Natalia KRAWCZYK, Luiza DĘBSKA, Lidia DĄBEK
Grzegorz MAJEWSKI, Łukasz ORMAN

Faculty of Environmental, Geomatic and Energy Engineering
Kielce University of Technology, Poland
Corresponding author: ldebska@tu.kielce.pl

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VALIDATION OF THE FANGER MODEL AND ASSESSMENT OF SBS SYMPTOMS IN THE LECTURE ROOM

Abstract: *Currently, the conditions of the internal environment should be close to comfortable, so that every person who stays in the room does not feel heat discomfort or other ailments resulting from it. Taking this into account, this study focused on the symptoms of SBS (dizziness, nausea, eye pain and runny nose) experienced by 69 people in a modern lecture hall of the Kielce University of Technology. It turned out that the analysed ailments were felt by the study group (which in turn could have caused a decrease in concentration during classes). In addition, the article compares the actual thermal sensations of people to the values obtained from the Fanger model.*

Keywords: *SBS, fanger model, lecture room*

Introduction

Thermal comfort is a very important aspect of well-being in closed interiors. It is important to create such parameters of the microclimate that you do not feel any ailments. However, any change in air temperature, humidity or carbon dioxide can make a person start to feel pain in the eyes, dizziness or a runny nose.

Many authors of studies try to discuss this topic – sick building syndrome like [1-3]. On the other hand, the authors of [4] showed in their studies that adequate ventilation will ensure good air exchange, reducing the appearance of infections. In addition, authors from China [5] examined 2370 buildings, confirming that it is the indoor environment that is the factor influencing the appearance of SBS. Another example of research related to SBS as well as productivity was Licina and Yildrim [6], who showed that SBS symptoms were below 20%.

The main purpose of the work is to find out whether the students of the Kielce University of Technology in one of the modern lecture halls may experience such syndromes as dizziness, runny nose, nausea and eye pain.

Methodology

The study was carried out in one of the modern lecture halls belonging to the Kielce University of Technology. In order to conduct the research, a meter called BABUC-A, an Italian manufacturer, was used, and a questionnaire was completed by a group of 69 (age 20-25) people regarding their well-being during the classes, i.e. symptoms related to the sick building syndromes.

Results

Using the BABUC-A meter, internal environmental parameters were obtained for air temperature of 26.2°C, carbon dioxide content of 1223 ppm, and relative humidity of 53.3%. In addition, for the Body Mass Index, the average was 17.71. First, the results regarding the feeling of dizziness were discussed. It turned out that women felt more dizzy than men. Secondly, eye pain was examined. This symptom was confirmed by "I definitely feel" only women (around 10%), while that for "I rather feel" by around 10% for males and females. The rest of the group declared that they "didn't feel anything" or "rather didn't feel anything". Moving on to the next ailment, i.e. the feeling of nausea, it was surprising that the men themselves declared feeling it. Women did not constitute any percentage share. One of the most frequently chosen ailments was a runny nose, as 19% of women and 9% of men indicated that they developed a runny nose after staying in this room. The prevailing conditions that prevailed during the study were definitely not conducive to well-being. Therefore, the answers related to the assessment of thermal sensations and dissatisfaction with the prevailing internal conditions were analysed. The results showed that the actual thermal sensations of people calculated on the basis of surveys (TSV – Thermal Sensation Vote) and the PMV (Predicted Mean Vote) index, calculated on the basis of the ISO 7730 [7] standard, are within the known range of thermal comfort from the ISO 7730 standard of cm from -0.5 to +0.5. However, it should be noted that people nevertheless rated the indoor environment as good (TSV) as it was -0.15, as opposed to the PMV which was +0.42. Moreover, the PPD (Predicted Percentage of Dissatisfied) indicator was analysed for student surveys and according to the ISO 7730 [7] standard. The feeling of discomfort by students was definitely lower than the data obtained from the ISO 7730 standard.

Conclusion

In the room examined for sick building syndromes, the values for the examined ailments were similarly high for eye pain, dizziness, and runny nose, with the exception of nausea. After analyzing the validation of the Fanger model, discrepancies between the model calculations and the experimental data were noticed. The conclusion that arises after the study is that the possibility of increasing the flow of fresh air could lead to a reduction in the feeling of SBS symptoms.

References

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