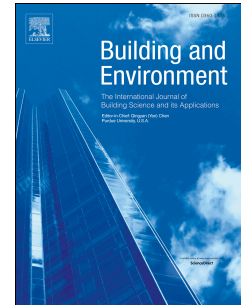


Accepted Manuscript

Comfortable air speeds for people lying at rest in the hot-humid area of China in summer

Yi Chen, Yufeng Zhang, Haolei Tang



PII: S0360-1323(17)30375-X

DOI: [10.1016/j.buildenv.2017.08.022](https://doi.org/10.1016/j.buildenv.2017.08.022)

Reference: BAE 5047

To appear in: *Building and Environment*

Received Date: 24 May 2017

Revised Date: 21 July 2017

Accepted Date: 14 August 2017

Please cite this article as: Chen Y, Zhang Y, Tang H, Comfortable air speeds for people lying at rest in the hot-humid area of China in summer, *Building and Environment* (2017), doi: 10.1016/j.buildenv.2017.08.022.

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.

Comfortable air speeds for people lying at rest in the hot-humid area of China in summer

Yi Chen^{a, b}, Yufeng Zhang^{b, *}, Haolei Tang^a

a. School of Architecture, Fuzhou University, Fuzhou 350108, PR China;

b. State Key Laboratory of Subtropical Building Science, Department of Architecture, South China University of Technology, Wushan, Guangzhou 510640, PR China

Corresponding author. Tel.: +86-18664866529; fax: +86-20-87110164.

E-mail address: zhangyuf@scut.edu.cn (Yufeng Zhang).

Abstract:

It is highly important to determine an appropriate thermal environment for resting and sleeping people from the perspectives of human health, comfort and energy savings. The thermal responses of people lying at rest in various room conditions with self-controlled airflow were studied in the hot-humid area of China. Subjects laid on a bed and were asked to control the fan gear to achieve a certain level of thermal sensation in the tests, during which their subjective responses were collected by a questionnaire.

The results confirmed that human thermal comfort could be maintained at air temperatures of 27–30 °C and humidity of 40%–80% when lying at rest in the hot-humid area of China. The air speeds that were required to maintain various thermal sensations changed linearly with room air temperatures. A higher air speed was needed to maintain the same thermal sensation at a higher air temperature or relative humidity (RH). The air speeds for thermal neutrality were between 0.25 m/s (at 27 °C and 40%–60% RH) and 1.17 m/s (at 30 °C and 60%–80% RH) and between 0.12 m/s and 1.31 m/s to achieve 80% percentages acceptable for thermal, airflow and humidity environments. The neutral air speeds for people lying at rest were 0–0.8 m/s lower than those for people engaged in sedentary activities. The results are beneficial for creating comfortable thermal environments for short rest, pre-sleep and sleep and are applicable for healthy young people living in hot-humid areas.

Key words:

Thermal comfort; air speed; acceptable thermal environment; lying at rest; hot-humid area

1. Introduction

The hot-humid area of China has a large population, a rapidly developed economy and a large number of buildings. The summer is long and hot, the winter is short and temperate, and the relative humidity (RH) is high year-round. In this area, people are fond of airflow for its cooling effect in

Download English Version:

<https://daneshyari.com/en/article/4911431>

Download Persian Version:

<https://daneshyari.com/article/4911431>

[Daneshyari.com](https://daneshyari.com)