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ARCHITECTURAL AND PHYSICAL CHARACTERISTICS OF INDIGENOUS LIMAS' HOUSES IN SOUTH SUMATRA

Ari Siswanto (1), Azizah Salim Binti Syed Salim (2), Nur Dalilah Dahlan (3), Ahmad Hariza (4)

(1) Ph.D. Student Universiti Putra Malaysia from University of Sriwijaya, Indonesia
ari_sisw@yahoo.co.id

(2) Assoc. Prof. Dr. Universiti Putra Malaysia

(3) Dr. Universiti Putra Malaysia

ABSTRACT

The architecture of Limas traditional house in South Sumatra is influenced by culture and environment. Limas house, differing heights of the floors, divided into 3 parts which are functioning as follows front, middle and rear. Veranda is in the front for the guests and the sons. The middle part as a centre of the house which has highest levels is for the parents and the brides or for important guests, while the rear part is for the daughters and kitchen. The way of life and the way they use their houses influence the layout, ornament and size. Culture has a huge effect on the interior and exterior of Limas house, often beautify buildings in relation to local traditions and way of life.

Limas house in tropical climates is constructed by wooden materials. It allows not only significant cross-ventilation through openings of the windows and but also useful up lift swing doors and pagar tenggalung. The houses on stilts mostly built along the riverbanks and they facing the water.

Traditional Limas house is perfect example of sustainability; it demonstrates good environmental adaptation and will not threaten its environmental. Indigenous Limas' houses meet the cultural aspects and environmental comfort in local setting.

Keywords: Limas, traditional architecture, indigenous and sustainable.

I. INTRODUCTION

Palembang lies on the island of Sumatra and is separated in two parts by the Musi River, the longest river in South Sumatra. This stream shapes the heart of the city and it gives strong influences to the daily livings of inhabitants. Along the Musi River banks stand house on stilts which types are Limas and *Gudang* houses. Most of those traditional houses are located in the tidal marsh areas. The houses by the side of the banks are facing the water; the orientation of the houses forms an elongated profile of Palembang.

Based on the topography, Palembang is located in lowlands. Water is sourced either from rivers or swamps, as well as rain water. Even today the city of Palembang, is still covered by 52.24% of the by tidal swampy areas. Musi River is a meeting point for small rivers or creeks from the entire city. The creeks are only navigable at high tide. Water transportation mostly carried out by boat. In the recent years, there are plenty of wooden old house such as Limas house still exist in Palembang.

Limas House can be found throughout the region of South Sumatra province and even in the neighbouring provinces such as Jambi, Lampung, Bengkulu and Bangka and Belitung archipelago. It isn't surprisingly if Limas house is famous as a representative of Palembang traditional house even South Sumatra traditional house. Based on the concept of Ulu – Ilir (upstream – downstream), Kathirithamby-Wells, 1993, stated that Palembang is Ilir region (central administration, city and center of power) and the rest is Ulu region (hinterland, rural and agriculture). Because of this concept, all the

A. Indigenous Architecture as Basic Architectural Design

house types outside Palembang are called Ulu house and in Palembang itself the house type is called Limas house. In fact, there are many house types outside Palembang with different architectural style including Limas house but people called it *Ulu Berundak* House (in Musi Rawas Regency). On contrary, in Palembang there is three types of house i.e. Limas house, Gudang house and Raft House and has no *Ulu* house type. It isn't surprisingly if Limas house is famous as a representative of Palembang traditional house even South Sumatra traditional house.

Wooden structures in South Sumatra have been used in all kinds of building types for long time. Timber construction has a long history and very familiar to local people, knock-down is the most common house construction type. As sustainable resources from forest, timber has the potential to provide a renewable building material.

During a decade, housing development by mass activities or by individuals continues to grow very fast. Locations for housing development actually take dry land but in some areas in South Sumatra the housing development takes swampy areas, tidal areas, and riverbanks. In general, nowadays housing which are developed in swampy areas, tidal areas, and in the riverbanks by reclamation facing natural disaster. Reclamation activities might change the topographic and landscape becomes monotonous and bored while it threatens areas surrounding of flooding and landslides.

II. LITERATURE REVIEW

The existence of Limas traditional house is related to the Palembang. Taal, 2003, stated that Palembang sultanate was founded by noble refugee from the then powerful Javanese sultanate Demak. Since that time, Palembang was control southern part of Sumatera which consists of now known as provinces Jambi, Lampung, Bengkulu, South Sumatra and the archipelago of Bangka and Belitung respectively. Palembang is a central administration and the rest is a hinterland of Palembang.

Oo. et.al, 2003, stated that the majority of traditional houses of Barmar, Mon, Shan and Inn-thar races are built with indigenous building materials. The reason of using these materials is great durability and resistance due to shear and split conditions. In South Sumatra, traditional architecture uses local indigenous material such as wood, bamboo, rattan and palm leaf. These materials those are familiar easily to find in the surrounding areas. In general, local societies have good experience of using local material with proper techniques that they learn from their ancestors. In addition, in the process of rehabilitation of their dwellings because of damage or wrecked, they will find easily the local building material as substitution.

Mushtaha and Noguchi, 2005, explained about court-concept which is provides people's satisfaction both culturally and environmentally. The court is good concept for encourage family's activities, share internal spaces, gain both benefit sun and wind during the year. The local people have good experience in their environment for years and they can manipulate thermal comfort for daily life that corresponding with their culture. In South Sumatra, people recognize their geographical aspects such as river, tidal swampy areas and earthquake. They build traditional architecture which the construction is appropriate to the environment. The people of South Sumatra have much specific traditional architecture based on the characteristic of those areas. It creates traditional architecture more dynamic, aesthetic and attractive in the sense of building structure, building materials and the details

Similar to the traditional buildings in most parts of Indonesia, the Limas house of South Sumatra shows characteristics of timber buildings on stilts which are beautiful and fixed according to different culture and geographical environments. South Sumatra traditional house is a knock-down house, the traditional houses could be dismantled and rebuild in another location with mostly reusing of origin housing materials. The typical construction of traditional house is with flexible nail-less joints, and non-load bearing walls.

The shape roofs of the traditional houses in South Sumatra are classified into saddle type with modification, shield and the *limasan* (pyramidal), those types are suitable with their environments. Several types of South Sumatra traditional house are ornamentally, wood carving, interior decoration

A. Indigenous Architecture as Basic Architectural Design

and blend with specific traditional motives. Most wood decoration has the form of non human and animal but plants, wood carving decoration uses see-through transparent carving technique bearing plant motives such as sunflower, pineapples, bamboo shoot, and jasmine.

Limas traditional house has been demonstrates the extraordinary indigenous knowledge of our ancestors in shaping their quality life in the past. This indigenous knowledge will regain its meaning and value in the society, we should aware of the glory of the inherited tradition. The bearers of indigenous knowledge might be developed in recent and future for sustainable housing development of South Sumatra.

Maidiawati and Sanada, 2008, explained if traditional residence with wooden structure seems to behave well because of its lightweight materials compared to other building types. Light structure like wooden construction has good flexibility when the earthquake happens. The resilience of the structure will reduce shaking influences during earthquake. Traditional buildings in the western part of South Sumatra province showed the outstanding flexibility during the earthquake. The adaptation to the specific environment conditions of traditional house provides excellence shelters for the community including anticipation of humidity and solar radiation in humid tropical climate.

Vellinga, 2006, stated that many unique vernacular building traditions have disappeared in recent history a vast number is currently in the process of being lost. Contrast to Vellinga's claims, in recent year housing development is using many new materials building that should be provides from distance region. Because of that, many traditional carpenters cannot be able to handle building construction properly, In addition, many housing construction is using steel construction for roof framing. Steel structure for housing is overused and need more energy to make it. It is very wise if we use low energy consumption and environmental friendly to make housing structure.

Kim. 2006. states that because of modern architecture nowadays need huge energy consumption, it generates many environmental problems. It seems that that architecture becoming inharmonious with nature. Architecture will give impact to nature and vice versa, meaning that it isn't wise if architecture wants to conquer nature. In addition, it is realized architecture, nature and human beings as integrated concepts for centuries. Some studies mentioned indigenous knowledge has relationship between architecture and nature in term of selection and arrangement of site, manipulating wind direction by using natural connection, using variable doors and windows, designing eaves to control the amount of sunshine and managing natural light and ventilation system.

Singh, et.al, 2009, state that the concept of vernacular architecture based on bioclimatic was established and practiced by many civilizations for centuries. Different societies have developed their own architectural styles based on the specific environments. In general, the buildings use local materials which are performed harmoniously with the existing environment such as climate and humidity Vernacular architecture shows a good example of the unity between settlements, people and the physical environment. In contrary, the situation is ignored in nowadays society.

III. ARCHITECTURAL STYLE

As a traditional house Limas was known as the home for *Tetuo*. This type of house was often used for ceremonial activities. In accordance with the name, the house has a roof shaped Limas. This unique roof type is different from *Gudang* house and *Ulu* house. Limas house has a multi levelled floor according to the function room or for a particular purpose. Limas house has rectangular and stood on top of poles.

A. Indigenous Architecture as Basic Architectural Design



Figure 1. Limas house in Jend. Sudirman Street, Palembang

In the middle part of Limas, which is the highest is known as Gegajah space. This space is regarded as a sacred space in the context of the macro cosmos. This space for a family or person privileged position. Limas architectural style can be described has Limas roof type, fencing (*pagar tenggaloong*, stairs, *simbar* and goat horns (*tanduk kambing*). the roof of Limas is decorated with *tandook kambing* (goat horns), *simbar* which are placed on the ridge or roof edge.

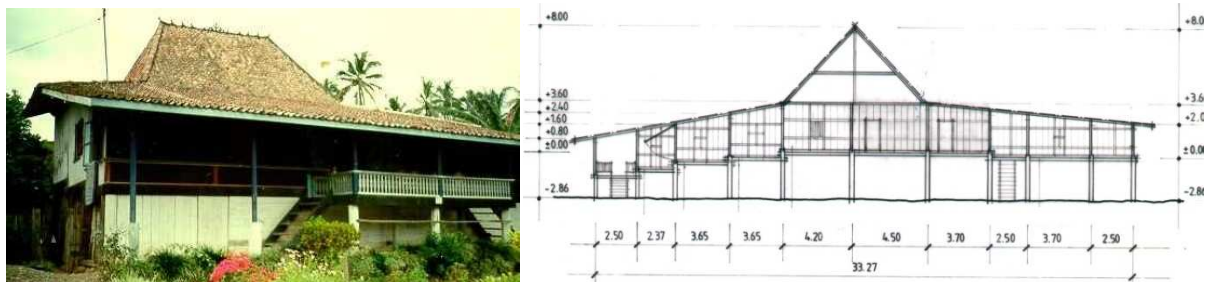


Figure 2. Limas House in Semendo Highland, Muara Enim Regency.

Limas has specific form of the roof angle. Roof angle above kekijing, front part of the house, has angle about 11° to 15° , while in Gegajah space the angle of the roof between 45° to 60° . There are still many Limas house, mostly in Palembang and very few in regencies and cities within South Sumatra province. Different roof angles provide a very good proportion of the building.



Figure 3. Ulu Berundak House similar to Limas House, in Musi Rawas Regency.

IV. PHYSICAL CHARACTERISTICS

Limas house foundation other than buried in the soft soil is also given the wooden pedestal in the base of pile. This system is similar to tie beams function and locally called *botekan* or *tapa'an* which provides excellent carrying capacity for construction. In general, this type of wooden construction for

A. Indigenous Architecture as Basic Architectural Design

Limas house is a pen and hole pattern. Construction with the traditional concept is in accordance with the concept of pivot, press, hook, pinch and pull. To strengthen the connection used a pen or a wedge of wood. Detail construction of Limas house is solved exactly in accordance with the function and its location.

Wood that lies horizontally such as beam and planks usually use the timber intact with no connection. While wood which lies vertically may be connected or placed on wooden construction underneath. In local, typical structures of Limas house were known as *lanang* (man) and *betino* (woman), *jalu*, *speeng*, *kip* and *poteeng*. Furthermore the ceiling is called *kajang angkap* with fitted *gulmat* and *rambatan tikus* or propagation of mice

In general, the structure of columns (bottom part) is not continuous with *sako* (upper part) of Limas house. *Sakos* are in rectangular shapes which sizes are different depends on the function. Basically, the position of the beam connecting the columns at the top is not proper based on the principal of structure, less robust than when lying upright but in terms of practicality it is much easier and simpler.

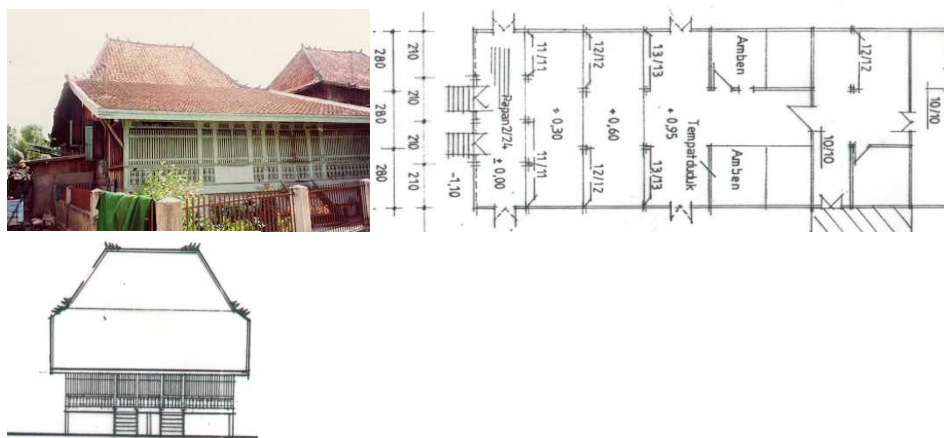


Figure 4. Small size of Limas House in Palembang

The layout of Limas house plans have a specific character, a rectangular, elongated from front to rear. The front of the house called *luan*, the rear called *buri*. While inside the house called *jeroo ruma* and outside the house called *jabo ruma*.

The composition and distribution of rooms in the house Limas in general are as follows:

1. *Pagar* (fence) *Tenggalung*, at the front of the house, in the front of *Lawang* (door) *Kipas*
2. *Jogan*, in the right and left side within *kekijing*.
3. *Gegajah*, in the middle part as core space under the roof of a steep pyramid
4. *Pangkeng*, bed rooms in right and left within *gegajah* space
5. Family Room
6. *Pawon* (kitchen)
7. *Garang*, a place to dry or is a transition area.

Basically, Limas house has several floors height in difference levels which is known as *kekijing*. *Kekijing* has the specific meaning and function that represents a philosophy of its location. The highest level of floor is for those that have high rank or caste and it has a private character. While the lowest floor is for common people and it has a public character. In recent decades, the situation is little bit change in Limas house, multi levelled floor express to respect older people by placing them on a higher *kekijing* while younger people settle in *lower kekijing*.

A. Indigenous Architecture as Basic Architectural Design

Limas multileveled floors divided into 3 parts which are front, middle and rear based on its function. Veranda is in the front for the guests and the sons. The middle part as a centre of the house which has highest levels is for the parents and the brides or for important guests, while the rear part is for the daughters and kitchen. Veranda is front *garangs*, space between *pagar tenggalung* and *lawang kipas*, *kekijing* and *jogan*. Few limas houses have *jogan* as a room in the right and left sides.



Figure 5. Pagar Tenggalung, Kekijing, Lawang Kipas and Jogan of Limas House

In general, Limas houses have ornaments with fine carvings and paintings on the wooden walls, ceiling and doors. Doors called *lawang kipas* can be operated up lift and stick in the ceiling. *Lawang kipas* are located between columns behind *pagar tenggalung* in the entire side of *kekijing*.

V. INDIGENOUS KNOWLEDGE OF LIMAS HOUSE

Limas house in Palembang are generally built on a swamp area that is affected by the tidal of Musi River whereas Limas house in the hinterland are built in highland. In the lowlands pile foundation of Limas use pedestal log inside the soft soil whereas in highlands, pile foundation of limas use stone pedestals lays on the grounds. In highlands, the using of stone pedestals is to prevent from soil humidity and to reduce shaking from earthquake.

Use the pole on Limas house other than to adjust to water level fluctuations during tidal, wind circulation is also intended to be used naturally. Wind circulation on all four sides of Limas house and on the floor board can maximize air circulation.

The use of *pagar tenggalung* and *lawang kipas* that can be opened by twisting above and stick them to ceiling is to provide a continuous open space between the inside of the house and the outside. Opening *pagar tenggalung* and *lawang kipas* on the entire side of the front are to maximize the function of *kekijing* for activities that involving many people. In addition, air circulation and natural lighting are also getting better. Limas houses in lowlands and highlands have adapted with the environment by placing windows, doors and transparent fencing for perfect thermal comfort.

Gegajah that has a relation with cosmology has a high ceiling space also gives the temperature inside the house to get colder. Roof form of limas house provides natural thermal comfort and adequate natural lighting inside the house. Some of the side of practicality in daily life as well as incidental events that occur can also be solved by both the detail and layout of Limas house

Knock-down timber house is the perfect solution for traditional wooden structure because the house can be dismantled and set up again in different placed with almost all the material of original house. If

A. Indigenous Architecture as Basic Architectural Design

the house can be disassembled and moved in a practical way, so homeowners can rebuild it elsewhere so that you no longer need a new home material. This causes no waste from demolished houses, so that it can reduce the amount of waste.

VI. CONCLUSION

Limas traditional house is strongly influenced by geography, environment, and culture aspects which are formed for centuries and in accordance with the needs of local communities.

The way of life and the way they use their traditional houses influence the layout, detail, ornament and size. Culture has a huge effect on the interior and exterior of Limas house, often beautify buildings in relation to local traditions and way of life.

Traditional Limas house is perfect example of sustainability; it demonstrates good environmental adaptation and will not threaten its environmental. Indigenous Limas' houses meet the cultural aspects and environmental comfort in local setting.

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