



UNIVERSITI
TEKNOLOGI
MARA

College of
Built Environment

Poster Book

IIIDBEE X 2023
20 JANUARY 2023
*International Invention, Innovation & Design Exposition
for Built Environment and Engineering 2023*

**College of Built Environment
UiTM Puncak Alam**
20 January 2023 | Friday

Editors:

*Dr Aidatul Fadzlin Bakri, Nurzafira Zainul Abidin, Sr Dr Noor Akmal Adillah Ismail,
Dr Har Einur Azrin Baharuddin, Assoc. Prof. Ts Gs Dr Abdul Rauf Abdul Rasam*



**Unleashing Potentials
Shaping the Future**

CONTENTS

01 Contents

02 Preface

03 Welcome remarks

04 Exhibition layout

05 Event programme

06 List of entries

**07 Poster category: Academician &
Professionals**

08 Poster category: Postgraduate

09 Poster category: Undergraduate

10 Appreciation

EXPOSITION OF TRADITIONAL MALAY HOUSE ARCHITECTURAL DESIGN ELEMENT INFLUENCING INDOOR THERMAL PERFORMANCE

IIDBEE X 2023
20 JANUARY 2023
International Invention, Innovation & Design Exposition
for Built Environment and Engineering 2023



ABSTRACT

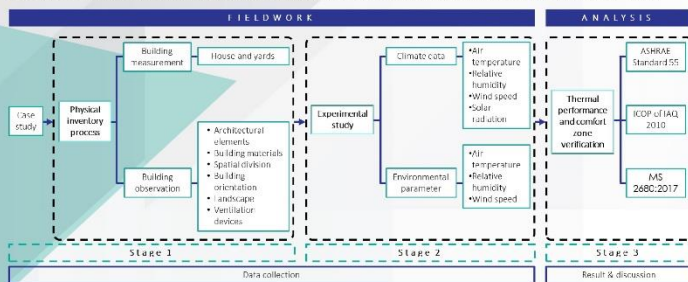
Traditional Malay houses (TMH) practicing climatic design strategies are acknowledged to have more acceptable thermal performance than modern residential houses. Unfortunately, due to contemporary science and innovation, the Malay house has undergone countless changes and is constantly threatened. This study aimed to assess the indoor thermal performance of Negeri Sembilan Malay houses for a sustainable approach to modern residential houses in the tropical environment. The fieldwork method was executed by observation and thermal measurement. The result shows that 20% of the overall data falls inside the recommended thermal comfort range when comparing the ASHRAE 55 and ICOP comfort levels. The house is in a comfortable condition in the morning where the indoor temperatures are between 25 and 27°C. Wind flow are within the comfort level ranges between 0.12 and 1.25m/s, while the RH level was 50-60%. Therefore, the primary finding were emphasized on five aspects of TMH construction that have a direct impact on the thermal performance of the house: size of the space, openings, floor and roof heights, materials, open compound areas, and building settings. A theoretical framework is developed in assessing the indoor thermal comfort of TMH. Thus, this study aspires to provide useful insights regarding the effectiveness of practices in the climatic design strategies of a TMH through the sustainable practices in modern residential design which aligned with the Twelfth Malaysia Plan (RMK12) Theme 3.

01 INTRODUCTION

To achieve optimal climatic control, the traditional Malay houses (TMH) are designed appropriately to suit specifically the vagaries of the tropical climate of Malaysia. They are appreciably suited to the local climate. TMH is among the best traditional houses that practice climatic design strategies (Johari and Said, 2021). It is known for its distinctive characteristics of the climatic design i.e., architectural design element that give a positive response to the thermal condition. Research on the evaluation of the thermal performance of TMH in Malaysia has been widely done. TMH practicing climatic design strategies are acknowledged to have more acceptable thermal performance than modern residential houses. This study aimed to assess the indoor thermal performance of Negeri Sembilan Malay houses for a sustainable approach to modern residential houses in the tropical environment.

04 METHODOLOGY

A mixed methods of fieldwork on site were applied consists of physical inventory of the building by observation and experimental study using climate data and environmental parameter of TMH.



02 ISSUE

NEGLECTION OF TRADITIONAL CONSTRUCTION TECHNOLOGY

Contemporary science and innovation, TMH has undergone countless changes and is constantly threatened

03a AIM

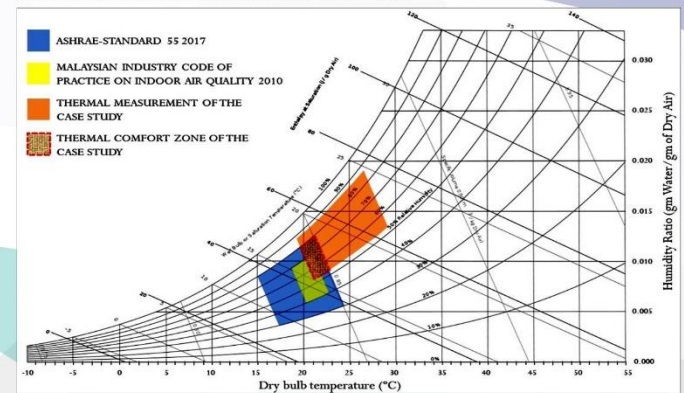
To assess the indoor thermal performance of Negeri Sembilan Malay houses for a sustainable approach to modern residential houses in the tropical environment

3b OBJECTIVE

To develop a framework the design features which influence the indoor thermal performance of the Malay house

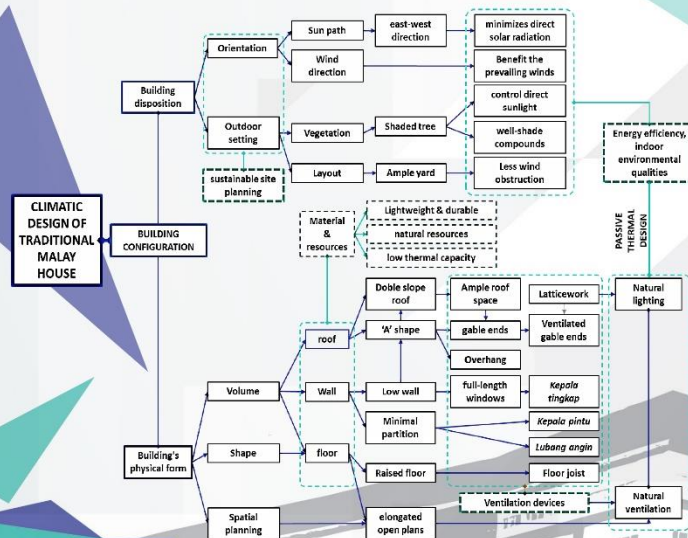
05 RESULT & FINDINGS

20% of the overall data in the thermal comfort range in ASHRAE 55 and ICOP comfort levels. The house is in a comfortable condition in the morning with temperature 25-27°C. Wind flow are varying within the comfort level range 0.12-1.25m/s, while the RH level was 50-60%. Therefore, there are five aspects of Malay house construction that have a direct impact on the thermal performance of the house: areas of spatial, openings, floor and roof heights, materials, open compound areas, and building settings.



06 NOVELTY

A theoretical framework is developed to acknowledge and comprehend the TMH's climate adaptations. The framework intends to facilitates future research in assessing the indoor thermal comfort or climatic effects assessment of TMH.



A theoretical framework is developed to acknowledge that the energy efficiency for indoor environmental qualities via natural lighting and natural ventilation were scientifically contributed by building deposition, building configuration and building physical form.

07 CONCLUSION

This study has demonstrated the essential strategies that existed in TMH, technically. The passive and climatic design strategies in TMH have a lot to offer to develop building construction, especially in the tropical country of Malaysia to attain a degree of passive control, thus providing comfortable conditions. It can be deduced that there are five architectural design elements that directly influence thermal performance which lead to indoor thermal comfort: size of the space, opening, floor and roof heights, materials, open compound area, and building settings. A theoretical framework is developed as a literature framework and facilitates future research in assessing the indoor thermal comfort of traditional Malay house. Thus, this study aspires to provide useful insights regarding the effectiveness of practices in the climatic design strategies of a traditional Malay house through scientific discussions of the sustainable practices in modern residential design which aligned with the Twelfth Malaysia Plan (RMK12) Theme 3.

08 REFERENCES

- ASHRAE. (2017). ANSI/ASHRAE Standard 55:2017 User's Manual: Thermal Environmental Conditions For Human Occupancy. American Society of Heating, Refrigerating, and Air-conditioning Engineers, Inc. <http://www.ashrae.org/>
- Johari, M. N., and Said, S. Y. (2021). A comparative analysis between traditional malay house and terraced house in energy conservation. IOP Conference Series: Earth and Environmental Science, 688(1), 012012. <https://doi.org/10.1088/1755-1315/688/1/012012>
- Teo, D. H. C., and Kibretse, E. (2014). Potential Application of Vermicular Passive Cooling Techniques to Naturally Ventilated Modern Terraced Houses in Hot-Humid Climate of Malaysia. <https://doi.org/10.3130/aijt.19.219>
- Teo, D. H. C., and Kibretse, E. (2013). Field measurement on thermal comfort in traditional Malay houses. AU Journal of Technology and Design, 19(4), 219-224. <https://doi.org/10.3130/aijt.19.219>
- Yusoff, Z., Yusof, A. F., and Nordin, T. E. (2021). Lukisan Terukir Rumah Tradisional Malay. Dewan Bahasa dan Pustaka.

09 CONFERENCES & PUBLICATION

- Hassin N S F N and Misni A 2023 The Evaluation on Thermal Performance of Rumah Negeri Sembilan Berserambi Dua dan Beranjung International Journal of Built Environment and Sustainability Vol. 10 (2) - ACCEPTED
- Hassin N S F N and Misni A 2022 Developing methodology to assess the thermal comfort of traditional Malay house IOP Conference Series: Earth and Environmental Science 1067 1 012023

PREPARED BY:

NIK SITI FATIMAH NIK HASSIN | njsfatimahhassin.work@gmail.com
Institute of Postgraduate Studies, College of Built Environment, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia

ALAMAH MISNI | alamahmisni@gmail.com
Centre of Studies for Landscape Architecture, College of Built Environment, Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia