W W! CHALLENGE 2024

WALL OF WIND MITIGATION CHALLENGE
Live High School Competition at FIU's Engineering & Computing Center
March 21st, 2024

Physical Guidelines

1. Design Objective

1.1 The objective for the *2024 WOW Mitigation Challenge* is to design a wind mitigation barrier that will provide the best wind mitigation for a Miami Beach condominium property. Imagine a six-story condominium building situated along the beach, and between the building and the beach is an outdoor leisure area that needs to be protected from wind off the Atlantic Ocean. Theoretically, this leisure area could include things like a pool, activity/entertainment space with a small pavilion and seating area. Figure 1 illustrates the Challenge scaled down by about a factor of 25.

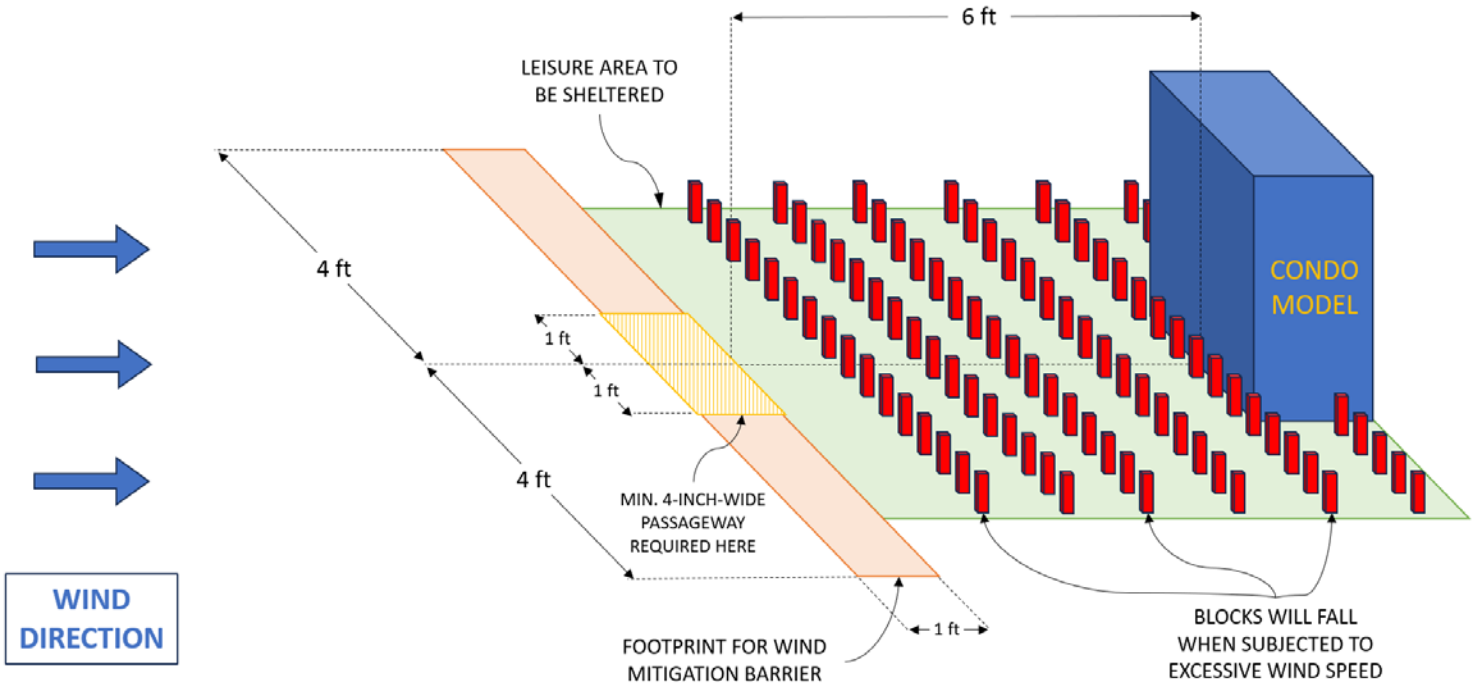

Figure 1: Scale model of condominium property with the area for wind mitigation.

1.2 Teams are tasked with developing a wind mitigation barrier model that will provide the best wind mitigation for the leisure area, which will be measured by how many small blocks on the scale condominium property fall over as wind speed is increased.

1.3 Each team's wind mitigation barrier model will be wind tested by the NSF-NHERI Wall of Wind experimental research facility at FIU. See Figure 2 at the end of this document.

1.4 The wind test will consist of gradually increasing the wind speed until small wooden blocks (provided by FIU and spread around the leisure area to be protected) start to fall over due to the wind speed they experience. The blocks may range in height between 2 inches and 4 inches at model scale.

1.5 Wind speeds will be measured by FIU and Teams will be able to watch the wind tests from the WOW Operations & Control Center.

1.6 The number of small blocks that are blown over will be counted by FIU.

1.7 Each Team with be supplied with a $75 gift card. Students are permitted to spend more than the provided $75, but any additional cost incurred shall be at the expense of the Team.

1.8 Please review any new technical documents on the WOW Challenge web page: (https://www.ihrc.fiu.edu/outreach-education/wall-of-wind-challenge/)

1.9 Teams must develop and construct their wind mitigation barrier models in compliance with the requirements and restrictions described in this document below. READ ALL THE RULES CAREFULLY!

2. Wind Mitigation Barrier Model Requirements and Restrictions

2.1 The wind mitigation barrier model must be placed on a ¾ inch thick plywood board 1 ft. wide by 8 ft. long. This 8 ft. long piece of plywood will be provided to each Team in two 4 ft. lengths. Four plywood boards of these dimensions will be supplied by FIU; two unpainted boards for experimentation, and the other two will be painted FIU Gold, to be used for the live competition. Other components of the scale model condominium property will be created by FIU.

2.2 Each Team will decide with Erik Salna to either pick-up their four plywood boards at FIU or to have them delivered to their high school.

2.3 The wind mitigation barrier model can be no more than 9 inches high and multiple barrier models (e.g. one behind the other or overlapping) are permitted just so long as they remain within the 1 ft. by 8 ft. area shown in Figure 1. The wind mitigation barrier models can be straight or curved, porous, or solid.

2.4 The wind mitigation barrier model must have a minimum 4-inch-wide by 4-inch-tall passageway within +/- 1 ft. of the center of the barrier model(s) which allows condominium residents to have access to the beach. The passageway does not have to be straight. See Figure 1.

2.5 Any type of non-hazardous material shall be allowed and considered acceptable for designing the wind mitigation barriers, given that the solution complies with the construction guidelines described in sections 2.1-2.3. Some common examples of acceptable materials include (but are not limited to) wood, foam, bug screen, plastic, metal, white glue, super glue, and epoxy.

2.6 Teams will decide to either drop off their wind mitigation barrier models to the FIU Wall of Wind on March 19th or have Erik Salna pick them up at their high school.

3. Physical Wind Test Requirements and Restrictions

3.1 During the competition on March 21st at the FIU Wall of Wind, each team's wind mitigation barrier model will be placed in the Wall of Wind test section and tested by gradually increasing wind speeds.

3.2 Only one wind mitigation barrier model entry will be accepted from each Team for wind testing.

3.3 All wind mitigation barrier models will be tested for one wind direction at 90 degrees to the line of the wind mitigation barrier model.

3.4 Safety is paramount during competition and testing. The WOW's technical team will be responsible for attaching the wind mitigation barrier models in the test section of the Wall of Wind.

3.5 NO ONE is allowed in the WOW test area during wind testing.

3.6 Prior to wind testing, Judges will inspect the wind mitigation barrier models to verify that the design is in compliance with the requirements and restrictions listed in Section 2; the Judges reserve the right to disqualify from competition or apply penalty points to any wind mitigation barrier model that is found to be in violation of the rules and regulations listed in Section 2.

4. Scoring

4.1 Each wind mitigation barrier model will be subjected to a predefined wind speed profile. The same profile will be used for all team models. Scoring will be based on the total number of wooden blocks that fall over during the wind test and the windspeed at which the first block falls over.

Figure 2: The NSF-NHERI Wall of Wind will test the wind mitigation barrier models for the 2024 Wall of Wind Mitigation Challenge; the NSF-NHERI Wall of Wind can generate sustained wind speeds up to the highest classification in the Saffir–Simpson Hurricane Scale, a Category 5 hurricane.