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IMPROVEMENT OF ILLUMINATION IN ARCHITECTURAL STUDIO WORKPLACE THROUGH FENESTRATION STUDY

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Abstract:

In relation to the human productivity of work, illuminance does play a big role. Daylight is the most reliable source of lighting than artificial lighting because it gives more pleasant environment inside the spaces. Thus, daylight is the main source of lighting chosen. It can give student a better working environment visually. To provide an effective internal illumination, arrangements of the openings with proper type of opening is important. This research focused on the numerous types and materials of the fenestrations, in order to identify the quantity and quality of daylight that enter the residential buildings.

Keywords: Daylighting ; Opening ; Illuminance

1.0 INTRODUCTION

One's workplace needs a good lighting. From a user's experience, poor illumination at workplace can lead to productivity problems like fatigue, headaches, stress and even accidents. Most of designers or architects more concerned about the beauty of the design compared to the effect of the light towards the users. So, as a designer, they should understand the basic knowledge of the visual quality that will affect the health, safety and emotional (Ginthner, 2002). On contrary to that statement, excessive light would bring safety and health problems such as glare, headaches and stress. These will lead to mistakes at work, less quality and low productivity. Numerous studies suggest that good illumination at the workplace pays dividends in terms of improved productivity, and a reduction in errors. According to ILO Manual, Improving Working Conditions and Productivity in the Garment Industry, 10% of increase in productivity and a 30% reduction in errors is a result of an improved lightings in factories.

There have been problems involving fenestration of the building. It encourage lighting problems such as glare and UV heat gain. The way that the studio was designed was not conducive for the users. Improvement must be taken to change the way it did. This research was mainly conducted to study the improvisation of the existence daylighting strategies involving fenestration properties. The objectives of this research was to investigate the factors that affect the illumination of a studio-based workplace focusing on the opening for natural daylighting and to understand the relation of human comfort and productivity with the lux of the specific spaces.

The research scope focuses on the buildings in the Fakulti Senibina Perancangan dan Ukur (FSPU) in UiTM Kampus Seri Iskandar, Perak. The building was built in 1998 and fully operated in 1999. It will be focusing generally on the architectural studio-based workplace that includes student of architecture, building, landscape architect and interior designer. Interview will be carry on the students that used the particular buildings.

2.0 LITERATURE REVIEW

Fenestration, refers to the design, construction, or presence of openings in a building. Fenestration includes windows, doors, louvres, vents, wall panels, skylights, storefronts, curtain walls, and slope glazed systems. Architecture is an art form that is equal parts design and functionality, so we need to first talk about how fenestration impacts a structure in a practical sense. If we look at an ancient Roman temple, they have an impressive entryway, but not much in the way of windows. Why? It is because fenestration can weaken the stability of a wall. After all, you can't load weight onto a hole. There are many components of a successful building, not the least of which is its fenestration. Fenestration,

however, is also a key component of architectural design. Why does the Empire State Building look so tall? Well, besides the fact that it is really tall, it has vertical columns of windows that draw the eye upwards.

2.1 Type of Fenestration

In order to decrease energy consumption from artificial lighting a good daylighting strategy is necessary. To provide effective internal illumination, the placing of the right openings in the right positions with sustainable type of window and glazing is important. These are several type of fenestration that are studied for this research, Casement, Jalousie, Clerestory, Skylight, Light Shelf (interior) and Light Shelf (exterior).

3.0 METHODOLOGY

A literature review was carried out based on references of variety readings materials. The references is extract from books, websites, articles, and journals. The reading is according to the specific topic of the study. The research begins with findings of the important information about common opening used in our buildings through literature review. The openings detail is studied thoroughly involving the effectiveness of the chosen openings. Observation is taken to study about the studio environment, the materials used inside the studio and whether it affect on the lighting inside the studio. The behaviour of the user is observed based on the productivity that affected by the interior illuminance. Next, questionnaire form is provided to the user to get detail information of the ways that the user uses the studio. This method of research is consider as primary data sources as it analyse directly from the user that experience the studio environment itself. Analysis is being made after the data collection. Conclusion is made based on the trends of the user respond in the questionnaire.

4.0 ANALYSIS AND FINDINGS

4.1 Case Study

The research will be carried in architectural studios in UITM Seri Iskandar. The exact location of the studios is inside Annex 1 building in the Faculty of Architecture, Surveying and Planning. There are three studios used for this study based on different orientation.

Studio A opening is facing the west side of the building. It will get much daylight from afternoon to the evening till the sun sets. The source of daylight (opening) is absent on the east side which limit the daylight to flood in. Studio B somehow faced the south side of the building which is opposite from the sun path. This condition blocks the sun light to penetrate the spaces directly. So space is lit with reflection rays from other building and landscapes. Studio C is facing the east side of the building. It gets most of direct daylight from the sunrise till afternoon.

All three of the studios have same type of opening type which is casement windows. The detailing of the opening like height and size was also the same. The purpose of studying these three studio was because it have difference orientation which is east, west and south. So they do really have different kind of problems based of questionnaire.

5.0 CONCLUSION

When properly designed, daylighting can provide significant energy savings for building owners. We just have to find the right design and strategy to improve illumination and it is imperative to use daylighting as a primary strategy for building illumination.

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