UNIVERSITI TEKNOLOGI MARA

EVALUATION OF DAYLIGHTING PERFORMANCE IN POLYTECHNICS' STUDENT RESIDENTIAL COLLEGE BUILDINGS WITH INTERNAL PARTITION

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this dissertation was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This dissertation has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The recent global warming problem has a significant impact on architecture design as architects have been forced to be careful regarding environmental impacts and sustainability. Insufficient natural daylight inside the building leads to an increase in electrical consumption due to usage of artificial lighting. It also contributed to carbon emission, which could lead to global warming. The internal configuration has influenced the daylight distribution inside the room. Therefore, this study is intended to evaluate the impacts of several internal partition layouts on indoor daylighting performance in residential college rooms. There were three objectives to be achieved, which are; (a) to determine the illumination level in the existing case study room, (b) to analyse the Useful Daylight Illuminance in different internal partition alternatives through Climate Based Daylighting Modelling (CBDM) and compare the value of the target threshold found in the literature and (c) to recommend daylighting improvement using Climate Based Daylighting Modelling (CBDM) through simulation by suggesting a new model of room typology. The field measurement was conducted in a typical student residential room under a tropical sky to analyse the indoor daylighting condition. Then a series of internal partition options were simulated using DIVA for Rhino to propose a possible partition layout that is effective in resolving low daylight levels in student living rooms. The finding indicates that changing the internal partition layout in a student residential room and installing light shelf generate a robust impact on daylight sufficiency. The study revealed that the highest annual daylight sufficiency values belong to those internal partitions oriented perpendicular to the window with the installation of static light shelf. These improvements could provide a comfortable, productive, and healthy environment for occupants as well as savings in annual energy consumption. The impacts of internal partition as a typical interior design element on indoor daylighting performance in student residential buildings can be accessed: it also provides significant alternatives for architect regarding daylighting design in tropical countries, especially Malaysia.

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