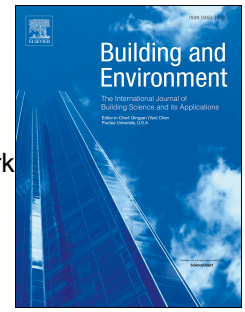
Accepted Manuscript



Numerical investigation of height impact of local exhaust combined with an office work station on energy saving and indoor environment

Ahmed Qasim Ahmed, Shian Gao

PII: S0360-1323(17)30245-7

DOI: 10.1016/j.buildenv.2017.06.011

Reference: BAE 4939

To appear in: *Building and Environment*

Received Date: 3 March 2017

Revised Date: 29 May 2017

Accepted Date: 5 June 2017

Please cite this article as: Ahmed AQ, Gao S, Numerical investigation of height impact of local exhaust combined with an office work station on energy saving and indoor environment, *Building and Environment* (2017), doi: 10.1016/j.buildenv.2017.06.011.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Numerical investigation of height impact of local exhaust combined with an office work station on energy saving and indoor environment

Ahmed Qasim Ahmed*, Shian Gao

Department of Engineering, University of Leicester, Leicester LE1 7RH, United Kingdom

*Corresponding author: phone: +44(0)116 252 2874; fax: +44(0)116 252 2525; e-mail: aqaa2@ le.ac.uk.

Abstract:

A healthy and comfortable working environment is very important for improving its occupants' productivity. In this study, the evaluation of the height impact for the proposed local exhaust ventilation system on the indoor thermal comfort, inhaled air quality and energy savings was explored numerically. In the proposed system, the exhaust opening was combined with the office workstation in a single unit. The intention was to help extract the warmed and contaminated air locally before it disperses across the room. The performance of the new system at three different heights of the combined system (1.4 m, 1.6 m and 2.0 m) above floor level was investigated numerically with a validated CFD model in a room with and without inclusion of the novel local exhaust ventilation system. The performance of using this system was evaluated using the main evaluation indices for any ventilation system such as energy saving, occupant thermal comfort, draught risk and the quality of the indoor air. The results showed that by selecting a suitable height for the combined system, a significant improvement on energy savings (up to 22.56%) and inhaled air quality can be realised with an acceptable level of the indoor thermal comfort. It was found that in comparison to cases 2 (1.4 m) and 4 (2.0 m), case 3 (1.6 m) was considered to be the best height at which optimal performance could be achieved from the LEVO system.

Download English Version:

https://daneshyari.com/en/article/4911459

Download Persian Version:

https://daneshyari.com/article/4911459

Daneshyari.com