

**Major Research Instrumentation: Acquisition of an Infrastructure for Real-Time Testing of Wind Effects on Structures, 9/01/05-8/31/08, NSF, \$590,000 (Co-PI – van de Lindt, PI- Bienkiewicz).**

Mitigation of natural and human-induced hazards will play a fundamental role in defining what society demands of engineers in the U.S. and worldwide. In the past, designing to a minimum standard was believed by many to provide adequate performance. A new developing paradigm, shared by several engineering fields, is performance based engineering (PBE), which seeks to measure design adequacy based on multi-objective system performance rather than the traditional component strength approach. To date, this paradigm has only received attention by earthquake engineering researchers. This MRI project seeks to enable researchers at Colorado State University to take a step toward establishing a design philosophy for performance-based wind engineering (PBWE) by utilizing what has been learned by earthquake engineering researchers (i.e. utilizing the NEES IT infrastructure for test equipment linkage). In order to do this, an infrastructure improvement to enable hybrid spatio-temporal testing of wind effects on structures will be acquired. This will make it possible to (1) apply realistic wind loads on structures, and (2) couple the left and right sides of the equation of motion during simulated wind loading in the presence of nonlinearities. Both these capabilities are essential for this next generation of design philosophies.