



The wind microclimate optimisation of large-scale re-developments

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Abstract

One of the key challenges facing the large-scale re-development process of existing commercial areas into mixed-use zones is to ensure a site-wide layout that not only serves the purposes of the scheme being developed, but also provides comfortable wind microclimate conditions for all users. In order to ensure that pedestrian comfort is suitable and meets best-industry practice targets, it is recommended that at the early stages of master-planning, the site-wide wind comfort is thoroughly examined via boundary layer wind tunnel testing. This approach is examined via a case study conducted on the re-development of a large-scale education zone in South London into a mixed-use zone whereby a series of basic massing schemes were examined to determine the “macro” scale wind climate across the entire site and subsequently re-examined at a more “micro” level to resolve any wind issues via the introduction of purposely developed mitigation measures.

Keywords: wind microclimate, pedestrian comfort, urban re-development, boundary layer wind tunnel testing

1 Introduction

Large-scale re-developments of inner city areas within London and in other major UK cities face stringent scrutiny by planning authorities. With the impetus on sustainable urban development that enhances the quality of inner city life and facilitates recreational use of the open spaces in and around any proposed development, developers are becoming increasingly aware of the need to optimise the local wind microclimate in order to ensure such areas are suitable for future pedestrian uses as well as to minimise the impact on public areas within the vicinity of the site.

Due to the huge potential for large master-plan type developments to beneficially impact the quality of inner city life, but with the equally possible risk of detrimentally impacting on the local wind conditions, UK planning authorities

expect due consideration of the wind microclimate from the early stages of the design of such proposals.

Details of this process and the associated advantages are examined in this paper by means of a case study on the re-development of one of the smaller urban hubs within South London. Details of the assessment methodology, including the wind climate analysis, wind tunnel techniques and criteria used are presented followed by a detailed discussion.

2 Assessment Methodology

A boundary layer wind tunnel study is typically designed for the assessment of the pedestrian level wind microclimate in and around the proposed development site. Alternatively, the wind microclimate could be assessed using numerical / computational methods, such as computational fluid dynamics (CFD). However,