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Light, daylighting and fluctuation of illuminance level in office buildings

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Abstract. Illuminance in spaces is important criteria in rating building performance. These also a strategy to develop some passive design criteria to meet the occupant visual comfort. The aim of this study is to investigate the fluctuation of the illuminance level and the impact of daylighting in an optimum performance zone. This study also investigates the effects of occupant density whether affect the illuminance level in two selected office buildings. Qualitative survey has been conducted on the occupant's perception toward visual comfort and obtaining the comparison on the glare effect by using IESVE computer simulation while visual test has been conducted involving selected workers. The maximum occupant density and physical conditions; window to wall ratio of 25%, 40% and 70% of typical office space were identified by using IESVE simulation. Findings from experiment of visual performance and daylighting simulation showed more than 50% occupancy in typical office room with 70% of WWR affected the extend of the daylight zone and the acceptable of illuminance level is not achieved. There high contract between 50% of the occupancy in a room is also changed the illuminance level of more than 26%. The findings contribute towards the improvement of an acceptable visual comfort ranges and design recommendations for optimum performance zone in a single office space in Malaysia.

1. Introduction

When most of the buildings were found to over illuminate or lack of illumination, it shows the designer should identify the significant parameter in lighting design during schematic layout till occupancy. This consideration and awareness can meet the acceptable illuminance level for occupants during performing the task less work for retrofitting such as de-lamping artificial lighting. Therefore, complaint by occupants on lighting distraction and too bright the illuminance level shows fluctuation of illuminance level occurs frequently in indoor spaces. In addition, these may reduce visual comfort and performance. Furthermore, the fluctuation of daylight illuminance level which affects the acceptable indoor daylighting level is not highlighted in any visual comfort issue where it significantly changes the quantity of daylight levels. This unpredictable change in illuminance level happens more severely when the room is fully occupied, and it is also reported that dimming control systems may be affected due to this condition. Clarification is needed on whether lighting guidelines have over- or underestimate the preferred amount of light. Factors that influence illuminance changes in offices are not identified during

