



LIMAS HOUSE HORIZONTAL PROPORTION AND DULANG MODULE: THE COLLECTIVISM OF AUSTRONESIAN, BUDDHISM, HINDUISM, TAOISM, AND ISLAM IN PALEMBANG HISTORY

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Ibnu Aziz

Department of Architecture Engineering
Universitas Tridinanti Palembang
Indonesia

Corresponding Author:

ibnuaziz0307@gmail.com

Ahmad Malik Abdul Aziz

Department of Architecture Engineering
Universitas Tridinanti Palembang
Indonesia

ABSTRACT

The development of Palembang city is progressing rapidly while traditional limas houses are increasingly rare. As a result, the local context regarding the rules for building limas has become rare and not documented. This is unfortunate considering that limas have architectural and cultural records related to the history of Palembang City, starting from the Austronesian, Hindu-Buddhist, and Taoist to the Islamic period. This study seeks to find the rules of horizontal proportion used in the construction of limas and their relation with the cultural values of society. Researchers explored the dulang, a circular container that holds plates for serving food to eight people, as the base module that builds the floor area of a limas. Data were collected from 50 limas in Palembang City, consisting of 20 four-bengkilas limas (4BL) and 30 three-bengkilas limas (3BL). The results show that 3BL is generally made with four dulang on the front and seven dulang on the side. In comparison, 4BL are built with five dulang on the semi-public side of the bengkilas, three dulang on the back, and seven dulang on the side. Furthermore, the researcher shows that this proportion rule is changed across time in line with the smaller house size. This change signifies the decline of collectivism from a concrete principle to a merely symbolic one. This decline is associated with an increase in the individual's economy and standard of living. This research has implications for efforts to standardize the Palembang limas house model for conserving the city's cultural heritage.

KEYWORDS:

Bengkilas; Culture; Architecture; Traditional; Individualism

INTRODUCTION

One of the traditional folk architecture in Indonesia is the limas house. The oldest evidence of a house with a limas roof comes from the Muara Jambi site, where archaeologists found nine clay blocks containing various shapes of houses, including a house with a limas roof [1]. Radiocarbon dating shows that the clay blocks date from the 9th to the 14th century AD, coinciding with the founding of the Sriwijaya kingdom. At the same time, Muara Jambi is also the territory of Sriwijaya's power.

Furthermore, there are also house relics from the pre-Sriwijaya era. Excavations at tens of kilometers downriver in Musi intertidal wetlands revealed dense agglomeration of stilt-housing around the 3rd to 4th century AD [2]. The Sriwijaya Buddhist kingdom itself was founded in the 7th century. Although it is not sure whether this house has a limas roof, it is inevitably a house on stilts and is a form of a house on stilts.

Limas house then developed widely in the Palembang Sultanate (1455-1851) [3]. Limas house has grown even more expansive and spread outside South Sumatra, such as to Jambi, Lampung, Bengkulu, and

Bangka Belitung areas [4]. Even so, the name of the limas house in Sumatra must be distinguished from the limas house in Malaysia [5], which is a traditional house of Negeri Perak [6] because it has a different architecture and philosophy. Currently, the existence of limas houses on the coast of the Musi River in Palembang has become an identity that characterizes the uniqueness of this city [3].

Because Palembang is the oldest city in Indonesia, it is natural to assume that the limas architecture is one of the oldest traditional architectures in Indonesia. Indeed, the newly built limas houses have become increasingly difficult to find. Furthermore, too expensive wood makes the construction cost of the limas house even more expensive. As a result, only people from the wealthy class can build limas houses. Based on the author's observations, no new limas houses have been constructed in Palembang in the last twenty years that are intended to be residences. Moreover, the cost of maintaining an old limas house is very high because it is made of wood [7]. In the end, only limas houses owned by well-known and well-off families still survive

in Palembang City.

Various previous studies have attempted to study the architecture of a limas house and its values to formulate policy efforts for conserving the city's cultural heritage. This effort includes Sibarani and Ekomadyo [4], who try to express the meaning and philosophical values of the Palembang society contained in the shape and architecture of the limas house. Meanwhile, more visibly, Anwar [8] studied the limas house from the side of natural lighting.

From the various studies above, there are still important aspects of traditional limas architecture that have not been studied in depth, namely the element of proportion. For example, Aziz et al. [9] once tried to reveal the relationship between the facade (vertical) proportion of a three-bengkilas limas house. However, the horizontal proportion of the house is still unexamined in the literature.

Although it has many variations, the limas house seems to follow a rule of its proportions. Rather than in terms of shape, the proportion can be a different factor that indicates the uniqueness of limas compared to other buildings. This rule of proportion will be strongly related to the local context in which the limas are built. Conceptually, local can be interpreted administratively at various levels, from country to city or geometric at a certain radius. This study defines the locals in terms of culture, namely the culture of Palembang society, expressed as a Malay sub-ethnic living in the Musi River watershed area, South Sumatra [10].

Local in the sense of a completely isolated place is impossible. Every culture will be influenced and influence other cultures to some degree. For this reason, we need to understand cultural locality as a uniqueness that can be shown or argued as something different from other cultural locations around it. Even if there is no difference from one location to another, this similarity can be shown or discussed as something that arose independently, or the location studied was the origin of other locations. For example, a feature of a limas proposition can be said to be a local feature if there are no similar features in the surrounding culture. This feature can also be said to be a local feature; even though it is the same as the features in the surrounding culture, the local feature appears independently or is the origin of the elements in surrounding houses.

The existence of a research gap related to the theory of proportion as the background of traditional architecture in Indonesia, especially the limas house, is the justification for conducting research related to proportions in the architecture of the Palembang limas house in the local context. Combined with the decreasing number of limas houses in Palembang and the increasingly rare and fading knowledge about limas house construction, this research is essential. This study's results not only preserve one of the critical aspects of the architecture of the limas house but also explore the important cultural values of Palembang society, mainly because this city is the oldest in

Indonesia. This knowledge can also be used for similar studies on other traditional buildings in Indonesia to realize a complete traditional Indonesian architecture.

Based on the above background, many problem formulations can be defined as follows:

1. The local context regarding the rules for making limas houses has become increasingly rare while it has not been documented.
2. The fewer and the rarer limas houses in Palembang are, the higher the urgency to build more limas houses that are under the rules of proportion inherited from previous generations.
3. There is no particular proportion theory based on the local context of the archipelago that can be put forward as a cultural heritage of national architecture.

This study focuses on horizontal proportions because this proportion is closely related to the appearance of the building from the front and rear, which are generally the directions for occupants to enter and exit. Therefore, this study attempts to answer the following questions: What are the rules for horizontal architectural proportions used in the construction of the Palembang limas house, and how are these proportions related to the cultural values of society?

This study aims to raise the problem of identifying the horizontal proportion rules in the Palembang Limas house and exploring its cultural values over time. This research has significance in formulating a picture of the limas house's horizontal proportions and identifying changes in this proportion over time.

Research On Horizontal Proportion

Research on the horizontal proportion of architecture in Indonesia is still minimal. Generally, research focuses on universal proportion rules that identify the ratio of horizontal to vertical and sagittal measurements. For example, in Javanese dwellings, the study determined that the joglo roof has a width: length: height proportion of 6:6:2,5. The proportion of the roof base, the center of the roof, and the rooftop is 6:2,5:1. The height of the room, the roof base level, and the top level have a ratio of 1,4:1:1,5 [11]. Meanwhile, a study on the Sopo Nagari Sihotang house from Toba Batak architecture [12] identified a ratio of the bottom: middle: top of the building at 1:1,15:4,3. Meanwhile, the length: width ratio is 1:1,8.

Studies that focus on horizontal proportions are still minimal. One of these rare studies is Arsy et al. [13], which identified the sulapa appa system as a horizontal proportion system in traditional Bugis houses. Sulapa Appa is a Bugis society's philosophy of life related to proportion. According to this theory, human life will be perfect if shaped rectangular. These four sides represent the elements that make up humans: earth, water, wind, and fire. In line with this, the proportions of traditional Bugis buildings must reflect the Sulapa Appa philosophy by being structured

with Sulapa Appa modules. One Sulapa Appa module is a regular rectangular module with four pillars (alliri). The module size is not determined by a standard but must be uniform in one house. The sulapa appa module is then used as a measurement for every room in the house. Even though it seems simple, on a more significant level, the obligation of sulapa appa makes the components of a Bugis house consistently rectangular.

Another study identified that Budel houses from Gorontalo used module seven. The Gorontalo society uses the module seven in-house design because of the priority of the number seven in Islamic teachings, such as seven heavens, seven earths, seven levels of heaven, seven levels of hell, and seven levels of lust [14].

In other countries, a system of horizontal proportions can also be found. The most famous one is the Japanese ken system. Ken is a unit of measurement equivalent to ten shaku. One shaku is equivalent to 11.93 inches or 30.30 cm, so one Ken is 3.03 meters. Japanese house poles are made as high as 1 ken, while the distance between the poles is from 3 to 3.5 ken. This distance accommodates four panels (fusuma) which can be removed to enlarge the room if needed. Fusuma are panels of paper on both sides of the room. In addition, there is another panel called shoji, which is even lighter and made of rice paper. The area of each floor room in a Japanese house is then determined based on ken size [15].

Dulang and its Origin

The horizontal proportion of Malay House rooms in Malaysia, at least for the size of their porch, is determined by a module called dulang. Dulang is a circular container that holds plates/dishes for serving food. He also identified that the dulang used to determine the size of the porch in a Malay house is a dulang that can provide food for four people sitting around it. This dulang is about 2 meters in diameter [16].

In the Palembang society, which is the focus of this research, dulang is also commonly used for social life. For example, the people of Palembang use dulang in the ngobeng tradition [17]. Ngobeng tradition is eating together for weddings, circumcisions, and others. The host invites the community to his house for a meal in this tradition. The guests then sat cross-legged in a circle containing eight people, surrounding a dulang containing food and eight plates. In this activity, guests can greet each other and socialize. Spoons are only used to transfer side dishes into plates, not used as cutlery. Besides Palembang, eating around the dulang is also found in the Minangkabau and Belitung tribes [18] and the Sasak tribe [19].

Because dulang also has an essential meaning for the Palembang community and the Palembang community itself is a Malay sub-ethnic, dulang will likely be an essential part of the Palembang traditional houses' horizontal proportion. In addition, anecdotal evidence obtained by researchers from a traditional

local leader provides clues that the dulang was used to measure the porch of limas house.

Unlike the Malaysian Malay house, the limas house has a terraced porch called bengkilas or kekijing. This terraced porch makes the number of porches in a limas house always more than one. A house with a single porch is not called a limas but a gudang house. In line with the thought above, the dulang for distributing food in the ngobeng tradition was later appointed as the basic module to determine the length of the porch (bengkilas) in the traditional Palembang house, Limas. This module is a circle with a diameter of 260 cm (Figure 1).

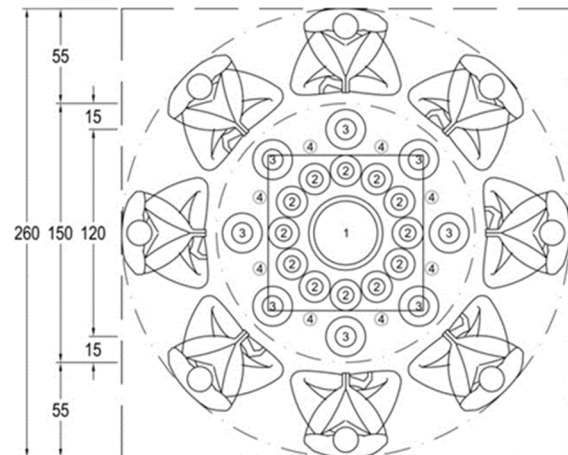


Figure 1. The Size of One Dulang module for eight people

Note: 1 = dulang for rice $d = 43$ cm, 2 = plates for side dishes, vegetables, and fruits $d = 18$ cm, 3 = plates for eating $d = 23$ cm, 4 = glasses of drinking water, 5 = people sitting cross-legged.

All measurements are in mm, $d =$ diameter

Source: Author (2020)

The priority of serving food to many people in the design of the bengkilas reflects the vital social aspect in influencing architecture. In a study on the Tigray community in Ethiopia, serving food in the community played an essential role in maintaining social status and membership in the cooperation community [20]. The same can be said of why serving food to many people became the basis for the dulang's design. In this case, the house owner tries as much as possible to ensure that people involved in the cooperation activity in building the house can be accommodated by eating together. The next time the house is built, bengkilas can entertain. This method allows homeowners to remain accepted by the community and maintain their social status.

Although they both use the dulang module, the eight-person dulang module in Limas differs from Malays who use the four-person dulang module like in the Malaysian Malay community and the Belitung Malays [21]. The four-person dulang module is also commonly used in Islamic boarding schools. On the other hand, the eight-person dulang module in the limas house has similarities to the dulang module in the Bajamba Eating tradition of Minangkabau society [18] and the Megibung tradition of Sasak and Balinese [22].

The reason for choosing eight people rather than four seems to indicate a high degree of

collectivism. Eight people are the maximum possible number for a dulang that one person can carry. The people of Palembang seem to be trying to maximize togetherness within anthropometric boundaries in the design of bengkilas. Of course, the number can be even higher with the row/column (berbanjar) system, such as the eat together on banana leaves (ngeliwet) tradition of the Sundanese and Javanese people. Even so, this is less collective because only two people face each other, and extreme points cause different degrees. In a circular shape, everyone faces each other, and there is no end in this circle, signifying equality.

That is, egalitarianism determines why the circular disc system (Figure 2(a)) is used instead of the longitudinal system. In the Bortram (Ngeliwet) model from Sunda and the Kamayan model from the Philippines, participants sit on the side of a dish that extends on the floor and a banana leaf without a particular container (Figure 2(b)). This system is less egalitarian because food portions are less evenly distributed, and social distance varies between participants. The elongated table-top system standard in modern culture allows for an even distribution of food. However, it does not encourage egalitarianism because there are people with privileged positions at the ends of the table (Figure 2(c)). Although a perfect egalitarian system can be realized in a circular serving system that accommodates an unlimited number of participants (Figure 2(d)), this system is impractical and impossible to achieve. It will take up a substantial amount of space, and most of the space is just space to accommodate the circle form and instead becomes a physical and social distance between participants. This room can be filled with additional participants but will pose the same problems as the bortram (ngeliwet) system. The Dulang system with eight people can be seen as the most reasonable system to minimize space to accommodate as many participants as possible so that social interaction is still possible. Intense social interaction occurs because the distance between participants is close, and participants do not need to turn to the side to talk to the person next in line.

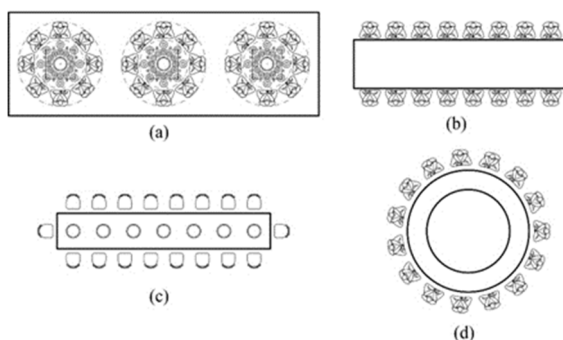


Figure 2. Various Egalitarian Food Serving Systems: (a) a dulang system with 24 people surrounding three dulang, (b) a bortram system with 16 people divided into two sides of the dish that is spread out, (c) a table system with 18 people divided into four sides of a table with seven dish plates, (d) a perfect circle system with 15 people surrounding a circle with a space in the middle
Source: The Author (2020)

This explanation can then be harmonized with the motto "Batanghari Sembilan" (literally means Nine Dayrods), the motto of the Palembang people, describing the existence of eight rivers that are branches of the Musi river. This motto has become a modern glue for the principle of togetherness based on eight people in the collectivist system of the Palembang community. Another alternative related to Palembang people's thinking is the concept of the Elderly Room (Amben Tetuo) and eight rooms. Amben tetuo is the core of the limas house, located in the middle of the main room, as a place to receive guests of honor and aisle at wedding ceremonies. Amben tetuo is surrounded by eight other rooms that form a limas house and is also the result of the transformation of the Batanghari Sembilan concept [23].

The sociological aspect related to the anthropometric characteristics of bengkilas is a high sense of togetherness. This togetherness is embodied in the maximized design of the dulang module. It is also strengthened by the expansion of the top bengkilas to be more comprehensive in the 3BL houses. The arrangement contradicts the caste theory, which states that the function of bengkilas is for nobility-based social stratification.

Furthermore, because collectivism is a prevalent aspect of human social behavior, the origin of the number eight in the dulang module can be traced back to the first period or even before the limas house existed. The pre-Sriwijaya era was when the ancestors of Indonesia, the Austronesian people, were still not influenced by various cultures from other regions outside the archipelago. The Austronesian people, the ancestors of the archipelago nations (Indonesia, Singapore, and the Philippines), are a collective society and prioritize togetherness in almost all activities [24].

The priority of the number 'eight' in the dulang module, which originates from the collectivist spirit of Austronesian people, persists to the present day because it continues to be relevant to the cultural developments in Palembang. Throughout history, Indian, Chinese, and Arabic cultures came to Palembang, bringing new beliefs such as Buddhism, Hinduism, Taoism, and Islam. These beliefs, however, support the emphasis of the eight in the limas house module in various ways.

Buddhism supports the priority of eight with the teachings of the eight paths of virtue which are the moral teachings of Buddha (Dolan, 2021). This teaching has been manifested in Chinese architecture, such as the octagonal roof design [25]. It later gained a comfortable place in Palembang society, and the eight people's dulang module is also relevant to these eight paths of virtue.

In the Yin-Yang proportion theory of Taoism, the number eight is good [26]. However, this may not be very relevant because the Yin-Yang proportion theory has many good numbers. Of the nine possible numbers, five (50%) of them are good numbers, namely 1, 2, 6, 8, and 9. Using the number eight on the limas

may coincide with the typology of good-bad numbers from the Yin-Yang theory.

In Hinduism, there is also the concept of *lokapala*, where there is one god in each direction [27]. The origin history of Palembang City, which refers to the existence of the Sriwijaya Kingdom with its Buddhist style and significant Chinese population as well as Hindus, support each other for the orientation of the use of the number eight in the *dulang* module.

Another influence that can help strengthen the use of the eight-sided *dulang* is the teachings of Islam. Islam does not have its system of proportions, but there are proportional decorative principles in making flat planes. One of the essential flat planes is the octagonal star, as used in the layout and plane composition of the Petronas tower [28]. In Islamic teachings, there is also a priority for eight people to eat together. Muslim Hadith's narration states, "Food for one person is enough for two people, food for two people is enough for four people, food for four people is enough for eight people" (HR Muslim No 3836) [29]. This reason explains the *bajamba* eating tradition in Minangkabau, which also uses a dish for eight people [18]. There is another hadith regarding the number of people who eat [29]. Hadith, narrated by Bukhari No. 5392, states that "food for two people is enough for three people, and food for three people is enough for four people." The Malays seem to adopt the Bukhari perspective, while the Palembang people take the Muslim perspective.

Changes In Cultural Orientation

Collectivism, as a form of cultural orientation, can experience a shift towards the other pole, namely individualism. While collectivism emphasizes group cooperation, togetherness, and dedication, individualism emphasizes selfishness, competition, and independent autonomy [30]. Individualism in architecture is reflected in the proportion of private space much broader than a house's public space.

Changes in society from collectivists to individualists can occur in social changes where people become more focused on themselves and behaviors that show decreasing solidarity. This shift in focus on oneself makes individuals unable to adapt to an environment that requires cooperation and makes them socially vulnerable [31]. Factors known to influence society's change to become more individualistic include an increase in the urban population, the size of household consumption, higher education levels, and an increase in living standards, happiness, and satisfaction [32].

The manifestation of the change from collectivism to individualism is reflected in changes in the structure of relationships, the use of pronouns, naming practices, choice of values, personality, sexual and religious attitudes, parenting and child development goals, cognitive styles, and emotional experiences [33]. However, these changes tend not to be permanent. There will be a moment when society returns to being collective because traditional

collective culture tends to have greater resilience. In addition, collectivism can interact with the composition of society so that in a multicultural society, the meaning of collectivism can change from a practical meaning to a symbolic one [33].

METHODS

The house that became the research sample was selected through a proportional sampling based on the number of *bengkilas*. *Limas* houses can have from two to five *bengkilas*. This research was only carried out on *limas* houses with three and four *bengkilas* because these two types are the most commonly found. Therefore, the sample size is decided to be 50 *limas* houses of a 100 years minimum age with a proportion of 30 three-*bengkilas* (3BL) and 20 four-*bengkilas* (4BL) houses. The research location is the Seberang Ulu and Ilir areas (Figure 3). This number was chosen based on the viable population of the *limas* houses in the Seberang Ulu and Seberang Ilir areas, which were the research locations.



Figure 3. Map of the sample houses in Seberang Ulu and Ilir
Source: Author (2020)

The quantitative data is in the form of field measurements. With the permission of the homeowner, the measurement is carried out. This measurement is based on the *Limas* house scheme (Figure 4).

To simplify the analysis process, houses of the same size are combined into one type. The quantitative data obtained are tabulated, and the proportion for each comparison is calculated and compared between houses. The minimum, maximum, mean, modus, modus total (N modus), and the percentage of modus to the total are drawn from this data. The modus of each comparison is used as the standard proportion. If there is no modus of comparison, then the mean value is used as the standard proportion. Standard proportions are then

drawn into the house schematic, replacing the corresponding symbols.

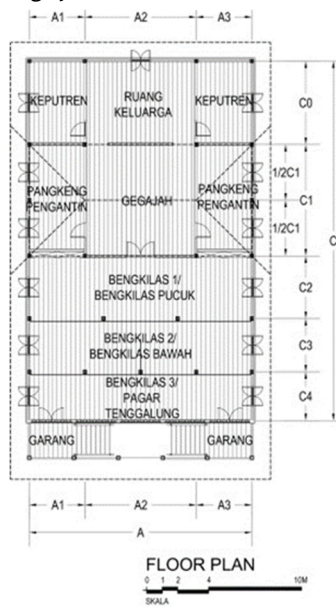


Figure 4. Measurement Elements of Limas House
Source: Author (2021)

RESULTS

Horizontal Proportion Of Three-Bengkilas Limas House

The total number of houses is 30 3BL houses. After taking measurements, the researcher realized that the same values appeared in several houses. This occurrence allows the creation of a typology to simplify subsequent analysis.

Table 1. Typology of Three-Bengkilas Limas House

Type	Total	Width Ratio (W)	Height Ratio (H)	Height Ratio without Roof	Length Ratio (L)	Average age (year)
Type I	1	2.4	2.3	1.6	4.8	175
Type II	5	2.7	2.6	1.7	4.9	150
Type III	16	2.7	2.6	1.7	4.7	146
Type IV	3	2.7	2.5	1.7	4.8	142
Type V	2	2.7	2.6	1.6	4.8	132
Type VI	1	2.4	2.3	1.5	4.6	140
Type VII	1	2.1	2.4	1.7	4.9	140
Type VIII	1	2.4	2.3	1.5	4.7	125

In the plan of the 3BL house, four horizontal elements can be identified, namely A1, A2, A3, and A. The module that becomes the divider is the size of the 260 cm *dulang*. Size $A_1 = A_2 = A_3$ so $A = 3 A_1$. The data for all types of 3BL houses are as follows.

Table 2. Measurement of the Horizontal Length in Three-Bengkilas Limas House (in cm)

	Type I	Type II	Type III	Type IV	Type V	Type VI	Type VII	Type VIII
A1	320	320	360	350	350	320	280	300
A	960	960	1080	1050	1050	960	840	900

The ratios can be obtained based on the data above, as shown in the following table. These values

are obtained by dividing each value from Table 2 by 260, which is the *dulang* size. The results show that the A1 ratio lies between 1.08-1.38 *dulang*, so that it can be rounded to 1 *dulang*. Meanwhile, the ratio A lies between 3.23 - 4.15, rounded to 3-4 *dulang*.

Table 3. The Calculation Result of Horizontal Element Ratio in Three-Bengkilas Limas House

	Type I	Type II	Type III	Type IV	Type V	Type VI	Type VII	Type VIII
A1	1.23	1.23	1.38	1.35	1.35	1.23	1.08	1.15
A	3.69	3.69	4.15	4.04	4.04	3.69	3.23	3.46

The following table depicts the descriptive statistics from calculating the horizontal element ratio of the 3BL house. The minimum value of A1 is 1.08, while the maximum value is 1.38. All of these values are in the 1 *dulang* rounding range. The mean value for A1 is 1.25, which is not very meaningful because the rounding still has only one choice: one *dulang*. The modulus value is the value that appears most often from the data, and Table 3 shows that the A1 value that appears most often is 1.23 with a total occurrence (N modulus) of three times which means 38% of the total 8 data (limas type).

Meanwhile, ratio A lies between 3.23-4.15 with a modulus of 3.69. The mean value is 3.75. These two values, both the modulus and the mean, can be rounded to 4.

Table 4. The Calculation Result of the Horizontal Element Ratio of Three-Bengkilas Limas House

	Min	Max	Mean	Modus	N Modus	% Modus
A1	1.08	1.38	1.25	1.23	3	38%
A	3.23	4.15	3.75	3.69	3	38%

From the table above, it can be concluded that elements A1, A2, and A3 each have a horizontal ratio of 1 *dulang*. In contrast, element A, the length of *bengkilas*, has a horizontal ratio of 4 *dulang*. By extending the above method to the sagittal elements (C0, C1, C2, C3, C4, and C) the following results are obtained:

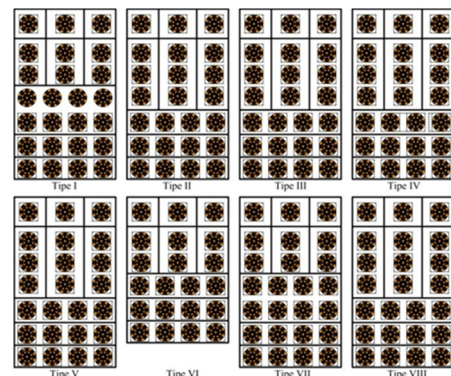


Figure 5. Proportion Variations of Horizontal Elements in Three-Bengkilas Limas House
Source: The Author (2022)

The figure above shows the proportion variation of horizontal elements on the 3BL by type. It can be seen that the placement of dulang for Type II, Type III, Type IV, Type V, and Type VIII is the same, that is, four dulang in each bengkilas, three dulang for gegajah, three dulang for amben, and one dulang in the back rooms. However, the other types differ from one another. The following figure shows a general model of horizontal proportion elements of a 3BL.

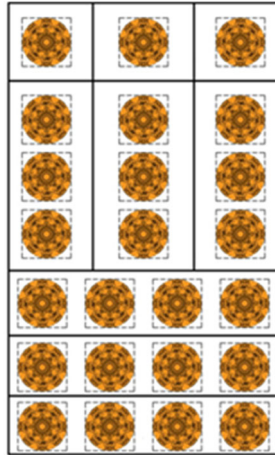


Figure 6. Common Type of Three-Bengkilas Limas House Based on Dulang
Source: The Author (2022)

On the other hand, type I limas have wider upper bengkilas and smaller gegajah. Type I is the same as Type VII in dulang placement. Type VI is the simplest. The dulang pattern of bengkilas is the same, but the gegajah are reduced to a smaller size because they only accommodate two dulang.

Furthermore, from Table 1, the emerging pattern can be associated with the average construction time of houses. Type I is 175 years old, while Type VII is 140. Therefore, the first variation existed at least 140-175 years ago. The second variation ranges from 125-150 years ago. Type VIII is the youngest, and Type II is the oldest. The third variation has only one sample that is 140 years old. If sorted, the variations starting from the oldest are variation I (175 years), variation II (150 years), and variation III (140 years) (see Figure 5). As it is known that variation I is the largest of the 3BL, variation II is the medium and most common one, and variation III is the smallest.

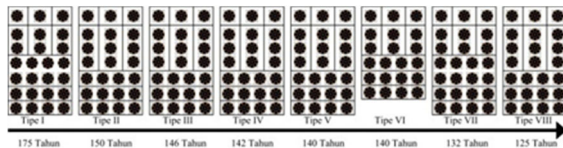


Figure 7. The Evolution of Horizontal Proportions in three-Bengkilas Limas House
Source: The Author (2022)

Horizontal Proportion Of Four-Bengkilas Limas House

Meanwhile, the total of 4BL houses in this study was 20 units. Based on the same method as in the 3BL, from these 20 houses, eight types with

different sizes can be drawn, namely types I, II, III, IV, V, VI, VII, and VIII.

Table 5. Typology of Four-Bengkilas Limas House

Type	Total	Width Ratio (W)	Height Ratio (H)	Height Ratio Without Roof	Length Ratio (L)	Average Age (year)
Type I	1	4.7	2.6	1.7	5.1	225
Type II	2	4.3	2.4	1.6	5.2	225
Type III	9	3.5	2.7	1.8	4.7	189
Type IV	4	4.0	2.4	1.6	4.7	154
Type V	1	4.0	2.2	1.4	4.7	190
Type VI	1	4.0	2.7	1.8	4.6	150
Type VII	1	2.5	2.6	1.7	4.8	125
Type VIII	1	2.6	2.5	1.7	4.4	125

The analysis results, in the same way, applied to the 3BL house, produce a distribution as shown in the following figure.

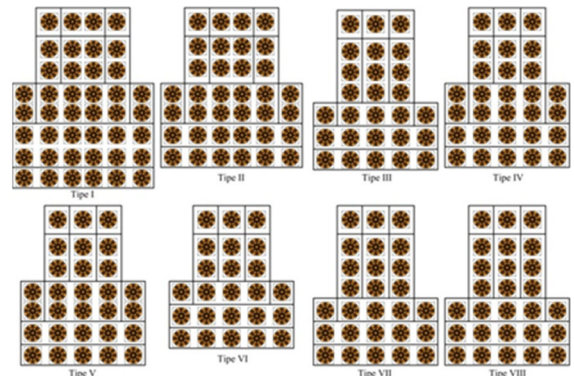


Figure 8. Proportion Variations of Horizontal Elements in Four-Bengkilas Limas House
Source: The Author (2022)

The horizontal proportions in the figure above are variations of the general model (Figure 7) for each type of 4BL. Type IV and Type V are the same as the general type. For the rest, there are variations in bengkilas and gegajah. Type I looks huge with more dulang on bengkilas III, gegajah, and the back room. Type II is slightly smaller, but the gegajah is still more significant than the ordinary type. Type III has a longer gegajah and a shorter upper bengkilas. Type VI has a smaller gegajah and bengkilas, while type VII and Type VIII are the same as Type III. From these descriptions, there are four variations of dulang proportion on 4BL, namely variation 1 (Type I), variation 2 (Type II), variation 3 (Type III, Type VII, and Type VIII), and variation 4 (Type VI). Type IV and Type V are not variations because they have the same layout as the general type.

Referring back to Table 5, it is known that most limas are Type III, as many as nine. The combination of type IV and Type V only includes five limas houses. The combination should indicate that variation 3 should be more of a model for the more common 4BL proportions than type IV/V. However, general types are not arranged according to overall proportions. If it is

based on this, we can look at the most abundant types in the sample and state it as a general model. The current general model (Figure 7) is arranged according to the modus of each room in the limas.

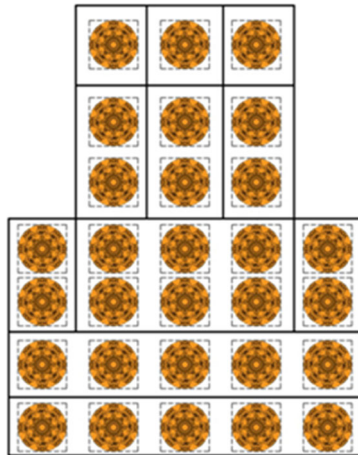


Figure 9. Common Type of Four-Bengkilas Limas House Based on Dulang
Source: The Author (2022)

The main differentiator for Type III (also means Type VII and Type VIII) and type IV/V is the top bengkilas. In Type III, the upper bengkilas consist of one row, while Type IV consists of two. The percentage of the two alternatives is the same at 50%. The limas with one row of dulang on the top bengkilas are present in Type III, Type VI, Type VII, and Type VIII, while the two rows are in Type I, Type II, Type IV, and Type V.

Therefore, Type III can be a general model with the same opportunities as Type IV, especially because Type III is more common than Type IV in the sample.

Returning to Table 5, we see that the order of type is almost linear with the mean age of the limas. It is just that, in this case, Type V limas are older than Type III limas. The order means that if the average age is sorted from oldest to youngest, it would be Type I, Type II, Type V, Type III, Type IV, Type VI, Type VII, and Type VIII. Type I is the oldest at 225 years, and Type VIII is the youngest at 125. The pattern immediately emerges by comparing this sequence with Figure 8: over time, there is a size reduction followed by a reduction in the row of dulang. Types I, II, V, and IV are among the oldest and have two rows of dulang on the bengkilas, at least on the top bengkilas. The younger Limas only have one row of dulang on the bengkilas. Reduction of the row of dulang was started in Type III, 189 years old. In the period 154-225 years (Type I-Type IV), there is a dominance of two rows of bengkilas. As a result, there are three significant periods: the period when limas had two rows of dulang in 189-225 years ago, limas with two rows of dulang and one row of dulang in 154-189 years ago, and limas with only one row of dulang in 125-154 years ago.

Another pattern observed was a change in the proportions of dulang on the gegajah. The pattern that emerges is the elongation and constriction of the gegajah. The old type limas (Type I and Type II) have a

gegajah size 2x2 dulang. Younger limas (Type V, Type VI, and Type IV) have 1x2 rectangular gegajah, and the youngest limas (Type VII and Type VIII) have longer gegajah of 1x3. However, there is an aberration in Type III, which has 1x3 gegajah but appears in the period between the old type and the young type (see Figure 10). The aberration shows that we cannot base the evolution of the bengkilas row based on gegajah's proportions.

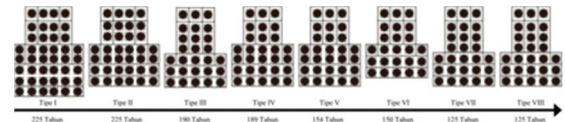


Figure 10. The Evolution of Horizontal Proportions in four-Bengkilas Limas House
Source: The Author (2022)

DISCUSSION

Traditional and even modern architecture can indeed present collectivity in many ways. Limas house presents it uniquely, combining it with morality, beauty, religiosity, sacredness, and harmony.

With evolutionary assumptions, it can be concluded that there is a tendency to change the dulang layout from large to slight over time. Because dulang is interpreted culturally as something collectivistic, society's collectivism has decreased over time. In addition, because the size also decreases over time, it can be concluded that the economic power to build a limas, using the same assumptions of materials and durability, is decreasing over time. The rising financial strength could be due to the popularity of limas in the community so that even poor people can build limas. Because of this, the new limas are smaller and have fewer dulang modules.

The phenomenon discovered by this study leads to the explanation that collectivism, in a practical sense, has diminished and eroded in Palembang society. The tiny house size only facilitates a few people to come and strengthen the collectivity into smaller groups and sometimes only clan associations (family-based).

The smaller the limas size shows that the practical meaning of the dulang-based proportions has changed to a symbolic meaning. This symbolic meaning is the ethnic identity of the Palembang ethnic group. Community members who are quite capable of making limas choose to build a limas house as a symbol of identity that they are part of the Palembang community, even though they do not practically apply collectivism, such as holding a banquet together.

These findings confirm the theory that individualism is closely related to people's economic growth [34]. In the 1800s to early 1900s, when the limas houses studied in this study were erected, significant economic changes took place. The people of Palembang developed from a monocultural society with sharp strata between the aristocrats and the commoners to a more economically equal society. At that time, the Palembang Sultanate collapsed, and

many officials and aristocrats lost their socioeconomic status, while on the other hand, the people became more economically developed through trading activities. At that time, several entrepreneurs of Arab and indigenous descent developed. The previous prohibition from the sultanate era prohibited the establishment of limas by non-aristocrats. As a result, many community members, immigrants, and natives built their limas houses to imitate the aristocratic ones considered magnificent at that time. However, this motif is symbolic either because of ignoring collective values in the limas house or lack of budget. As a result, the houses built tended to be smaller and narrower, which could not accommodate as many people as the houses of the older nobles. Therefore, these limas houses are more of a cultural identity that symbolically confirms that the owners are Palembang people. This affirmation of identity is essential considering that at that time, Palembang had become a multicultural city with more significant immigrants from other residents in the archipelago and immigrants from abroad.

Previous research identified a decline in collectivism and increased individualism through language [35]. However, this study shows that this shift occurs through architectural means, especially from horizontal proportions. This finding is essential to the literature on psychology, culture, and architecture. Nowadays, the change from collectivism to individualism is a global phenomenon brought about by globalization [36]. Interestingly, this phenomenon is not linear. In many places, awareness to revive the spirit of collectivism is growing through efforts to preserve a traditional culture considered more beneficial for the survival of society than individual modern culture. This revivalism relies on timeless cultural features eroded by individualism, such as *dulang*-based horizontal proportions. This research shows that although the limas houses are getting smaller and smaller, some of the hallmarks of collectivism in these houses are not extinct. Some community members who are proud of their identity try restoring collectivism from being merely symbolic to being practical again by holding the *ngobeng* tradition. Even though the limas are more minor, each *bengkilas* can still accommodate the size of one *dulang* sagittally. The local government also adopted elements of limas, such as *Batang Hari Sembilan*, as a joint pride of the people of Palembang. Researchers can still identify influences from various cultural layers that shaped Palembang's history from the limas house, ranging from Austronesian, Buddhist, Hindu, and Taoist to Islam.

The novelty of this research is the relationship between the proportion of rules of limas houses and the community's cultural values. Until now, this relationship is unknown because to know it means that limas house proportion rules must first be known, even though research on this proportion rule is still very partial. On the other hand, there have been many studies on the cultural values of the limas house, but these studies do not link cultural values with

proportions. Most of these studies associate cultural values with the orientation of the house, the number of *bengkilas*, the amount of room, or the variety of decoration. By knowing the relationship between the proportion rules of limas house and the cultural values of the Palembang people, this research can contribute theoretically and practically.

This study shows that relations are related to the proportions and cultural meanings attributed to the community in the horizontal plane. This finding will provide a theoretical contribution to the theories of proportion which have been dominated by Western proportion theory, especially by the Greeks.

Furthermore, although it is widely believed that nobility-based social stratification is a factor causing the existence of terraced *bengkilas*, from the lowest to the highest nobility degrees according to their respective *bengkilas*, the findings of this study do not support this conception. Instead, a significant theoretical contribution emerged with this finding. The results showed that the *dulang* module on the horizontal axis in 3BL houses applies to all *bengkilas* with the same proportions. This finding will imply a hypothesis that *bengkilas* cannot serve nobility-based social stratification in the form of a pyramid, or at least in the 3BL houses built by non-aristocrats. Moreover, in 3BL, the expanding *bengkilas* are not at the lowest but at the top. This arrangement makes it increasingly impossible to construct a pyramid of nobility-based social stratification in *bengkilas* because if so, it would mean that the nobles with the highest rank, who were assumed to sit at the top of the *bengkilas*, far outnumber the commoners, who were assumed to sit at the bottom. In turn, this supports the idea that *bengkilas* function as a transitional space between private and public spaces, and the number of *bengkilas* depends on the economic capacity of the occupants [37].

CONCLUSION

This research studies the proportion of limas in the horizontal plane. The results show that the limas three *bengkilas* houses are generally built with four *dulang* on the front and seven *dulang* on the side. In comparison, the 4BL houses are built with five *dulang* on the semi-public *bengkilas*, three on the back, which is private, and seven *dulang* on the side. Limas house contains collectivist values with religious wrappings preserved as a form of acculturation from Austronesian, Buddhist, Hindu, Taoist, and Islamic cultures. Historical reviews reveal that limas houses tend to change in size to become smaller over time. This finding shows that there has been a shift from concrete collectivist values to values that tend to be symbolic and individualistic. This change occurred because of globalization at the beginning of the 20th century, when the people of Palembang became increasingly multicultural. Traditional institutions had lost their power to regulate who was allowed to build limas. The discovery of horizontal proportions in this study provides an opportunity to build standardization

of limas and restore concrete collectivism in the form of limas designs that can accommodate and encourage the spirit of cooperation in society.

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