The Completed Design Of Ulu House At Tidal Musi River Shore-
Palembang

Khotijah Lahji
Iik_lahji@yahoo.com
Agustin Lakawa
agustinlakawa@yahoo.com
Department of Architecture, Faculty of Civil Engineering and Planning,
Trisakti University, Jakarta

Abstract

This paper is describing an architectural phenomenon which has been created as a result of an indigenous knowledge of Palembang people. This paper discusses field observation and library study on Malay stilt house in general and traditional stilt house on the rivershore area in specific. The discussion aims to see whether local people habit is represented in the form of room structure; to see how room space is being used optimally; and to see how the structure and construction of limas house is being completed. To gather data, pyramid limas houses at Musi rivershore are used as the object of observation. In completing architectural design of limas house on the tidal area at Musi river shore, it is important to consider specific stilt house design compares to other Malay stilt houses in general. The specification in the form of covering indigenous knowledge includes room structure, building orientation, structure and construction system (foundation, wall, and roof elements), and materials chosen. The result of this study shows that indigenous knowledge has allowed local people to wisely predict and anticipate local condition so that they can construct limas stilt house accordingly. However, in constructing and structuring the design of limas stilt house, there have been some changes in the form of room structure, architectural elements, and building materials.

Keyword: Design, Ulu-house, Tidal, River shore

I. INTRODUCTION

1.1. Background

The area along the water is a specific and dynamic area in a town where land and water (river, lake, bay or sea) are met in which the uniqueness needs to be maintained. The area includes the building or activities which do not directly have to be above the water, it however is visually, historically or physically bound to water as part of the broader scheme (Brenn & Rigby, 1994).

In general, as Indonesia known as an archipelago, the water region becomes part of social life, in which marine region is coming either from sea, lake or river. For the society, marine life can become a positive impact on the people because the potency and wisdom it has which therefore can create an architectural masterpiece having high value (can make use of unique local conditions coupled with the existing climatic potency in order to create a comfort resident for local community). The city of Palembang specifically Musi river shore as the case study, considering the condition of dynamic area, has a local and historical uniqueness which is closely related to water as a medium of local, national, even international transportation. The city of Palembang in the period of Sultanate of Palembang, geographically was divided into two by Musi river i.e. Seberang Ilir and Seberang Ulu which was known as a lowland where the area was always suffused by water. Some important heritages in the area of Musi river shore are traditional stilt house of Palembang, composed of: limas house, warehouse/deret house, and raft house. As limas house or warehouse/deret house is the stilt house while raft house is the type of floating house assembled on the body of Musi river (Alimansyur, 1985).

The environmental situation of Musi river shore will influence the design of the building in this case building form, room arrangement inside the building and the efforts to construct the structure based on the condition of water front (the location is laid on the tidal area of Musi river Palembang). Stilt house on Musi river shore in the Ulu area can be categorized into three: (1) house which is located on the river body (raft house), (2) house which is located on the river shore at the tidal area (stilt house in the form of warehouse type), (3) house which is laid on the river shore at dry area which is not influenced by tidal activity. (stilt house in the form of limas type) (Study Observasi di Tepian Sungai Musi, 2006).

Indigenous knowledge used in finishing room structure which is closely bound with Malay custom, construction and structure of stilt house on the river shore requires unique and special solution. It needs the ability to complete the design with specific layout inside in accordance with individual and social functions.
1.2. The History of Limas Ulu Stilt House

As a town, Palembang has a very long history, passing a period of prosperity of Sriwijaya Empire until Sultanate of Palembang. The long covering ground has yielded the invaluable cultural inheritance, one of which is the traditional settlement. Among the historical inheritance is Ulu/limas stilt house, warehouse, and raft house. Ulu stilt house can be seen as in the following Figure 1:

![Figure 1. Illustration of Palembang original house in the past at Musi river shore](image)

The form of traditional Ulu houses is as much the same as others; the only difference is on the size of the house as stilt house. Limas house remains as dwelling house and is occupied by local community which in the era of Sriwijaya, Musi river was functioned as the main tool of transportation which connected one region to other regions. Therefore, stilt house on the river shore is the dwelling house with easy access to the river or the land as mode of local transportation from region to regions. The size of this Ulu/limas house depends on the occupants’ degree or level of ranks in the society (Sukanti, 1994).

Stilt house is a dwelling house which is attached to the pillars on the floor and is the same height among ordinary people house (there is no difference on the height of floors). Under the house which is often referred to as feet of the house, is usually used as the warehouse and can be used for renting. The materials of the floor of the house are made of board, while the roof is formed by using stereotypical form of limas house such as saddle roof and shield roof with zinc or tile as the cover materials.

Stilt house which has limas roof as traditional house is conceived as the house for the elders in the society, which is often used for ceremonial events accordingly. Limas house has limas formed roof with tile as a cover material, the floor has unequal heights according to the functions of the rooms or for selected purposes. Limas house is in the form of square length, attaching on the pillars as alternative solution for tidal and land condition.

1.3. Problems

In designing houses, indigenous knowledge is used in constructing room arrangement which should be pursuant to social status, functions, Malay customs and traditional house. This paper discusses how local community is able to solve structure and construction of Ulu traditional house/limas house in the form of stilt at the river shore which is always depended on tidal zone especially at the foundation level which is directly corresponded to water, the body of the house (roof and wall), and the efforts attempted to reach thermal comfort inside the house.
towards the existing climate. Another important issue is how local community is able to select, gather, and preserve materials traditionally.

2. RESULT AND DISCUSSION

2.1. The type of Limas Ulu Stilt House at Musi River Shore

House is human or society basic need besides cloth and food. The community is a human being or a group of human being who resides in the selected region or area that is legally bound to the values in accordance with its local regulation. Hence stilt house is a house for human being or a group of human being who live in selected area legally. The interesting places for human being to live are generally in the area which provide adequate source of food, water, transportation, social, and economics activities. Such a so called environmentally conditions will influence the pattern of settlement, room arrangement in a house, structure and construction demand in the house, and the use of its materials in the house.

Based on the location and situation, stilt house of Musi river shore - Palembang is divided into three categories (Dwinasar, 1997).

1) House laid on the body of the river which is always floated above water is referred to as raft house. 2) House laid at the river shore in which the location depends on the river tidal is referred to as stilt house (limas house/warehouse). 3) House laid at the river shore in which the location is relatively dry with soft and flabby area and watery if there is a seasonal flood is referred to as stilt house (limas house/warehouse/ deret house). The three locations of the above types are shown in Figure 3.

This paper reports on Ulu house/limas house which is located above the swamp area at tidal zone of Musi river shore - Palembang, and discusses how local people use indigenous knowledge in designing stilt dwelling house based on the existing condition and local climate (micro climate in an attempt to have thermal comfort inside the house).

2.2. Social Activity and Room Arrangement

Rooms in traditional house are made to fulfill some purposes which were initially functioned as shade from hot, rain and beast attack. Later, along with the development of social and cultural behavior of the people, the house is not only used as shade but also used as a place to deal with human psychology, society, personal desire, religion, custom and tradition, etc. Therefore, the formation and building arrangements of the house are related to the above aspects (Ismail, 1992: 31).

Nowadays, Ulu house is made of some purposes beside as dwelling house it also serves as lodging house or trading house. Therefore, in explaining the functions of the rooms, it relates to three things i.e. as permanent...
A dwelling house to the owner of the house, as temporary lodging house to the foreigners and a part from it is functioned as a trading place. The room arrangement of Limas Ulu stilt house for ordinary people can be seen below on Figure 4 and 5.

Room formation is constructed pursuant to both the needs of custom or tradition and the needs of human beings in general. Limas-Ulu house consists of two layers. The first layer is basement/cellar as gallery of stilt (in between pillars/stilt feet), this room is usually opened with pillars and equipped by waterproof wooden floor. It is used by Ulu community as public area or communal room among neighbors or relatives. The main activity conducted at the first layer or cellar is weaving, reaping paddy to all girls or women, children playground, repository of canoe as a means of water transportation at that moment, hitherto canoe is still exploiting as a means of river crossing to connect between Ilir and Ulu.

With the growth of economic sector, change of function is happened, i.e. the place for weaving turn into place for trading, however; there is still communal room in which teenage boys and girls can sing alternating pantun to each other spontaneously as a form of social communication in the society. Due to Musi river sedimentation, hence when high tide, this basement area is temporarily closed for any activity.

Room formation for the upper layer is constructed based on the original society life of Palembang community, such as:

1. External doorstep used to connect underneath and upper layers can be consisted of one or two doorstep.
2. Next to doorstep, there is a first room called garang or lintut as transition of public room lying at underneath room, this area functioned as terrace without walls. Traditionally, this room has several functions i.e.: (a) as a reception room for teenage boys, if the owner of the house has teenage girls (b) as reception room, if the guests considered as foreigners (c) as a sleeping room for bachelor in the evening if the he is proposing the young woman of the owner the house as the period of testing for him (ngule), for about one until three months.
3. Second room after garang is the first room inside the house which is usually conceived by as pemidangan depan in squared form, with the functions as (a) temporary stay for lodgers, usually this room is further divided into as small lodging room. If it is not rented it functions as sitting room for relatives. In the event of high tide, this room switched into the weaving of songket by all girls (b) this room is also used as custom socialization room and religious activity (Moslem) which was often conducted by Palembang community.
4. Third room after pemidangan depan is pemidangan tengah which is functioned as (a) family room in the evening (b) as place to yarn for weaving songket (c) as bed for all guests or relatives of the owner of the house (d) as place for baby or marriage celebration hence wedding reception will be held in this room.
5. At the left side of pemidangan room, there is a sleeping room for the head of the family and his children, this room is referred to as gedongan, as for another room is tempuan which is functioned as the extension of pemidangan tengah room if the owner has a special event or religious ceremony. If there is no special activity, this room is used for grandfather or grandmother.
6. The back rooms are dining room, kitchen, and washing room (tundan), dining room is the most back part which is used as depository room of food-stuff.
For limas house, as dwelling house for noble people, the formation of this house is almost the same with others traditionally except *peminangan tengah* room is bigger and higher with steps, and so as with *gedongan* room which consists of three rooms, and *tempuan* room consists of three rooms which is also followed by fluctuated heights of floors which designating the level of nobility.

![Figure 6 Location of limas house](image6.png)

![Figure 7. Front view of limas house](image7.png)

![Figure 8. Limas house plan of noble people](image8.png)

![Figure 9. Back view of limas house.](image9.png)
2.3. Steps of Construction

2.3.1 Preparation Phase

In preparing the construction of stilt house of Musi river shore Palembang, first is the selection of old enough wood with specific diameter. The river shore condition needs specific old wood with solid grain and avoids wood damaged, especially for foundation which will have direct corresponding with water as pillar or belandar/cagak/main pillar of the house.

As for selected wood type the best quality is tembesu wood. Special for raft house, the foundation used is bamboo with specific diametrical and selected measurement. Seru wood having quality of durability is used for the top of the house that is for nok/gording or roof frame. Podium pillar, belandar/cagak/main pillar of the house through to the top of the house uses ungen or tembesu wood. For higher economic level family, they even use it for floor and wall of the house. Nowadays, it is difficult to find tembesu wood so that people need to find wood which is as good quality as tembesu such as merawan, petanang, melebekan, medang and meranti. Merawan and petanang wood is used for main pillar of podium, belandar, beam, house and nok, also roof frame sento/log. Medang or meranti wood is used for wall and floor. Door and window are made of merawan wood.

The preparation work needs one year time for the construction of stilt house with specific reasons of selecting adequate wood, getting enough age and measurement for maximum quality of wood, and preserving construction material.

2.3.2. Construction Phase

Before constructing the house, there are several phases that need to be done including specifying exact place and time. The steps of constructing a stilt house are as follows. 

- Constructing a stilt/podium house is started from placement of main pillar as podium. Before constructing the pillar, the upper pillar is seping for the installation of kitau that is globular pillar or squared pillar with the size 40-60 cm, 137-237m high and the amount of 15 pillars, which are constructed over three layers to the right and five layers to the front – back.
- The pillar is not dug inside the hole on the ground as a stepping stone instead three river stones is used as a stepping stone with a purpose to balance the earthquake (Sukanti, 1994).
- For the endurance and strength of the stepping stone, the pillar is beforehand dug and constructed with concrete. After the pillar is stood, kitau/log is attached horizontally from front to the back side. As podium pillar, kitau is square or globular with diameter 20-25 cm.
- The installation of kitau above the pillar does not use nail or other extension tool with iron materials or other copper, but kitau is attached on the top podium pillar which has been seping/coak. The number of kitau is five that is the same number of pillar rows from front until back side.
- The installation of atung (log). Above kitau, akung/atung is attached in opposite direction with kitau. Kitau is attached from front rear to the back rear while atung is attached from left to the right. Atung which is attached in front rear is carved and only made within three rows while others are not carved. Akung is in the form of square length.
- The installation of belandar (log above atung) that is house pillar attached above atung. Belandar is usually referred to as girl doorstep, the number of belandar is 34 (17 in the middle, 9 on the left and 8 on the right).
- The above side of Belandar is lungser attached. The top side is base or floor which can be made of bamboo which has been split into two and weaved with rattan. The split bamboo is made in order to prevent from mouse den or other animal den. Bamboo and rattan braid is referred to as nylampit.
- Work hereinafter is top side which is done after work of below side is completed and above belandar, soko will be attached as pillar of the house.
- Work of soko as pillar of the roof has been done hence work of upper pillar of the main house is lifting on roof. This work is conducted for roof installation, such as roof pillar (alang) and others.
- Front wall consists of two windows which are attached at soko horizontally with pen junction system.
- Besides main elements of the house, there is another work that needs to be constructed among others is making of doorstep towards the floor of podium house, put down seat pance at front yard parallel to the podium pillar with the size of wide 100 cm, long 236 cm and high 71 cm.
- The work of doorstep, to climb up podium house floor/lintut or garang it usually needs seven steps in the size of long: 146 cm and wide: 19 cm. The staircase of traditional house is usually anomalously in number.
- The work of making of wood railing for the room demarcation of lintut or garang at ordinary house formation is terrace because for podium house as a safety element it is added with fence as high as 60 cm with construction of lanang and of batino (woman and man) in pen junction system.
The installation work of window and door with wood materials which have been mentioned above with high: 212 cm and wide: 80 cm. Board construction forms a door-leaf with wedge construction and installation of doorframe by using wedge construction thereby if the door opened or closed it will generate sound which is intentionally meant so that if in the event of attack it will beforehand detected with door sound. Door is always made in one leaf and it is always from left to right.

House at the river shore in which the ground condition is always suffused by water (depends on tidal condition) is called podium house. It can be in the form of warehouse or limas house. The function of the house is as permanent dwelling house or mix dwelling house (production house). The building of podium house is stood up above podium pillar with 1.5m height until 2.3m height with a purpose that in the event of high tide the water does not go into house. Generally, warehouse does not have water supply facilities because the bath and wash activity is directly done at the river shore which depends on the tidal situation.

2.4. Construction of Podium House at Tidal Location

Structure and construction as the result of indigenous knowledge of society of Musi river shore Palembang is applied in anticipating river shore location and climate condition with wind speed and relatively high humid situation. Indigenous knowledge is used in anticipating structural and construction of Limas-Ulu house Palembang as in the following:

2.4.1. Foundation Part/Under Side Building

In general, building in tidal location is a building which has the functions as dwelling house, guest house, warehouse or lodging of trading goods. House in the tidal location is categorized as podium house in that the foundation below is made of podium pillar and it is always connected to water.

The construction of podium house is started from the placement of piling as podium. Before pillar is constructed, the upper pillar is *seping* for the installation of *kitau*, globular pillar or squared form of the size 40cm - 60cm, 137m - 237 m height, as many as 15. The pillars are further arranged into three rows to the right and five rows to the front and back part. The pillar is not dug inside the hole on the ground as a stepping stone instead three river stones is used as a stepping stone with a purpose to balance the earthquake. For the endurance and strength of the stepping stone, the pillar is beforehand dug and constructed with concrete. After the pillar is stood, *kitau*/*log* is attached horizontally from front to the back side. As podium pillar, *kitau* is square or globular with diameter 20-25 cm. The connection of podium pillar and *kitau* is without joint. The next work is the construction of *belandar* in which wood log is installed diagonally above *kitau* at diameter 40cm-60cm. To the strength of *belandar*, the middle part is connected by using *seping* way.

2.4.2. The Middle Part of the Building

The installation of middle pillar/sako is started from the corners of the house. This *sako* is main pillar which at the same time is used to attach wood wall. The material of *sako* is usually wood with good quality such as *tembesu*, *penatang*, and *unglen*. As for wall, it uses *merawan* wood which has good quality and interesting color. From each *sako*, *sento* log is connected. The both tips of *sento* pen are made to connect *sako*. At the time of *sako* installation, window (*jenang*) and door frame are installed. At this *sento*, wall will be attached.

Besides for door frame, *jenang* is also used as pillar/sako. After installing the middle frame, wall installation is conducted by compiling boards with pen junctions it is then put at sento. At one surface of wall, there will be three until four sento. Installation of window and door are further done. Materials for floor, wall, door and window leaves are made of *merawan* wood. For the wall of the backside or kitchen, the wall cover is installed sparsely for ventilation purposes. The installation of front and back doorstep is used pen junction construction. The installation of engraving at frame/jenang is also meant as room ventilation.
2.4.3. Roof/Top Part of the Building

The work of top part is started from the installation of log which is usually referred to as by long alang, then is followed by the installation of pillars of penumpu roof frame. For traditional house the frames of roof cover do not use easel but pillar of sako which is connected to the above part. So as to jenang (frame), if needed, pillar is to be added at long beam. Later, gording, kasau and also reng are installed. Kasau at this Palembang traditional house is attached on lying position.

Sako extension system, jenang at long beam is pen junction which is strengthened by dowel. The cover of building roof which in the form of tile is installed after kasau is attached, followed by the installation of board of lisplang. After the work of roof is done, it is continued by the work of making of plafond frame (gegajah). Board of plafond frame is tied by using pen system.
The following are some types of limas house at Musi river shore in Palembang:

![Figure 18. Current condition of limas house in 2008](image)

3. CONCLUSION

In general, most Indonesia regions are water territory therefore the concept of completed construction at the water front needs unique solution depending upon each region condition. Special for Palembang case, the old settlement is located at the Musi river shore-Palembang, either in Ulu or Ilir areas which have local characteristics, in the form of unique designed solution.

From location facet, stilt house of Musi river shore - Palembang is divided into three i.e. house in the river body (raft house), house at tidal location and house at the law land of seasonal flood area (high tide).

The formation of Ulu limas house represents how local society constructing rooms according to its needs in the form of custom and traditional activities, cultural and also social activities of Palembang people. Most of Palembang people are Islam believers so that the room separation is clearly stated in the form of functions in which the room is separated between women and men group.

Indigenous knowledge of the community, allow local people to anticipate on solving the construction of traditional house at Musi river shore on the tidal area of Palembang, whether the problem of preparation phase in election of raw materials, materials measurement, preserving process of materials and also construction system which is water and or climate resistance.

REFERENCES