

Lighting Analysis in Mosque Architecture in Malaysia

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ABSTRACT

The appropriate design and mixture of daylighting techniques can significantly help in improving the interior space design. Light plays an important role in famous mosques around the world but it is ignored in new built mosques of Malaysia to make a dynamic feeling and sense of God's presence in the religious space. It is proved that natural daylight design with light hierarchy and harmony has an important role in interior environment which is beable to make the human to reach the sense of serenity and concentration. The main aim of this study is to investigate and review the fundamental aspects of daylighting for evaluating how daylight as a sacred element was used in implicated mosques. For this reason firstly we analysed the mosque prayer hall by collected datas from literature and observation to evaluate the current situation. The results indicate that the openings for daylight entrance should be designed in a way to achieve hierarchy, harmony and designed patterns with daylight during the pray time in the prayer hall. Methods, techniques and designs which have discussed in this paper are suggested solutions for pupose of enhancing sense of sacred by using natural daylighting in mosque prayer hall.

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INTRODUCTION

Light, a visible immaterial element which can demonstrate great meanings and affects in a spatial structure. Beauty and power of light are depended upon on how it is scattered into the designed space. It can be considered as an architectural element to create a pleasant visual environment by making the building soulful. Light does not only facilitate the visual task, but also augments and contributes to the feelings of human. When the light flows in the space, hardness and coldness of the place will be reduced and will make it a shelter for our spirit[1]. Light is like the soul for a solid structure and was known as appearance of divine, so architects used it in the religious places as miraculous substances [2].

Daylighting was defined as interplay of natural light and building form to provide a visually stimulating, healthful, and productive interior environment [3]. Daylight is a source that is most closely light which matches the human visual response and provides a more pleasant and attractive element for indoor environment[4]. In this research we probed and evaluated harmony, hierarchy of daylight and sacred space design in mosque's prayer hall with natural daylight. The main we looked for was the way of using the light, the way daylight entered in to the prayer hall and the light patterns and designs made by natural light.

Methodology:

Research method designed for this study was based on case-study, combined with descriptive-analytic and comparative-analytic tactics. The data collection process was restricted to analyzing collected data from observed case study mosques. This study has done in three phases of data collection to gain all objectives. As illustrated in figure1, the first phase was collecting information from reading sources. Second phase was observation from case study mosques and third phase was analysing case studies by plan and section (Figure1).

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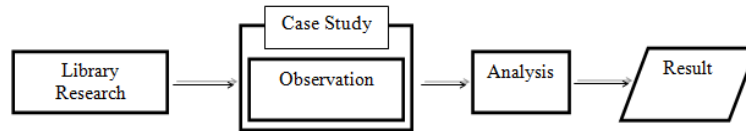


Fig. 1: Flowchart illustrating the process of research.

Case Studies:

For this research four case studies from Malaysian mosques were chosen in order to investigate the lighting in details, define the relations and identify differences and similarities. Criteria for choosing these case studies were; being a federal territory mosque with capacity of holding over 15,000 people in city of Kuala Lumpur or Putrajaya, two cities where cultures, religions and politics of Malaysia met and interacted (Table 1).

Observation:

Library research method was applied as the data gathering to find lighting techniques, lighting effects and psychological perceptions of light. Observation was employed to study and evaluate implicating daylight in prayer hall of mosques. The observation was carried out in prayer hall around 1:30 p.m. and around 4:30 p.m. (time for afternoon and evening prayer) studying on daylight, I observed for spots that people chose to stay for their pray, the hall size, number of light-openings, types of openings, characteristics and position of the windows, size and depth of windows, shape of the space, role of light, prayer-hall's height, practical light usage in defining zones and boundaries with light, light expands, distinguishing and accentuates spaces, creating links to guiding peoples movement and delineates one area from another with light, hierarchy of light and shadow.

RESULTS AND DISCUSSION

As Table 1 illustrates, chosen Malaysian mosques are open-round mosques with shadings around the main hall. There are two main parts which has the most opening, one is under the dome and the seconde one was around the prayer hall instead of the walls. In three mosques except Besi mosque, parayer hall was surrounded with shadings, so the prayer halls have an indirect light, a light which is reflected from environment around the prayer hall.


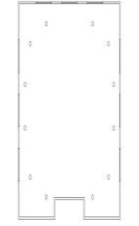
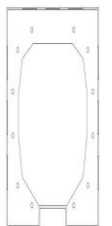
As shown in Table 2, light does not have a independent role as an element and its just used for a simple lighting with same value the prayer hall, there is no light border, no pattern designed with light. Daylight designed for two mosques, Putra Mosque and Negara Mosque, is not a sufficient light and its necessary to use electrical light. There was no special controled daylight from openings designed considering annual sunpath to have direct sunlight during the prayer time.

The importance of light hierarchy and harmony is to imagin the meanings for attendants and prepare them psychological for the pray by visual effect of light, giving them serenity to concentrate on their pay.

Summary:

Light can be considered as an sculpture to give different effects to space depending on how its designed in that space. Daylight is a lighting obtained from direct sunlight source and provides the best source which comfortably matches with human visual response. In cases such as identifying acceptable and convenient ways for increasing effective daylight in prayer hall as an architectural element to design a sacred space for the attendants, questionnaires, light measurement and simulation are useful for further results.

Table 1: Case Study Mosques.

No	Name of Mosque	Section	Ground Floor Plan	First Floor Plan	Mosque Position (latitude and longitude)	Year	Capacity	Location	Architectural Style
1	National Mosque (Masjid Negara)				3° 8' 30.255" N 101° 41' 28.964" E	1965	15,000	Kuala Lumpur	Modern



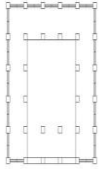
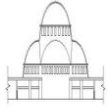
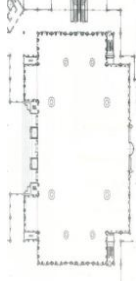

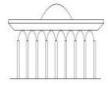


2	Putra Mosque				2° 56' 10.018" N 101° 41' 20.260" E	199 9	15,000	Putrajaya	Mixed
3	Wilayah Mosque				3° 10' 19.416" N 101° 40' 13.949" E	200 0	17,000	Kuala Lumpur	Ottoman
4	Besi Mosque (Masjid Tuanku Mizan Zainal Abidin)				2° 55' 9.507" N 101° 40' 52.086" E	200 9	24,000	Putrajaya	Modern

Table 2 : Mosques Analyziz.

No.	Mosque	Role of light openings	Light making zone & boundaries	Hierarchy of light & shadow	Proportion of the walls with widows	Patterns made by light
1	National Mosque	Just illumination of interior considered	No zones or boundaries designed with light	No playing with light and shadow	High amount of widows used under the dome and walls	No patterns
2	Putra Mosque	Just illumination of interior considered	No zones or boundaries designed with light	No playing with light and shadow	High amount of widows used on the walls but with shades	No patterns on floor, Just in the dome
3	Wilayah Mosque	Just illumination of interior considered	No zones or boundaries designed with light	No playing with light and shadow	High amount of widows used	No patterns on floor, Just in the dome
4	Besi Mosque	Just illumination of interior considered	No zones or boundaries designed with light	No playing with light and shadow	High amount of widows used	No patterns on floor, Just on the walls

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