developing recommendations for stakeholders. The expected results include the identification of resilient underlayment materials, quantification of uplift pressures, insights into failure modes, and recommendations for standard enhancements. Ultimately, this research aims to contribute to safer and more resilient built environments in hurricane-prone areas.

2. Scope of Work

TBD

3. Staffing

Personnel

PI: Ioannis Zisis, Associate Professor, CEE, Florida International University, USA

Graduate Student: TBD, Florida International University, USA

4. Method of Payment

A purchase order will be issued to the Florida International University. This project shall start on date of execution of the purchase order and end at the midnight on **TBD**. This purchase order shall not exceed **TBD** and shall cover all costs for labor, materials and overhead. Payment will be made for the study after the Program Manager and the Florida Building Commission's Hurricane Research Advisory Committee have approved the final report. Additionally, the Contractor agrees to provide additional documentation requested by the Program Manager to satisfy all payment and audit requirements.

5. Deliverables

- a. An interim report shall be prepared and delivered no later than **TBD**. The interim report shall contain the deliverables of Task **TBD** and any preliminary findings from Task **TBD**; i.e. a detailed description of the testing protocols and model parameters adopted in the WOW-EF tests. In addition, the interim report shall be formally presented to the Florida Building Commission's Hurricane Research Advisory Committee at a time agreed to by the Contractor and Department's Program Manager. The due date may be extended with the approval of the Department of Business and Professional Regulation's ("Department") Program Manager.
- b. A final report shall be prepared and delivered no later than **TBD**. The final report shall contain deliverables of the first **TBD** Tasks as discussed in Section 2. The final report shall be formally presented to the Commission's Hurricane Research Advisory Committee at a time agreed to by the Contractor and Department's Program Manager. The due date may be extended with the approval of the Department of Business and Professional Regulation's ("Department") Program Manager.

6. Financial Consequences

FIU LWER/EEI is solely responsible for the satisfactory performance of the tasks and completion of the deliverables as described in this Scope of Work. Failure to complete the tasks and deliverables in the time and manner specified in Sections 2 and 5, shall result in a non-payment of invoice until corrective action is completed as prescribed by the program or contract manager.

7. Program Manager

The Program Manager for this project is Mo Madani. Mo Madani's email address is Mo.Madani@myfloridalicense.com and his phone number is 850-717-1825.