

Satisfaction, Acute Health Symptoms, Performance, Behaviour and Preferences of Occupants in Green Mark Certified Office Buildings

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ABSTRACT

Green building certification schemes have been introduced to assist creation of sustainable buildings. It is often assumed that the additional “spin-off” of a building sustainability certification is the improved indoor environmental conditions for their users. The present study was carried out to provide data whether this is the case.

The main purpose was to examine indoor environmental quality and the subjective responses of occupants in office buildings in the tropical climate with air conditioning that were certified using the Singapore Green Mark scheme against the buildings that were not and could not receive this certification.

A cross-sectional study was carried out in Singapore. Six buildings with Green Mark (GM) Gold or Platinum and six buildings without certification (NGM) were selected. For all 12 buildings, Green Mark score that either were obtained, or could be obtained, were collected. NGM buildings scored low as expected.

The measurements were carried out and subjective responses of building occupants were obtained using a specially developed web-based survey. The survey included three tests for measuring cognitive performance. A parametric hierarchical statistical model was used to analyze the data.

Higher satisfaction with indoor environmental quality was seen in GM buildings. In particular, satisfaction with air quality in GM buildings was statistically significantly higher compared with NGM buildings. The odds for having acute building related health symptoms were on average two times lower in GM buildings compared with NGM buildings; most differences reached statistical significance. Self-estimated performance was higher in GM buildings, but no difference was observed in performance results derived from the cognitive tests. Short-term sick leave was lower by 1 day per year in GM buildings.

Some dissatisfaction was observed related to acoustic and visual privacy. These problems were also reported in other studies examining performance of buildings with sustainability certification.

Overall, the results suggest that the application of Green Mark scheme achieved significant benefits for the building occupants. The results can be used to improve the method on how credits are allocated within the certification scheme especially as regards rewarding the actions resulting in improved indoor environmental quality.

BIOGRAPHY

Pawel Wargocki is an Associate Professor at the Technical University of Denmark, where he teaches and performs research work. Carried out numerous laboratory and field experiments with human subjects on the effects of indoor air pollution and ventilation on health symptoms, sensory perception of indoor air quality and performance of office work by adults and schoolwork by children. Experienced in auditing of indoor environmental quality in buildings. Currently examining additionally the effects of sleep quality and building certification schemes on performance and the mechanisms behind the effects on performance, as well as the principles of health-based ventilation and different air cleaning and other technologies for promoting high indoor climate. His recent work examined the effects of CO₂ and human bioeffluents on human responses. Active internationally in International Society for Indoor Air Quality and Climate, ISIAQ (Past President) and ASHRAE (Past Chair of the Environmental Health Committee and the Position Document on Filtration and Air Cleaning). Member of Academy of Indoor Air Sciences. Published extensively.