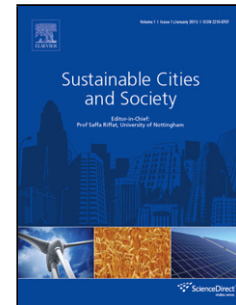


Accepted Manuscript

Title: Evaluation of climatic zones and field study on thermal comfort for underground engineering in China during summer

Authors: Yong Li, Shibin Geng, Yanping Yuan, Jing Wang, Xiaosong Zhang



PII: S2210-6707(18)31039-4
DOI: <https://doi.org/10.1016/j.scs.2018.08.002>
Reference: SCS 1200

To appear in:

Received date: 31-5-2018
Revised date: 4-8-2018
Accepted date: 7-8-2018

Please cite this article as: Li Y, Geng S, Yuan Y, Wang J, Zhang X, Evaluation of climatic zones and field study on thermal comfort for underground engineering in China during summer, *Sustainable Cities and Society* (2018), <https://doi.org/10.1016/j.scs.2018.08.002>

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.

Evaluation of climatic zones and field study on thermal comfort for underground engineering in China during summer

Yong Li ^{a,c,*}, Shibin Geng ^{a,*}, Yanping Yuan ^b, Jing Wang ^a, Xiaosong Zhang ^c

a, Army Engineering University of PLA, Nanjing 210007, PR China

b, School of Mechanical Engineering, Southwest Jiao tong University, Chengdu 610031, PR China

c, Southeast University, Nanjing 210007, PR China.

Corresponding author. Tel.: +86 15996275349, lgdxbing121@163.com (Li)

Highlights

- Four climatic zones for underground engineering in China were established.
- Questionnaires and field investigations had been elaborated in the four climatic zones
- Occupants' thermal preference and acceptability in different climate zones are discussed.
- Developed models of neutral temperature were derived for different climatic zones.
- How higher *RH* impact on occupants' thermal acceptability and MTS were explored.

ABSTRACT

The researches on thermal comfort for underground engineering are lacking in China. In this paper, ground temperature (T_g), ventilating sensible heat ratio (*VSHR*) of fresh air in 249 cities of different areas were calculated, and four climatic zones including Cold, Dry, Humid, Hot&Humid were established. Through field surveys from June 1 to September 30 during the period 2007-2015, larger amounts of measured data and 5862 effective questionnaires were obtained in non-air conditioned defense basement in the four climatic zones. Results showed that the mean thermal sensation (MTS) values did not agree with the values of PMV model. At the same operative temperature of 27 °C, the values of MTS were 0.53, 0.47, 0.32 and 0.0 in Cold, Dry, Humid and Hot&Humid climatic zone, respectively. When T_{op} was more than 26 °C, more than 84% of the occupants expect 'no change' in the four climatic zones, especially 91% in Hot&Humid zone. When relative humidity (*RH*) was more than 80%, most of the occupants' thermal acceptability (*TA*) was less than -0.3. In addition, by using multiple regression techniques, the neutral temperature models were derived using the parameters of average outdoor temperature, T_g , *RH* and clothing value for different climatic zones.

Keywords: climatic zones; thermal comfort; underground engineering; neutral temperature

Download English Version:

<https://daneshyari.com/en/article/11032506>

Download Persian Version:

<https://daneshyari.com/article/11032506>

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