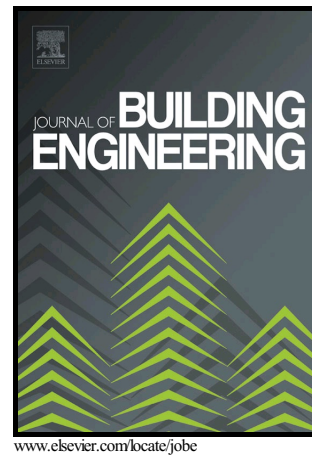


## Author's Accepted Manuscript

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PII: S2352-7102(17)30758-1  
DOI: <https://doi.org/10.1016/j.jobee.2018.03.006>  
Reference: JOBE428

To appear in: *Journal of Building Engineering*

Received date: 28 November 2017  
Revised date: 3 March 2018  
Accepted date: 17 March 2018

Cite this article as: Hemant Mittal, Ashutosh Sharma and Ajay Gairola, A review on the study of urban wind at the pedestrian level around buildings, *Journal of Building Engineering*, <https://doi.org/10.1016/j.jobee.2018.03.006>

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## A review on the study of urban wind at the pedestrian level around buildings

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### Abstract

Urbanization is leading towards the change of local wind climate in the vicinity of tall buildings, which influences the pedestrian level wind environment to an uncomfortable or even dangerous level. Therefore nowadays, building design should not be limited only for the consideration of wind load and indoor environment, but outdoor wind environment should also be considered. This study presents a review of the methods for the assessment of pedestrian level wind climate, different wind comfort criterion and various techniques to evaluate the wind speed at the pedestrian level. In later sections, brief review for the influence of different parameters related to building design and configuration on pedestrian level wind is presented. After analyzing previous literature it is suggested that there is a strong need for the homogenization of different wind comfort criterion, as it may lead to different consequences for the architects. Among various wind tunnel measurement techniques, use of Irwin probe is simple and accurate compared to hot-wire anemometry and it can be installed at numerous locations for simultaneous measurement of pedestrian level wind speed. For numerical simulation, Reynolds Averaged Navier Stokes based technique has been used by various researchers, although this technique is not accurate as much as large eddy simulation and detached eddy simulation. But this technique is cost effective and requires less computing resources.

**Keywords:** Urban wind climate, Wind comfort, Building design, Wind tunnel test, CFD

### 1. Introduction

The socio-economic growth of a nation is majorly driven by urbanization, as it accommodates the increased demand for business and residential space. As an evidence of the current scenario, many cities of developed and developing nation like Japan, Hong-Kong, China, Malaysia, and India are moving towards the construction of cohesive skyline structures or mega tall buildings. On contrary to these advancements, mega tall buildings in the urban area affect the surrounding wind flow pattern and pedestrian level wind (PLW) comfort.

Presence of tall building in the urban area tends to deflect the upper-level high-speed wind to the ground, which creates conditions that could be unpleasant or even dangerous to pedestrians. There are many such incidents which are reported due to strong winds. But nowadays modern megacities are packed with the high density of high rise buildings, which influences the air movement. The reduced air movement at pedestrian level causes weak natural ventilation and allow the pollutants to be accumulated at ground level which increases air pollution. Such wind conditions are persistent in Hong Kong, Tokyo and New Delhi [1]. Many causalities have been reported due to the accumulation of air-borne SARS virus (Severe Acute Respiratory Syndrome) because of low wind speed zone at a building site in Hong Kong

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