

**ASSESSMENT
OF LIGHTING PERFORMANCE FROM
LIGHT PIPES AND WINDOWS**

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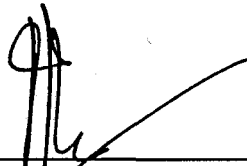
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This Final Year Project Report entitled **Assessment of Lighting Performance from Light Pipes and Windows** was submitted by Nurulizzati Makhtar, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied sciences, and was approved by



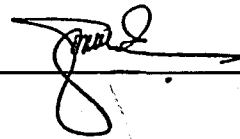
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ABSTRACT

ASSESSMENT OF LIGHTING PERFORMANCE FROM LIGHT PIPES AND WINDOWS

Daylighting is a relatively new renewable energy resource in Malaysia. It can contribute to energy savings since it can supplement and replace electric lighting. Additionally, daylighting can also improve indoor comfort and visual quality. Windows are the most common and main source of daylighting for buildings. However, natural light can also be channelled into interior of building spaces through light pipes. While this form of daylighting has been introduced in Western countries, it is still not being utilized at all in Malaysia. In this study, the assessment and comparison of the lighting performances of that due to windows and light pipes were investigated using physical modeling. Different orientation of single sided openings were studied i.e. openings facing North, South, East, or West. For the case of the light pipe, it was based on the optimum dimensions and materials from the previous studies. Simultaneous interior and outdoor illuminance were measured and daylight factor (DF%) calculated at working plane level. DF values were also predicted and indoor illuminance patterns estimated for the different daylight strategies at different solar times, using outdoor illuminance taken from the Model Year Climate Data for the Klang Valley. The results showed that the light pipes performance was very similar to North or South facing windows, but with a slightly different pattern of distribution. Generally, results of this study show that light pipes can be a good and comparable source of daylighting compared to windows, providing sufficient lighting for about 42% of the daylight hours between 10 a.m. to 3 p.m.