Reviewing the Standards for Wind-Driven Rain (WDR) Intrusion through Tracks of Sliding Glass Door Systems during Hurricanes

Florida Department of Business and Professional Regulation
Florida Building Commission (FBC)

and

Department of Civil and Environmental Engineering (CEE)
Florida International University (FIU)

Project Lead: Omar Nofal, Assistant Professor
Co-Principal Investigators: Arindam Gan Chowdhury (FIU), Ryan Catarelli (U. of Florida)

1. Introduction

Pursuant to Section 32 of HB 10 21 – 2024, the FBC has been tasked with performing 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 is required to 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 the tracks of sliding glass door systems can allow wind-driven rain (WDR) intrusion. Water intrusion through the tracks of 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 the tracks of glass sliding doors, the effectiveness of these devices has not been confirmed yet.~~ A literature search and review are ~~therefore~~ needed to identify recent advances in rainfall intrusion protectors. Such a review will also necessarily include 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 technical review for the current standards to investigate its applicability to test WDR intrusion through the tracks of the sliding glass doors.

2. Scope of Work

a. Formation of A Technical Advisory Committee

The objective of this task is to form a technical advisory committee (TAC) to guide the research program. TAC members shall represent different groups of practitioners and academics. This may include representatives from the fenestration and building component and cladding manufacturing

industries, testing laboratories, architectural firms, engineering firms, and code officials. The role of this TAC will be to evaluate various methods of WDR testing and inform revisions to current testing protocols for studying WDR intrusion through tracks of sliding glass door systems. The TAC shall convene by video conference on a minimum of five occasions.

b. Reviewing Existing Literature and Standards and Reporting Their Applications to WDR Testing for Tracks of Sliding Glass Door Systems and Evaluation of Mitigation Methods

- Based on the recommendations from the technical advisory committee, FIU-CEE and UF-CEE shall review current testing standards and relevant literature and reports related to WDR intrusion through tracks of sliding glass door. ~~This~~

- FIU-CEE shall research studies and test results on WDR experiments previously performed at the NHERI Wall of Wind Experimental Facility (WOW EF) at FIU and other facilities including the University of Florida NHERI EF.

- FIU-CEE shall provide a summary of the literature and testing review outlining the recommendations and conclusions of each research study reviewed.

c. Formulate Recommendations

In collaboration with the TAC and based on the literature review conducted under Item b, FIU-CEE shall develop recommendations regarding the applicability of the existing industry standards in testing WDR intrusion through tracks of sliding glass doors and evaluation of efficiency of mitigation devices and determine whether modifications and/or new protocols are needed for improved testing and evaluation.

d. Expert Consultant

FIU - CEE shall consult with the University of Florida and Dr. Catarelli shall serve as a consultant over the life of this project. Dr. Catarelli shall provide specific assistance in the following areas:

The University of Florida consultant will provide assistance in the standards review based on the previous testing to the sliding glass doors conducted at the Powell Family Structures and Materials Laboratory at University of Florida. Dr. Catarelli will also help in the forming of TAC.

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

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Co-PI: Dr. Ryan Catarelli, Assistant Research Scientist, University of Florida, Dept. of Civil & Environ. Engineering

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

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 June 30, 2025. This purchase order shall not exceed $95,000.00 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 September 16, 2024. 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 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 Program Manager.

b. A draft final report shall be prepared and delivered no later than November 1, 2024, for comments by the Florida Building Commission's Hurricane Research Advisory Committee. The report shall contain deliverables of all tasks discussed in Section 2. This shall include a clear outline of the problem statement, summary of the literature and standards review, and recommendations regarding testing standards for testing WDR intrusion through tracks of sliding glass doors. The final report shall be prepared with revisions to address Hurricane Research Advisory Committee comments and delivered no later than November 15, 2024. In addition, the draft final report and the final report shall be formally presented to the 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 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.