

Thesis title:

A study of wind effects on low rise buildings due to surrounding trees

Abstract:

Low rise buildings immersed in the aerodynamic boundary layer have complicated wake characteristics due to influences of turbulence intensity and surrounding obstructions. Most of the wind tunnel and actual scale studies on low rise buildings have been carried out in uniform terrain conditions neglecting complications due to surrounding obstructions such as trees, boundary walls and neighboring houses. Moreover, design wind load predictions from codes show dispersed trends even for a simplest of applications.

Practically, trees have been used effectively as wind breaks in agricultural industry and for effective wind induced energy consumption. However, clear guidelines were not established on using trees to reduce wind effect on low rise buildings due to limited research on this aspect.

In this study, a typical low-rise building representing a gable housing unit was tested in a wind tunnel for several random tree configurations. The degree of effect has shown scattered variation with tree configurations and some configurations have reduced wind effects. Furthermore, it was found that the establishment of dominate wind direction is of critical importance since oblique angle of attacks has illustrated higher wind pressures for some tree configurations.