

Field study of thermal comfort in residential buildings in the equatorial hot-humid climate of Malaysia

Abstract

An extensive field study has been carried out in non-air-conditioned residences in Kota Kinabalu city, in Malaysia for the prediction and evaluation of the effect of the indoor thermal environment on occupants' thermal comfort. A total of 890 responses over one year were gathered. The hot-humid indoor climates of the surveyed buildings have been described and analyzed in terms of air temperature, globe temperature, relative humidity, wind velocity. The clothing insulation ensemble and metabolic rate of the occupants were also characterized. In the aim to assess the comfort temperature in residential buildings in the hot-humid tropics, each analyzed variable was thoroughly compared with the results of two field studies located in the hot-humid tropics, one conducted in Jakarta by Feriadi and Wong [1] and the second in Singapore by de Dear et al. [2]. Multiple and stepwise regressions were applied for the selection of the independent variable for neutral temperature prediction. Air temperature was chosen as an index for the indoor thermal comfort. The comfort temperature was determined using various approaches. The predicted temperature was found to be nearly 30°C regardless of the adopted approach. The indoor comfort temperature was close to the recorded mean indoor air temperature of all responses having a difference of about 0.7°C. The mean and the recorded indoor range temperatures seem to have effect in the prediction of comfort temperature.