UNIVERSITI TEKNOLOGI MARA

ASSESSMENT OF INDOOR AIR MOVEMENT IN A MALAYSIAN STUDENT RESIDENTIAL BUILDING CASE STUDY: POLITEKNIK UNGKU OMAR

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Dissertation submitted in partial fulfillment
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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

Natural ventilation is among the essential aspects to be considered to provide an acceptable indoor air movement in building designs. A proper ventilation process helps to deliver fresh air and expels heat and indoor pollution. Therefore, this study aims to investigate the potential of cross ventilation in improving indoor air movement in the student residential building. The objectives to be achieved in this study were; (a) to determine the current indoor air movement condition in the selected case study building and (b) to evaluate the effects of various opening configurations on optimizing indoor air movement in a simulated case study building. A field measurement was conducted in a selected room to analyse existing the indoor air movement. A model of the case study room similar to the field measurement was developed using computerized simulation software. Two (2) sets of opening configurations with consideration of window openings and louvers panels with different angle slats were proposed for the case study room to evaluate the suitable openings that help to improve indoor air movement conditions. Findings showed that the range of air velocity of the case study room in opening configurations did not meet the Malaysian Standard requirement for a potential natural cross ventilation strategy as a cooling effect in internal building space. The study provides an opportunity to examine indoor air movement condition in one (1) selected room in the case study building by conducting model testing with several opening configurations using Computational Fluid Dynamic (CFD) simulation. The study concluded that the results of the CFD simulations showed an uncomfortable condition in the case study room and recommendations for improvements to the future development of Malaysian Polytechnics might help to provide better natural cross ventilation performance by providing an appropriate configuration of openings in which a more comfortable environment can be established.

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