

TROPICAL CYCLONE SURFACE WIND AND WIND-DRIVEN RAIN AND THEIR EFFECT ON HUMAN PERCEPTION AND THE BUILT ENVIRONMENT

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Abstract

This presentation will present information about ongoing research at the University of Florida directed at improving the resistance of residential and low-rise commercial buildings to extreme winds and rain. The basis for this work are experiments conducted (1) in the laboratory with actively controlled ‘full-scale’ simulators that can reproduce time varying wind load and rain conditions with a high degree of realism and (2) in hurricanes to characterize the behavior of surface wind and wind-driven rain and the resultant loads on structures. Damage assessments are also conducted to evaluate the performance of the building stock and the codes and standards that guided their construction. This presentation will provide a brief overview of these programs, with emphasis on recent developments regarding full-scale simulation of wind loading in hurricanes and supercell thunderstorms. The purpose of these technologies is to replicate time-varying wind load conditions at sufficient scale to test building systems in order to diagnose weak links that limit system level performance.

Preliminary results from a recently completed study of human perception of wind, wind-driven rain, horizontal rainfall, and water current and speed will also be presented. Participants were subjected to physical simulations of each agent and asked to provide quantitative estimates of intensity (e.g., wind speed, water depth) and their perceptions of personal risk on an ordinal scale. This study found that on average, people are prone to over predicting wind and water speeds. The mediation pattern is stronger among people with no prior experience with tropical cyclones, which is a significant finding given the in-state migration statistics of coastal states.