

The integration of wind and structural engineering

Ashraf A. El Damatty¹⁾ and F.Y. Elezaby²⁾

1) *Department of Civil and Environmental Engineering, The University of Western Ontario,
London, Ontario, Canada*

2) *T.Y Lin International, Miami, Florida, USA*

¹⁾ damatty@uwo.ca

ABSTRACT

The University of Western Ontario in Canada has been leading the science of Wind Engineering since the sixties of the previous century through the research conducted at the Boundary Layer Wind Tunnel laboratory located at this University. The research capabilities at Western has been augmented recently through the establishment of large-scale testing facilities including the Insurance Lab of Better Himes and the Wind Engineering, Energy and Environment (WindEEE) Institute. The existence of such facilities allows more integration between wind and structural engineering pushing the scope of wind testing into assessment of structural capacities and failure modes. Two extensive research projects geared to design structures that can adapt to extreme wind events are conducted using those facilities and are summarized in this paper. Those projects involve studying the behavior of transmission line structures under tornadoes and downbursts and the behavior of wood houses under hurricanes. Those two types of structures have exhibited in the past severe damages under the considered windstorms. The third project presented in this paper is geared towards achieving sustainable design of tall buildings under wind loads by relying on the structure ductility similar to the approach adopted for years in seismic design of structures.

¹⁾ Professor and Chair

²⁾ Structural Engineer