Decorative Elements of Traditional Malay Houses: Case Study of Rumah Limas Bumbung Perak (RLBP)

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Abstract
The existence of decorative elements in traditional Malay houses represents the integration between functionalism and aesthetics of architecture. Its ornamentation, form and pattern particularly in woodcarving and bamboo weaving reflect the uniqueness of local craftsmanship and the master carvers. Defined as non-structural and “additional” member of the building there are at least 15 (fifteen) decorative elements of the traditional Malay house that have been identified by previous researcher. There are Tunjuk Langit, Sisik Naga, Sulur Bayung, Ande-Ande, Pemeleh, Kepala Cicak, Tiang Gantung, Lebah Bergantung, Kekisi, Gerbang, Gerbang Pintu Sesiku Keluang, Pagas Musang, Kepala Pintu and Kepala Tingkap. Architecturally in Malaysia traditional houses were categorised based on roof design, spatial organization and geographical setting which finally this categorization were named after the states. Every traditional house in the state of Malaysia signifying particular style and architectural characteristics of that particular state. This article discusses the study of those decorative elements on the traditional Malay houses in the state of Perak known as Rumah Limas Bumbung Perak (RLBP). With the objective is to investigate the type, terms and characteristics of decorative elements site observations were done on selected thirty (30) RLBP houses located along Sungai Perak. Sungai Perak is the second longest river in peninsula Malaysia recognised as the site of early Malay settlement in Perak. The analysis on visual data and verbal data were carried out to established architectural terminology and typology based on form and style of every decorative element. The study found that nine (9) decorative elements come to be the major characteristics of RLBP; some with different name, form and style from other states. These similarity and dissimilarity contributes to the enrichment of the aesthetical theory and philosophy of the Malay traditional house in Malaysia.

Keywords: Decorative elements; Malay traditional house; Rumah limas bumbung perak.

1. Introduction
Traditional architecture despite being regarded as primitive or out dated has always been the main source of references in the social and cultural studies by architects, historian and anthropologists. Thus, ‘architecture is the manifestations of the society and their cultural practise. It reflects the society’s way of life, their belief and philosophy; all encompassing; forms important components in the uniqueness of a culture.’ (Ezrin Arbi, 1997).

In the state of Perak the development and expansion of the traditional Malay villages and towns during the colonial era outlined an interesting collection of architectural study. Architectural study along Sungai Perak established two types of architecture which are:

i. Traditional Malay architecture
ii. Colonial architecture

The traditional Malay architecture found along the riverbank of Sungai Perak are mostly in the form of old Malay palaces, traditional houses and mosques whilst the colonial architecture are mostly located in several towns along the river such as Kuala Kangsar, Parit, Bota, Pasir Salak, Kampung Gajah and Teluk Intan where many
houses, schools, offices, rest houses, mosques and hospital still stands and in use to this day. A typological study of the traditional architecture established at least two main categories or architectural styles:

i. *Rumah Bumbung Melayu* or *Rumah Kutai* (RBM)

ii. *Rumah Limas Bumbung Perak* (RLBP)

Study done by Anuar Talib (2005), (Norhasandi Bin Mat, 2010) and (Mohd, 2018) found that RBM were the earlier architectural style of the Perak Malay houses in comparison to RLBP. Apart from the timeline, the roof design and construction detail also marks the different between the two houses. The earliest house of RLBP found was built circa 1900’s and continue until 1970’s with certain architectural design development.

### 1.1. Decorative Elements of Traditional Malay House

Few study have been done on decorative elements of traditional malay houses. With reference to diagram 1.0, Mohd and Sufian (2013) listed 15 (fifteen) decorative elements within a particular traditional Malay house which are:

1. Tunjuk Langit
2. Sisik Naga
3. Sulur Bayung
4. Ande-ande
5. Pemeleh
6. Kepala Cicak
7. Tiang Gantung
8. Lebah Bergantung
9. Kekisi
10. Gerbang
11. Gerbang Pintu
12. Sesiku Keluang
13. Pagar Musang
14. Kepala Pintu
15. Kepala Tingkap

![Diagram-1. Decorative Elements in Traditional Malay Architecture](image)

He further defined all the elements as follows:

1. **Tunjuk Langit** – literally means pointed to the sky
It is a piece of decorative element in an upright position at the tip of the gable end; commonly used in houses and palaces in Peninsula Malaysia. In general this type can be further categorised into few basic types; i. batang (rod), ii. bulat (rounded) iii. silang (cross) and iv. bunga (floral). The batang type is a piece of decorative timber or rod and is commonly used for Bumbung Limas roof. It has been observed that the the rounded and floral is commonly used on bumbung perabung lima or pyramidal type of roofing and is positioned in the middle top of the roof. Most are made of carved timber solids but of late there has been practices found to have used the concrete mix similar to the one used for the Malay gravestones. Commonly called buah buton in Kelantan and buah gutung in Terengganu.

**Fig-1.** (left to right) Tunjuk Langit batang (rod), silang (cross), bulat (rounded) and bunga (floral)

Source: Site observation

2. **Sisik Naga** – literally means dragon fin

*Sisik naga* refers to the decorative carvings along the ridge of a roof (perabung and rabung atap). *Sisik naga* are decorative architectural elements can be found in palace architecture, residential and religious buildings in Indochina, Malaysia, Thailand and Indonesia. Other names are kemuncak, naga-naga, puncak rabung.

**Fig-2.** Sisik Naga as seen on the ridge (perabung) of Istana Jahar, Kelantan

Source: Site observation

3. **Sulur Bayung**

*Sulur bayung* refer to a decoration on the corner of a roof edge. Other names are sulu bayung, sayap layang-layang, sayap layangan, ekor Itik, anjong balla’, som. In the traditional architecture of Bugis Makasar it is also called anjing balla, that means a decoration on the corner of a roof representing the creeping plants. **Mohd and Sufian (2013)**. Based on observation there are three typological styles of sulur bayung that can be classified as (figure 3):

**Figure-3.** (left to right) Sulur bayung curled type as used on Masjid Wadi Hussein, Teluk Manok, Patani, Thailand; curved type also called ekor itik (literally means duck tails used on Istana Jahar, Kota Bharu, Kelantan; figurative type used on a house (wakaf) in Tumpat, Kelantan

Source: Site observation

4. **Ande-ande**

*Ande-ande* is the horizontal decorative timber roof eaves covering the timber rafters (kayu kasau) Other names ande-ande are papan meleh, papan pator, papan cucuran atap, papan kaki atap, kening, papan tumpu kasau, papan cantik. There are at least two types of ande-ande which are the single piece type with carvings on a single long timber piece and multiple pieces) with carvings on multiple timber pieces arranged side by side.(**Mohd and Sufian, 2013**)


5. **Papan pemeleh**

Other names for *kayu pemeleh* are *peles*, *pemeles*, *papan layan*. *Kayu pemeleh* is actually a pair of timber pieces located on two fascia ends of a gable roof (*tebar layar*). The ones covering *kasau lintang* or *kasau jantan* is called *peles* or *pemeleh* in Kelantan and Terengganu but called *papan layang* elsewhere. *Kayu pemeleh* or *peles* is shaped slightly curving and sharpens towards the top as a sign of strength in the design language of houses in Kelantan, Terengganu on the East coast and also in Cambodia and Pattani in Thailand. *Yusoff and Rashid (2012)*

6. **Kepala Cicak** - literally means lizard head

*Zulkifli Hanafi (2000)* identified *kepala cicak* as a type of end decoration to *tumpu kasau* or *papan meleh*. There are two types of *kepala cicak* which are the ‘L’ type with the end timber pieces positioned abutting to one another at corners of the roof eaves (*bucu atap*) and the ‘I’ type with a single end timber piece positioned on chamfered corners of roof eaves (*bucu atap*) (figure 5 and 6).

7. **Tiang Gantung** - literally means hanging column

Other names for *tiang guntung* are, *saka bentung*, *tiang guntung*, *tiang sotoh*. Traditional houses in Negeri Sembilan it looks like a small carved hanging column positioned at the tip of the alang that is supporting the main *kasau jantan serambi* and is called *tiang guntung*. Also called *saka bentung* in the traditional Javanese architecture and on the house of Negeri Sembilan it is known as *tiang sutoh*.

8. **Lebah Bergantung** – literally means hanging bees

*Halim (1987)*, *Norhasandi (2012)* and *Jahn. (2017)* uses *lebah bergantung* (hanging bees) to describe it in his narration of Kutai houses in Perak; as a style of hanging column at the end of *alang panjang*, rumah ibu, that is constructed as a set (left and right) on the bottom of the gable end of the roof (*tebar layar*). It is round in shape the size of the local water vessel (*labu air*) looking very similar to the bees’ nest.
Figure-8. Lebah Bergantung - decorative piece usually shaped like a pumpkin place below the point where crossbeams meet

Source: site observations

Figure-9. Kekisi - Apart from aesthetical reason Kekisi function as safety features and security device at the opening of a window

Source: site observations

9. **Kekisi** (*other names* Kisi-kisi, kekipas, jeriji, jeruji, terali,*). Decorative piece of timber or rod used at the opening of a window function as window grill.(fig 9)

10. **Gerbang** (*Archway*)
    Decorative piece of timber as an arch at entrance of a house or used for dividing space usually between Anjung and Rumah Ibu of the main house.

11. **Gerbang Pintu** (*Arch door*)
    Decorative piece of timber at the top of the door opening .

Figure-10. (right). Gerbang - Decorative arhway at the entrance and also can be found as separator between two spaces such as anjung and rumah ibu (the main house)

Fig-11. (left) – Gerbang Pintu Decorative piece of timber at the door opening symbolised welcoming or warm greeting to the guest

Source: Site observation

12. **Sesiku Keluang** (*other names* Tupai-tupai, Tetupai)
    Decorative piece of timber normally in shape of triangle fix to the column and sometime function to support the beam. Otherwise it is for decorative purpose.
13. **Pagar Musang**

Balustrade in the form of timber rod or timber plank often beautifully carved and arranged to decorate the window opening. It is function as safety features apart from its aesthetical role. Other names known as Jeriji, Jerejak, Pagar Tinggalung.


Decorative piece of timber on top of the door. Normally carved with floral pattern, Quranic verses calligraphy or simple motif of jejala (lattice work). Apart from aesthetical reason its function is to allow sufficient cross air ventilation to flow into the house.

15. **Kepala Tingkap** (literally means window head)

Decorative piece of timber on top of the window. Normally carved with floral pattern, Quranic verses calligraphy or simple motif of jejala (lattice).

2. **Research Methodology**

There are two types of traditional architecture in the state of Perak; Rumah Kutai or Rumah Bumbung Melayu (RBM) and Rumah Limas Bumbung Perak (RLBP). As mentioned earlier this study investigates type of decorative elements on RLBP. Based on previous researcher there are at least fifteen (15) decorative elements were found on traditional Malay houses all over the country. Exploratory research was carried out through site observation on houses along the river banks of Sungai Perak. Sungai Perak is an old Malay settlement that housed many traditional Malay villages. From the initial survey there are hundreds of RLBP located along the river banks of Sungai Perak. Thirty (30) houses were selected for this study and were coded (Table 1). The selection was done based on their level of authenticity, architectural type, current physical condition, accessibility and geographical factor. Many houses were found have done major renovation by the owner and has lost its ingenuity in terms of traditional architectural style. Those were built during 60’s and 70’s (post-independent era) found to be almost zero decorative elements due to few factors such as introduction of new materials, increased of timber pricing, lack of local carvers and modernism or under the influence of modern architecture. Few number of houses also found to be abandoned and ruined. These are some of the factors that contribute to the limitation of the scope of the study. Finally the selected thirty houses were considered as among the authentic RLBP that are still survives and intact representing the RLBP of Perak state (Table 1) during this study were done. Documentations of visual data were collected using EOS DSLR Canon 6D camera whilst semi-structured interview were done to collect verbal data from the owner of the house or the occupants. Both data were used to investigate and identify the existence of the type of decorative elements at selected RLBP. Results were discussed based on the visual tabulation and typological analysis produced from the study.

3. **Discussion and Analysis**

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<th>CODE</th>
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<th>Area</th>
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**Figure-12.** Geographical Location of selected 30 houses of the Rumah Limas Bumbung Perak (RLBP) along Sungai Perak

![Geographical Location of selected 30 houses of the Rumah Limas Bumbung Perak (RLBP) along Sungai Perak](image-url)
Figure-13. Tunjuk langit

Figure-14. Ande-ande

Figure-15. Kepala Tingkap

Figure-16. Papan Pemeleh
3. Discussion

This study established the characteristics and architectural style of RLBP from the decorative elements perspective. Obviously Tunjuk Langit, Kepala Cicak, Ande-Ande, Kayu Pemeleh, Kekisi, Gerbang, Kepala Pintu, Kepala Tingkap and Pagar Musang become the major decorative elements of RLBP. At least two types of Tunjuk Langit exist in RLBP. The upward type (pointing to the sky) and the downward type (pointing to the ground) were found - refer to figure 13. This piece is either in the form of rod or decorated timber piece which is carved motif installed separately or together. In the other states, the downward type of Tunjuk Langit is also termed as “tunjuk bumi” (literally means pointed to the earth). Whilst there is also possibilities that the downward tunjuk langit has been designed together with Papan Pemeleh in the case of RLBP. Papan Pemeleh of RLBP is different compared to those the iconic Papan Pemeleh of the east coast style in Kelantan and Terengganu. In the East Coast the position of Papan Pemeleh is located at the edge of the roof (to cover and beautify the rough roof edge) whilst the location of Perak style Papan Pemeleh seats directly under the apex of the roof eave, thus making the edge of the roof sheet visible. There are two types of papan pemeleh carving style in RLBP, which are:

1) Papan Pemeleh carving motifs runs continuously from the ande-ande.
2) Papan Pemeleh carving style and motifs match the carving style and motifs of Kepala Cicak and in the form of a single, large panel. In other words it is a piece of carved timber with a Kepala Cicak motif and form the downward Tunjuk Langit.

Ande-Ande of RLBP is quite similar with other states in terms of function and location. It is made either as a small carved panel installed continuously or one piece individual panel carved continuously and consistently. The latter is more popular in Perak. It can be concluded that as for roof design, Tunjuk Langit, Papan Pemeleh, Ande-ande and Kepala cicak of RLBP is considered as dominant element among other decorative elements and this contribute as major element of Perak architecture style.

Kepala Tingkap is the decorative piece located on top of the window. From the analysis it can be identified that Kepala Tingkap of RLBP is paired with Lubang Angin (literally means air hole) which located on top of kepala tingkap, spanning up till the Alang (beam). Lubang Angin can be in the form of carving timber piece or the simpler versions are Jejala (lattice) or Sisip Angin (louvres). In some of the houses where decoration are much simpler, lubang angin was used to replaced Kepala Tingkap. At least two (2) types of Kepala Tingkap identified in RLBP;

i. rectangular panel
ii. semi-circle panel

Both normally carved in tebuk tembus (perforated) with floral motifs or jejala (lattice) or sisip angin (louvres). Kekisi in RLBP only exist in the form of Jeriji (plain metal rod) installed in certain gap that fill the window opening.
Besides function as the ventilation opening, it also serves as part of the security and safety measure of the house. Similarly Kepala Pintu act the same as Kepala Tingkap.

Through this study Gerbang (arch) is identified as special character of RLBP. It can be consider as major decorative element dominating the facade of RLBP. Gerbang act as two function in RLBP:

i. Gerbang is the archway commonly decorated with the jejala motifs and located at the front entrance or main stairs of the house. Gerbang is made up of multiple arches and adorned with carved tetupai at the arch’s end. Besides adding aesthetic character to the house, Gerbang function to tones down the double volume height gap between the ground level and the first floor.

ii. Apart from archway, Gerbang function as the separators between two spaces (i.e anjung (living area) and rumah ibu or the main house.

The usage of Pagar Musang (as balustrade) at below part of long window opening depends by the types of wall of the house. In the house that uses wood panel wall (knows as janda berhias) and normally uses half window, it can be observed that the window has no pagar musang. It is commonly decorated with kekisi that fully span from the bottom of the window till the top of the window. Whilst in the house that uses full horizontal timber strip wall (knowns as bertindih kasih) and vertical or diagonal timber strips wall (known as papan bertindih kasih), the long window is commonly adorned with pagar musang.

The discussion on the study has clearly brought new level of understanding towards the architectural style of Perak traditional house specifically the Rumah Limas Bumbung Perak (RLBP). Through the decorative elements perspective this study established the major characteristics of RLBP. This findings is important in development of the Traditional Malay Architecture theory and philosophical domain.

Acknowledgement

I would like to acknowledge and extend heartfelt gratitude to The Ministry of Higher Education and Universiti Teknologi MARA (UiTM) for funding this study under the Fundamental Research Grant Scheme (FRGS). My sincere thanks to all KUTAI members for their support and provided valuable comments of this article.

References


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