

Study on Numerical Simulation Preference for Evaluation of Building Ventilation Performance

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Abstract

Natural ventilation has been widely used in buildings in order to deliver a healthy and comfortable built environment for occupants in buildings. It also reduces the consumption of energy in the built environment and dilutes the concentration of carbon dioxide. Various methods and techniques have been implemented to evaluate and predict indoor air ratio and pattern in buildings. However, few studies have been implemented to justify the most relevant methods for examining ventilation performance at indoor and outdoor spaces. The current study aims to review all available methods to finalize the most reliable methods in order to use in future research. The study uses available data bases and compares the advantages and drawbacks of methods including analytical models, empirical models and CFD models. It was found that the CFD model is the most relevant method due to cost effectiveness and informative technique. Also, it seems as a most relevant approach due to its capability to predict air velocity patterns and ratio in buildings.

Keywords; Natural ventilation, Wind-Driven Ventilation, Analytical Models, Experimental Models, CFD Models,

1. Introduction

Natural ventilation, as an efficient passive design strategy, has been considered extensively by relevant stakeholders particularly architects and engineers in building investments as a means to reduce the energy consumption and to provide a healthy and comfortable indoor environment for the building occupants. A study by Givoni [1] shows that natural ventilation is a widely used technique in improving comfort levels for the human body. Increased air speed over the body enhances sweat evaporation and reduces discomfort due to the moistened and wet skin. Further research on the