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# THE DESIGN OF THE ROOF OF A MOSQUE AND HOW IT AFFECTS THERMAL COMFORT

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## **Abstract:**

The inconsistent temperature in Malaysia affects the surrounding and comfort of people. For mosques the thermal comfort and the design strategies for the roof and openings are very important for their conduciveness. The aim of this research is to investigate the relationship between the roof of a mosque and its thermal comfort within its interior. Does the roof really affect the temperature of a mosque? In order to find the truth a few methods were used. Firstly, questionnaires were distributed to the users and secondly, observations were made inside the mosque. The expected result is that the roof plays a vital role in the thermal comfort of the mosque.

**Keywords:** Attire, Openings, Roof

## **1.0 INTRODUCTION**

Thermal comfort in buildings is very important to the users. This is to provide work efficiency, smoothness of work progress and also productivity. For mosques, thermal comfort is affected by openings and the first aspect of great thermal comfort is the type of roof design. Different types of roof will provide different thermal comfort. The mosque is usually used to conduct prayers but sometimes other activities are also held in the mosque. Therefore, suitable thermal comfort is very important to ensure the activities are carried out in a comfortable manner.

## **2.0 LITERATURE REVIEW**

Comfort can be defined as the sense of coziness. While, thermal can be defined as the temperature. So thermal comfort can be defined as “that condition of mind that expresses satisfaction with the thermal environment” (Meshack et al., 2014).

## **3.0 METHODOLOGY**

Observations were made inside the mosque. The activities held and the number of visitors visiting the mosque were observed in order to have a clear vision of the work efficiency in the mosque. The attire of the visitors was also observed. This was to identify how comfortable the visitors were in the mosque. Observations were also made with the calculation of the ventilation coming in and also the openings of the mosque itself. Apart from that, questionnaires were distributed to the visitors of the mosque. In the questionnaire, few questions focused on how comfortable the visitors felt when visiting the mosque. Besides that, questions on time spent at the mosque and attire worn were also asked. The questionnaire is intended to shed light on the thermal comfort of the building.

## **4.0 ANALYSIS AND FINDINGS**

Analysis and findings were compared between two different mosques located in the capital city of Kuala Lumpur. The thermal comfort of the two mosque analyzed were ISTAC Mosque and National Mosque.



Figure 1: photos of National mosque (left) and ISTAC Mosque (right)

Table 1: Data of internal temperature, humidity and air velocity of ISTAC Mosque

DAY	TIME	TEMPERATURE (C)	HUMIDITY (%)	AIR VELOCITY (MPH)
20 Oct	9 am	26.0	10	2.5
	12 pm	30.0	6	1.8
	3 pm	33.0	7	2.3
	6 pm	28.0	25	4.8
27 Oct	9 am	27.0	1	3.0
	12 pm	30.0	6	2.6
	3 pm	29.0	18	3.5
	6 pm	26.0	28	4.5
10 Nov	9 am	24.0	9	3.0
	12 pm	26.0	7	3.0
	3 pm	27.0	12	4.0
	6 pm	24.6	10	3.0
24 Nov	9 am	25.8	3	4.8
	12 pm	24.7	16	3.6
	3 pm	28.9	15	6.5
	6 pm	27.4	20	5.5

Table 2: Data of internal temperature, humidity and air velocity of National Mosque

DAY	TIME	TEMPERATURE (C)	HUMIDITY (%)	AIR VELOCITY (MPH)
15 Oct	9 am	28.1	17	2.1
	12 pm	33.6	8	1.3
	3 pm	31.6	9	1.5
	6 pm	31.0	10	1.8
25 Oct	9 am	29.2	7	2.2
	12 pm	32.6	12	3.14
	3 pm	30.5	18	3.25
	6 pm	30.0	26	4.18
	9 am	27.9	6	0.9

28 Oct	12 pm	33.4	9	1.9
	3 pm	32.9	11	6.2
	6 pm	31.3	16	5.69
17 Nov	9 am	28.4	12	2.6
	12 pm	30.7	32	1.8
	3 pm	29.6	18	3.0
	6 pm	28.0	7	2.12

## 5.0 CONCLUSION

From the study it is found that roof design is really important in affecting the thermal comfort of the spaces inside the building. It is suggested that more sustainable roof be designed to cater for the comfort of users. The term sustainable includes the major identity of Malaysian style of architecture which hopefully can be implied in the design. Thus, suitable thermal comfort can be achieved for the users. Suitable thermal comfort will make users feel happy to visit and carry out their activities without any interruption and hesitation.

## REFERENCES

Meshack, O., Efeoma, M.O. & Ola Uduku, (2014) Assessing Thermal Comfort and Energy Efficiency in Tropical African Offices Using the Adaptive Approach. *Structural Survey*, 32(5), pp.396-412