

## Evaluating Daylight Performance in an Office Environment in Malaysia, Using Venetian Blind System: Case Study

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**Abstract :** Having a daylight space together with view results in a pleasant and productive environment for office employees. A daylight space is a space which utilizes daylight as a basic source of illumination to fulfill user's visual demands and minimizes the electric energy consumption. Malaysian weather is hot and humid all over the year because of its location in the equatorial belt. However, because most of the commercial buildings in Malaysia are air-conditioned, huge glass windows are normally installed in order to keep the physical and visual relation between inside and outside. As a result of climatic situation and mentioned new trend, an ordinary office has huge heat gain, glare, and discomfort for occupants. Balancing occupant's comfort and energy conservation in a tropical climate is a real challenge. This study concentrates on evaluating a venetian blind system using per pixel analyzing tools based on the suggested cut-out metrics by the literature. Workplace area in a private office room has been selected as a case study. Eight-day measurement experiment was conducted to investigate the effect of different venetian blind angles in an office area under daylight conditions in Serdang, Malaysia. The study goal was to explore daylight comfort of a commercially available venetian blind system, its' daylight sufficiency and excess (8:00 AM to 5 PM) as well as Glare examination. Recently developed software, analyzing High Dynamic Range Images (HDRI captured by CCD camera), such as radiance based Evalglare and hdrscope help to investigate luminance-based metrics. The main key factors are illuminance and luminance levels, mean and maximum luminance, daylight glare probability (DGP) and luminance ratio of the selected mask regions. The findings show that in most cases, morning session needs artificial lighting in order to achieve daylight comfort. However, in some conditions (e.g. 10° and 40° slat angles) in the second half of day the workplace illuminance level exceeds the maximum of 2000 lx. Generally, a rising trend is discovered toward mean window luminance and the most unpleasant cases occur after 2 P.M. Considering the luminance criteria rating, the uncomfortable conditions occur in the afternoon session. Surprisingly in no blind condition, extreme case of window/task ratio is not common. Studying the daylight glare probability, there is not any DGP value higher than 0.35 in this experiment.

**Keywords :** daylighting, energy simulation, office environment, Venetian blind

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