

Scope of Work

An Experimental Testing Approach for Understanding and Mitigating Wind-Driven Rain (WDR) Intrusion through Tracks of Sliding Glass Door Systems during Hurricanes

1. Introduction

“The Florida Building Commission shall perform a study on standards to prevent water intrusion through the tracks of sliding glass doors, including the consideration of devices designed to further prevent such water intrusion. By December 1, 2024, the Florida Building Commission must provide a written report of its recommendations to the Governor, the President of the Senate, the Speaker of the House of Representatives, and the chairs of the legislative appropriations committees and appropriate substantive committees with jurisdiction over chapter 718, Florida Statutes.”

Past hurricanes have shown that sliding glass door systems can experience wind-driven rain (WDR) intrusion. Water intrusion through sliding glass door systems can cause damage to interiors and belongings. It can also lead to health risks from mold and mildew. A few mitigation strategies have been proposed in the literature, but their effectiveness against water intrusion remains unclear and depends on the (1) duration of the storm and rain intensity, (2) water intrusion paths, and (3) driving wind pressures against the sliding glass door system.

Although the current market has some devices that can protect or mitigate rainfall penetration through glass sliding doors, the effectiveness of these devices has not been confirmed yet. A literature search and review is therefore needed to identify (a) the historical impact of currently used mitigation measures and (b) recent advances in rainfall intrusion protectors. Such a review will also necessarily include current advances in sliding glass door protection and advances in testing the reliability of these protections. Based on the gap in knowledge on WDR mitigation for sliding glass door systems in existing buildings, this research proposes a step-by-step understanding of the WDR phenomenon and the effectiveness of possible mitigation strategies. New research can then be designed to study the combined impacts of direct wind and WDR on sliding glass door systems. The long-term goal is to study a number mitigation measures for sliding glass doors to decrease the amount of WDR intrusion.

2. Scope of Work

Task 1: Defining the problem, literature review, identification of knowledge gaps

This task will include a detailed literature review of the performance of glass sliding door systems against WDR. This literature review will include investigating the performance of historical mitigation measures as well as current advances in sliding glass door rainfall protections. This literature review will also cover any published results from previous testing.

Task 2: Forming a technical advisory committee

A 5-8 member technical advisory committee will be formed that will represent different groups of practitioners and academics. This may include representatives from industry, agencies, and

academia. The role of this committee will be to evaluate various methods of WDR testing and inform a testing protocol for studying WDR intrusion through tracks of sliding glass door systems.

Task 3: Developing a testing protocol

Based on the recommendations from the technical advisory committee, a testing protocol will be developed for WDR intrusion through tracks of sliding glass door systems both with and without mitigation devices. This testing protocol will include WDR parameters based on previous studies at the NHERI Wall of Wind Experimental Facility (WOW EF) at FIU ; holistic model design including sliding glass door(s); measurement systems; and data analysis methods to investigate WDR intrusion and effectiveness of mitigation technologies. The protocol will be approved by the technical advisory committee before any testing is undertaken.

Task 4: Testing WDR intrusion through tracks of sliding glass door systems

Based on the literature review and the approved testing protocol and methodology, an initial proof-of-concept testing will be conducted to evaluate the methodology. Next, one or more mitigation devices (as per availability to the team) for WDR intrusion will be tested at the NHERI Wall of Wind Experimental Facility using the approved test protocol, instrumentation, and methodology. The test results will include WDR intrusion measurements with and without the mitigation devices.

3. Staffing

PI: Dr. Omar Nofal, Assistant Professor, FIU Dept. of Civil & Environ. Engineering

Co-PI: Dr. Arindam Gan Chowdhury, Professor, FIU Dept. of Civil & Environ. Engineering; PI and Director, NHERI Wall of Wind Experimental Facility; Fellow, Extreme Events Institute

Research Assistant: Mr. Yonathan Adamu, PhD research assistant.

4. Method of Payment

A purchase order should be issued to FIU at the earliest to ensure that the project tasks can be completed within the strict timeline of the statute. This project shall start on date of execution of the purchase order and end at midnight on December 1st, 2024. This purchase order shall not exceed \$300,000.00 and shall cover all costs for labor, materials, and overhead. Payment of \$100,000 will be made upon the submission of the interim report and \$200,000 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 by email to Program Manager Mr. Mo Madani. The interim report shall cover progress to date on all tasks. This report will also serve as a progress update that details descriptions of any issues that may have been encountered. The due date may be extended with the approval of the Program Manager.
- b. A draft final report shall be prepared and delivered no later than November 1, 2024. The report shall contain deliverables of the four tasks discussed in Section 2. This shall include a clear outline of the problem statement, summary of literature review, a summary of the knowledge

gaps, and technical advisory board recommendations. The due date may be extended with the approval of the Program Manager.

6. Financial Consequences

FIU's Extreme Events Institute (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 Mr. Mo Madani. Mr. Madani's email address is Mo.Madani@myfloridalicense.com; his phone number is 850 717 1825.