



TEXAS TECH UNIVERSITY
National Wind Institute™

***Wall of Wind Research and Testing to Enhance Resilience of Civil
Infrastructure to Hurricane Multi-Hazards***

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The Wall of Wind (WOW) at Florida International University (FIU) is the largest and most powerful university research facility of its kind and is capable of simulating Category 5 hurricanes – the highest rating on the Saffir-Simpson Hurricane Wind Scale. The National Science Foundation (NSF) designated the 12-fan WOW as one of the nation’s major Experimental Facilities (EFs) under the NSF’s Natural Hazards Engineering Research Infrastructure (NHERI) Program. The NHERI WOW EF is allowing researchers across the nation to explore and test ground-breaking concepts to protect homes, businesses and infrastructure lifelines, and will enable innovations to help prevent wind hazards from becoming societal disasters. This presentation will focus on WOW interdisciplinary research and testing capabilities to enhance the built environment’s resilience to hurricane multi-hazards, including wind, rain, and debris.

Hurricane engineering research at the WOW has confirmed the effectiveness of large- and full-scale *holistic* testing approaches in advancing the understanding of hurricane impacts on buildings and other infrastructure elements, such as traffic and electrical infrastructure elements. Holistic testing procedures entail testing of systems consisting of integrated assemblies of components, as opposed to individual component testing. The latter type of testing can be misleading because it misses the interaction effect of different parts (components) of a structure, which can often be decisive in the understanding and estimation of failure processes and progressive collapse. WOW research has resulted in the development and validation of innovative damage mitigation products and techniques, including Roof Suction Mitigation Devices, Rooftop Equipment Wind Screens, and a Non-Intrusive Roof-to-Wall Connection System. Also, full-scale experimentation results were applied to improve Florida Building Code’s wind load provisions on building roof mounted equipment for the State of Florida, including its High Velocity Hurricane Zones.

The insurance industry views WOW testing as a development as revolutionary for wind engineering as crash testing -- which led to airbags and other safety features -- was for the automobile industry. The civil engineering community likens WOW to shake table testing, which has significantly contributed to the development of performance-based earthquake engineering. The new test-based data from the WOW facility will help create a sound scientific basis for developing risk- and performance-based design criteria embodied in code provisions, and contribute to the attainment of a national objective: *achieving more sustainable, hurricane resilient, and energy efficient communities.*