EVALUATION FOR ENERGY EFFICIENCY FOR GREEN BUILDING INDEX: CASE STUDY FOR UITM TEST CELL

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ABSTRACT

EVALUATION FOR ENERGY EFFICIENCY FOR GREEN BUILDING INDEX: CASE STUDY FOR UITM TEST CELL

Energy efficiency and indoor environment quality are among the assessment criteria for Green Building Index for Malaysia. In this study, a test cell building is used as a case study to evaluate the heat transfer through window and the OTTV of building and also the daylighting. Data of the surface temperature and indoor air temperature were recorded using automated data logger at an interval of 10min for duration of three days. The indoor and the outdoor illuminance were recorded using hand held lux meter. Data were processed for the conductive heat transfer through window and the daylight factor for two window types named clear float and tinted. Result shows that the installation of tinted film on window is reduce the indoor air temperature and daylight factor by 6.8% and 7.82% respectively. The daylight factor of clear float window is 8.1% and tinted windows are 0.28%. The OTTV value of clear float and tinted window also reduce from 18.83W/m^2 to 10.56W/m^2. The energy used for cooling load can be reduces by installation of tinted film to window. Unfortunately, the energy consumption of the building will used to light up the space since the building with tinted windows has low illuminance level.

CHAPTER 1

INTRODUCTION

1.1 Background and problem statement

Building envelope is the separation between interior an exterior environment such as wall, window and roof. The used of building envelope is for privacy and security. However, the absorption of solar radiation from external building envelope causes a gradual rise in temperature. Temperature inside of the building is related to the thermal performance which is highly depends on the performance of building envelope.

Several design modifications could reduce heat transfer inside the building. These are by installation of insulation material onto building envelope or decreasing shading coefficient of the window. Wall and roof insulation can produce energy saving up to 77% (Kemal *et al.*, 2002). The climatic condition, building geometry, and location should be considered so that the optimal insulation thickness can be obtained (Balocco *et al.*, 2007).

The focus of this research is to analyze the thermal and visual comfort of window. Most people are not aware on the performance of a window which constructed by glaze material which allow light to come through. The purpose of window is to bring in daylight inside the building. There are three mechanism of heat transfer occur which are conduction, convection and radiation. Those three mechanism result the increasing temperature inside of the building. Air conditioners are mostly used for space cooling. However, the long usage