

TYOLOGY OF MALAY TRADITIONAL BUILDING CONSTRUCTION CASE STUDY: BAWI MALAY HOUSE IN KAMPUNG EMPAT BALAI, KAMPAR

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Abstract. Kampung Empat Balai is one of the old villages in Kuok District, Kampar Regency. The kampung comprises traditional Malay houses as cultural heritages that urge to preserve. The house has a unique roof shape and carvings pattern. However, the house is endangering due to a lack of maintenance. This research has aimed to identify the construction of houses that belong to the Bawi ethnic group people. A qualitative descriptive approach has been carried out to investigate and analyse this Malay house. This research found that the Bawi's house has a curving roof type which is known as part of the Lontiok roof type. This stilt house has a structural system in the form of a series of line elements with non-rigid joints that bind each other using notches and pegs as a connection system that is anticipated for earthquakes. Materially, this Bawi House uses wooden-based materials throughout its construction systems, such as floors, walls, columns, girder beams and roof trusses.

Keywords: Malay house; traditional construction; lontiok roof; wooden-based materials

I. INTRODUCTION

Kampar Regency is a rich cultural area with a plenty of cultural heritage objects. It is not surprising as the regency has existed for centuries from the Muara Takus period to the Kampar kingdoms that followed it. According to historical research, there was the kingdom of Lindung Bulan (Kuok) in the 11th century and then known as Koto Perambuhan, East Kampar District [1]. The existence certainly constructs cultural significance both in tangible and intangible forms. One form of cultural existence is the presence of traditional houses. In-depth, the physical structure of the house that exists in the Kuok Village area has shown a very strong cultural pattern. In this research, the house has been found a residential that is located in Empat Balai Village. The Traditional house at the Kampung Empat Balai has been used as a place to live by the local community. One of the traditional buildings that still exists today is known as the Malay House of the Bawi ethnic people. The Bawi's Malay Lontiok House which is the object of this research built-in 1342. The Bawi's Malay house is one of the traditional buildings that exist today. The construction of traditional houses requires a long process involving local communities and traditional ceremonies. The Bawi's house expresses the attractiveness of architectural art that reflects the Malay culture. In comparison to other Malay houses, the Bawi's house is unique in its type. The typology is generally similar to the form of the Limas Malay house in Pekanbaru, the Lontiok house in Kampar, Begonjong houses on the Mount Toar, screen and winged roof houses in Sentajo, Crossbreed Malay houses (mixed ethnic Chinese) in Bagan Siapiapi and

Selat Panjang, as well as several typical Malay houses in other areas [2]. In addition, the typology of the Bawi's house has tall pillars [3]. Kassim [4] says that the roof of a Malay house traditionally reflects not only the origin of its inhabitants but also their social and financial status.



Figure 1. The front door of the house was built-on carved on the inner wall of the house

Source: Research documentation, 2022

Structural systems are generally divided into four groups that are based on the geometry of the elements, the stiffness of the support structure and the forming materials. Based on the geometry of the structure, the formation can be classified into line elements/arrangements of line elements. Based on the stiffness, the structure is known as a rigid or non-rigid structure. Structural elements are usually rod elements that do not experience insignificant changes in shape

when given a force or load [5]. The structure in the building has the function of channelling the loads carried by the building either in the form of dead loads (self-weight) of the building or moving loads both horizontally and vertically. A structure should withstand all loads acting on the structure efficiently and safely [6]. The materials of the house are wooden-based, concrete and steel. The most basic way to determine the various types of structures is to define the structural systems used, such as one-way or two-way structural systems. In addition, the forming material is also used to classify the type of structure used.

II. RESEARCH METHODS

This research uses a qualitative descriptive method with a case study. The case study was carried out to analyse phenomena that occur at a time and activity and collect detailed and in-depth information using various data collection procedures [7]. This approach was taken as an attempt to look in detail at the construction system of the Bawi's Malay house. Data collection was carried out through field observations to determine the existing condition of the House by taking photographs, recording, measuring and field sketches as well as direct interviews with residents/owners and traditional leaders in Empat Balai Village in order to obtain profile data and the history of the construction of the Bawi's Malay house. Data processing has been carried out through an analysis process in the form of data comparisons based on facts in the field survey. From the data obtained, a model of the current condition of the Bawi's house was created and then sorted from interviews and literature studies. This process was conducted because the Bawi's house had undergone a change in shape, especially on the roof.



Figure 2. View of the Bawi Malay Lontiok house
Source: Personal documentation, 2022

III. RESULTS AND DISCUSSION

The name Lontiok house in this traditional house is due to the shape of the roof which bends upwards at the ends. This lontiok roof type has a philosophy of human life that has

a beginning and an end and returns to the creator. Meanwhile, in the middle of the dome, it symbolizes the valley of life which is sometimes full of trials [8].

The construction system for the Bawi's house is a stilt building typology with wooden-based materials for each of its construction elements. The main pillars, girder beams, floors, walls and roof trusses use wood materials. Overall the structural construction system of the Bawi's house can be divided into 3 (three) layers, namely the lower, middle and upper building construction. The lower structural elements are the foundation, columns and girder beams. The central construction elements are floors, frames and ceiling coverings, walls, and doors and windows. While the upper construction elements are the frame and roof covering.



Figure 3. Details of the foundation structure of the Bawi Malay Lontiok house

Source: Personal documentation, 2022

The construction of the lower structure of the house is made as a not rigid (dead) which functions as a pedestal that can move vibrations that occur due to an earthquake. In addition, the foundation structure does not directly come into contact with the ground but is placed on a rock which serves to reduce wood material from being directly exposed to water so as to avoid the weathering process.



Figure 4. The construction system of the Bawi Malay Lontiok house
Source: Analysis

The structural construction in the middle which consists of columns/main pillars and girder beams has a vertical and horizontal geometry to form a frame. The main column construction of the main house is 18 with 6x3 modules. The grid pattern of column structures forms spaces to create buildings with structural volumes that can adapt to space requirements [9]. The columns in the main house consist of 6 rows with each row consisting of 3 rows and the second row is the tallest column that forms the lontiok roof. The main structure of the column is in the form of continuous wooden-based material from the foundation to the roof with a length according to the height of the house building which is continuous with an octagonal shape. The height of each column is adjusted to the height of the oval-shaped roof covering. This column also functions as a support for the roof construction.

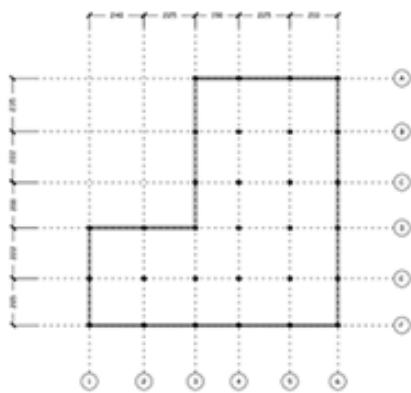


Figure 5. Column plan of the Bawi Malay Lontiok house
Source: Analysis



Figure 6. Continuous columns construction of the Bawi Malay Lontiok house
Source: Analysis

The system of girders at the Bawi house has 7 (seven) girders in the longitudinal direction between the columns (current conditions have undergone a change of material from the original material). In addition, there is also a girder beam that is larger in the vertical direction which is located further below the longitudinal girder.



Figure 7. Girders construction of the Bawi Malay Tribe Lontiok house
Source: Personal documentation, 2022

The connection system used to connect all the elements between the column structure and girder beams as well as columns and tie beams uses a notch system using pegs as reinforcement without using nails.

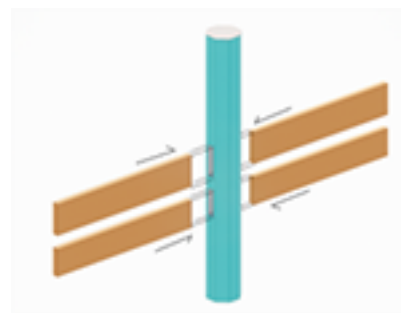


Figure 8. Column isometric of the Bawi Malay Lontiok house
Source: Analysis



Figure 9. The Lontiok house connection system of the Bawi Malay people
Source: Personal documentation, 2022

The wall construction of the Bawi's house both inside and outside the house is in the form of plank walls. The pattern for installing the walls of this house uses a pattern of overlapping. This can be seen where there are overlapping boards and overlapping boards and are mounted vertically.



Figure 10. Construction of the outer wall of the Bawi Malay Lontiok house

Source: Personal documentation, 2022

The inner wall is installed not directly touching the floor but is raised as high as 10 cm to place the wall construction horizontally giving a carving motif. Before installing vertical walls, beams are installed first to strengthen the wall construction.



Figure 11. The interior wall construction of the Bawi Malay tribe's Lontiok house

Source: Personal documentation, 2022

The construction of a square-shaped staircase with the foot of the ladder is given a pedestal as the base. The top of the ladder is placed obliquely to the door and the steps are flat.



Figure 12. The construction of the house of the Bawi Malay Lontiok House
Source: Personal documentation, 2022

IV. CONCLUSION

The building system of the traditional house of the Bawi Malay ethnic people has undergone some changes. This change is due to weathering of the structural material, which affects the strength of the building. This can be seen in the foundation, which initially used the stone as a support, but has now altered to using concrete. On the column directly to the foundation, a coating is carried out using concrete material as a structural reinforcement. Other changes can also be seen in the roof, which was originally oval-shaped, but now has changed to a gable roof. The construction of the Bawi's house in the structural elements that have geometry in the form of a series of vertical, horizontal and diagonal elements. The construction of the foundation structure uses a pedestal system by only placing column elements on top of the base so that it is classified as a non-rigid structural system. The entire column construction uses wood material which is continuous without a connection from the foundation to the roof. Column and girder element connections use a notch system with pegs as reinforcement. The wall elements are mounted vertically between one wall and one against the wall other, this pattern is also called the pattern of overlapping. In general, the structural construction system uses a notch connection with a peg as its fixing element so that this structure can be categorized as a non-rigid structure capable of withstanding the horizontal forces that occur due to earthquakes.

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