

CFD Analysis for wind load on symmetrical and unsymmetrical high-rise buildings with complex plan shapes

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ABSTRACT

With time, mankind has advanced from building single-story structures to multi-story monumental skyscrapers. High-rise buildings in high-density cities are developing rapidly. The main reason behind it is the growing urbanization justifying the need for super-tall structures which prove to be highly efficient. Wind load has an adverse effect on the safety of the buildings if not considered carefully. This paper demonstrates a broad study of the wind flow characteristics of high-rise buildings with complex plan shapes. Computational fluid dynamics (CFD) study has been done on the two building models, symmetrical and unsymmetrical, for the wind load analysis. The mean wind pressures on the faces of the building are predicted by CFD simulation, using ANSYS. The final result also presents the wind flow patterns and pressure contours of the faces of the building. Comparisons of flow characteristics and critical coefficient of pressure on surfaces of both models have been discussed.

Keywords: High-rise buildings, wind load analysis, Computational fluid dynamics (CFD), ANSYS, wind flow patterns, pressure contours