

Evaluation of Air Movement, Humidity and Temperature Perceptions with the Occupant Satisfaction in Office Buildings in Hot and Humid Climate Regions by Means of Field Surveys

Authors : Diego S. Caetano, Doreen E. Kalz, Louise L. B. Lomardo, Luiz P. Rosa

Abstract : The energy consumption in non-residential buildings in Brazil has a great impact on the national infrastructure. The growth of the energy consumption has a special role over the building cooling systems, supported by the increased people's requirements on hygrothermal comfort. This paper presents how the occupants of office buildings notice and evaluate the hygrothermic comfort regarding temperature, humidity, and air movement, considering the cooling systems presented at the buildings studied, analyzed by real occupants in areas of hot and humid climate. The paper presents results collected over a long time from 3 office buildings in the cities of Rio de Janeiro and Niteroi (Brazil) in 2015 and 2016, from daily questionnaires with eight questions answered by 114 people between 3 to 5 weeks per building, twice a day (10 a.m. and 3 p.m.). The paper analyses 6 out of 8 questions, emphasizing on the perception of temperature, humidity, and air movement. Statistics analyses were made crossing participant answers and humidity and temperature data related to time high time resolution time. Analyses were made from regressions comparing: internal and external temperature, and then compared with the answers of the participants. The results were put in graphics combining statistic graphics related to temperature and air humidity with the answers of the real occupants. Analysis related to the perception of the participants to humidity and air movements were also analyzed. The hygrothermal comfort statistic model of the European standard DIN EN 15251 and that from the Brazilian standard NBR 16401 were compared taking into account the perceptions of the hygrothermal comfort of the participants, with emphasis on air humidity, taking basis on prior studies published on this same research. The studies point out a relative tolerance for higher temperatures than the ones determined by the standards, besides a variation on the participants' perception concerning air humidity. The paper presents a group of detailed information that permits to improve the quality of the buildings based on the perception of occupants of the office buildings, contributing to the energy reduction without health damages and demands of necessary hygrothermal comfort, reducing the consumption of electricity on cooling.

Keywords : thermal comfort, energy consumption, energy standards, comfort models

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