



Structural/Wind Engineering Distinguished Lecture Series¹

Time: 2:00-3:00 PM, July 13, 2009, Place: EC 2300

WIND INDUCED INTERNAL PRESSURE IN BUILDINGS

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Abstract: The safety of a building during the passage of windstorms depends on the characteristics of both internal as well as external pressures. Non-neutral internal pressure in buildings may be induced by the wind through leakages or permeability of the envelope; through dominant openings; and through the flexibility of the envelope. Of particular interest under windstorm conditions is the generation of internal pressure fluctuations through dominant openings, which may be created by impact of wind-borne debris. Sudden breakage of windows and / or doors in this manner is not uncommon in severe windstorms. There are two issues of concern following the creation of a dominant opening. First is the internal pressure overshoot, if any, in the ensuing transient response, and second includes the (Helmholtz) resonant response. These depend upon the external pressure at the opening, and the frequency response characteristics of the building cavity. This presentation will discuss the importance of internal pressure, the physics of internal pressure dynamics, and the influence of various wind flow and building parameters on the characteristics of internal pressure. The speaker will draw upon a significant body of research completed at the University of Auckland over the past 15 years. Areas for further research will be highlighted and a case will be made for full-scale research on internal pressure.

Bio-sketch: Dr Rajnish Sharma is originally from the Fiji Islands which lies in the South Pacific. On average Fiji experiences at least one Category 3 or higher Tropical Cyclone (Hurricane) each year and residential dwellings typically suffer widespread damage. This motivated Dr Sharma to pursue Wind Engineering research, completing his PhD studies in this area in 1996 from the University of Auckland in New Zealand. He taught at the University of the South Pacific until he moved to New Zealand in 2001. He has since been employed at the University of Auckland. In addition to Wind Engineering research, he has diversified his research into areas such as wind and tidal energy, turbulent jets, jet impingement and heat transfer. Over the years, he has published several journal and conference papers specifically on building internal pressure dynamics.

¹ Organized by Department of CEE and IHRC in collaboration with GSO-CEE and Chi-Epsilon, for further information please contact Dr Bitsuamlak at bitsuamg@fiu.edu or 305-648-6755.