

## Structural System and Local Cultural Wisdom in The Traditional Architecture of Kenali Lampung Which is Currently Starting to be Rare

Pipiet Arini Putri<sup>1\*</sup>, Ema Yunita Titisari<sup>2</sup>, and Respati Wikantiyoso<sup>3</sup>

<sup>1,2</sup>Department of Architecture Built Environment, Brawijaya University Malang, Indonesia.

<sup>3</sup>Department of Architecture, University of Merdeka Malang, Indonesia.

Corresponding Author: pipitap98@student.ub.ac.id

### Abstract

#### Keywords:

*Kenali's Lampung  
Traditional  
Architecture; Local  
Wisdom; Structural*

This research takes a case study of traditional architecture in Lampung Province with the material and method used is descriptive qualitative by taking data and analyzing it deductively. The data was obtained from secondary data in the form of books, journals, and other sources related to the traditional architecture of Lampung. The analytical technique used is descriptive exploratory with the results of the analysis of the Kenali traditional house showing a broad understanding of space and adaptation to the environment. The form and system that supports the building are one of the community's efforts to complement and explore its natural and cultural potential. In terms of structure, construction, and connection system, this traditional house also has local wisdom that can be developed and can be used as an alternative for construction completion and natural disaster management to date.

© 2017 The Authors. Published by GKAK UNMER  
Malang

Article Received : Dec 05, 2021  
History Accepted : Jan 14, 2022  
Published : Jan 15, 2022

### 1. Introduction

A traditional house is a building that has a special characteristic, used as a place of residence by a certain ethnic group. In Indonesia, there are various kinds of traditional houses scattered in various provinces. Traditional houses become one of the highest cultural representations in a tribal community or society.

With such a wide area, making Indonesia has many factors of cultural differences in each region. This diversity is a characteristic and strength of the Indonesian nation that is not owned by other countries. One of the diversity that exists in Indonesia is the existence of traditional houses in each region. Traditional houses in Indonesia are very diverse and of course have an important meaning in the perspective of heritage, history, and the progress of society in a civilization.

Traditional architecture is an architectural form that is passed down from one generation to the next (Rapoport, 1969). Studying traditional buildings means studying community traditions that are more than just physical building traditions. Lampung's traditional architecture is one of the ancestral cultural heritages that are starting to be

difficult to find in today's society. Apart from the fact that the next generation does not feel they have this tradition due to lack of knowledge about the background of the wealth of values in its development, it is also caused by other domestic factors related to meeting the needs of people's daily lives.

Traditional Indonesian architecture experienced the peak of its development during the development of Hinduism and Buddhism. It cannot be denied that Indonesian architecture gets a lot of influence from outside such as China, India, Arabia, and Europe. "Indonesian architecture is heavily influenced by architecture from outside Indonesia such as Hindu, Buddhist, Islamic and Colonial architecture" (Hasbi, 2012).

Currently the development of traditional architecture is experiencing a decline, where European or Dutch colonial architecture is more dominant than traditional Indonesian architecture. This phenomenon occurs because of the development of technology and materials in the globalization and modern era, where new technology can make materials that work, are practical, fast, and last a long time. This causes the Indonesian people to switch from materials that come from the surrounding environment to new materials that are more practical and durable. Coupled with the development of modern architecture, especially the International Style, which does not have a regional spirit, which results in architecture that does not have a territorial identity or character.

As a result, we will find the same character in architecture around the world because of this influence, as Zarzar and Berry (2008) said in (Dahliani, 2015) the process of globalization causes cultural homogeneity, when the culture is homogeneous it is certain that the architecture will become homogeneous as well because architecture is a product of culture. This is also supported by a statement from Soedigdo, et al (2014) which said that with the development of world architecture, the identity of Indonesian architecture itself has faded eroded by European and American architecture.

In addition, the lack of knowledge of the artisans about the traditional architectural traditions of Lampung or even not knowing it at all, resulted in basic changes to the building structures. For example, building pillars filled with various ornaments depicting the reality of the life of the cultural ancestors of the Lampung people were discarded and replaced with new pillars. The original poles were left rotten and infested with termites until they were burned as if they had no importance for life today.

The area in Lampung Province which has a variety of distinctive traditional houses is West Lampung Regency, one of which is in *Kenali* village, Liwa. Liwa City, which is the district capital, is an earthquake-prone area because its location is close to the earthquake route on the island of Sumatera. The city of Liwa which is located + 950 meters above sea level is often shaken by earthquakes, so this is the basis for the thought of the ancestors of the area in inheriting the shape, structure and construction of traditional Lampung houses.

The traditional house belonging to the Lampung community, located in the *Kenali* area, is an area that is believed to be the origin of the Lampung indigenous people. This traditional house is estimated to be 200-500 years old and stands on a foundation and columns with a diameter of 0.5-1 meter. This building has been renovated many times, but these renovations actually lose its historical value. The existence of the traditional *Kenali* house is currently known to only have 2 houses left. One is in its original location which has now been converted as a cultural heritage and the other is in the Lampung Museum with the hope that the rich value of the indigenous knowledge of the *Kenali* area

# Structural System and Local Cultural Wisdom in The Traditional Architecture of Kenali Lampung Which is Currently Starting to be Rare

Pipiet Arini Putri, Ema Yunita Titisari, and Respati Wikantiyoso

can continue to be studied by the community and the younger generation. The purpose of this paper is to find out how the structural system used in *Kenali* traditional architectural buildings and obtain information about local cultural wisdom that exists in *Kenali* traditional architectural buildings.

## 2. Materials and Method

This study uses a qualitative descriptive approach by taking data and analyzing it deductively. Exploratory descriptive method is used to analyze and draw conclusions based on the results of the analysis of the *Kenali* traditional architecture being studied. The data in this study were obtained from secondary data sources from books, journals and other sources related to the traditional architecture of Lampung.

Analytical techniques begin with the collection of data from the study of literature on structural systems, construction systems, and the traditions and cultures that exist in traditional *Kenali* architectural buildings. After that, the data is reduced (simplified) first, or directly presented in the form of narrative text systematically, and then the withdrawal of conclusions.

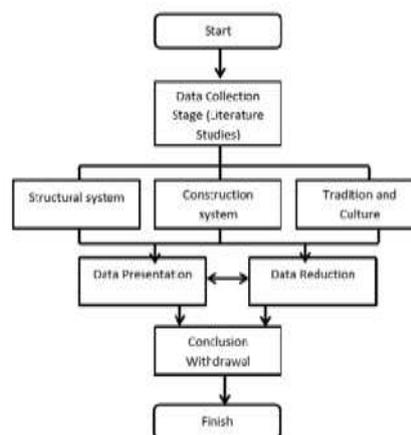


Figure 1. Analysis Framework

### Area Overview

*Kenali* is the capital of Belalau Subdistrict, West Lampung Regency, Lampung Province. This area is located 20 kilometers from Liwa, the capital of West Lampung regency. The name *Kenali* is derived from *Kinali*, a region located in present-day West Sumatra. This name is given by Umpu Belunguh a spreader of Islam from as many Arabs as ever staying in *Kinali* for a long time. Based on Law Number 6/1991. This village consists of 6 hamlets: Kenali 1, Kenali 2, Surabaya, Sukadana, Banjar Agung, and Campang Sari with an area of 1,211 Ha with land uses: settlements, rice fields, plantations, forests, mixed gardens, ponds, rivers, and roads. The surrounding area is mostly hilly to mountainous with steep slopes. Plants in residential areas are ornamental plants, medicinal plants, kitchen spices, fruits, vegetables, and secondary crops. Forest products are dominated by resin and the main plantation product is coffee.

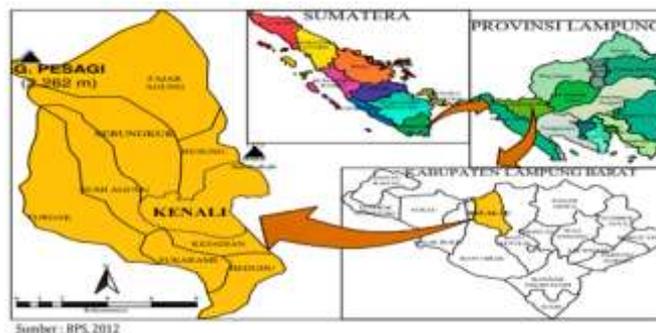


Figure 2. Kenali Area Map

### Local Wisdom

Local wisdom etymologically from two words, namely wisdom which includes (wise) and local. Local wisdom can be interpreted as views, ideas, and local values that are wise and of course good for the community and are followed by community members (Widyanti, 2015) Local wisdom is a result obtained from certain communities through an experience that has occurred and other communities. who have not necessarily experienced that experience (Supiyah, 2018). In addition, local wisdom can be interpreted as a system that exists in the order of political, social, economic, environmental, and cultural life that is integrated with the life of the local community.

Local wisdom can also be interpreted as a local community behavior that has been developed from generation to generation to be used as guidelines and instructions in interacting with nature and the surrounding environment (Vitasurya, 2016). These guidelines are converted by the community into principles and values of customary norms that have been approved and applied by the community (Widisono, 2019). The application carried out by the local community often lasts a very long time because these norms and values have been practiced by the community as something good and right (Nugroho, 2017).

Local wisdom can start with the unification of thoughts or ideas that exist among individuals in the community. Local wisdom is usually created and applied to benefit certain groups by studying and practicing local wisdom. The application of local wisdom is often applied to a few people, for example in the village environment, besides that, it is applied by several people, local wisdom is also applied and used by a large group of people, for example in the ethnic scope (Marpaung, 2013).

The characteristics of local wisdom are: 1) dynamic, 2) sustainable, 3) accepted by its members, 4) able to survive from outside cultures, 5) have the ability to combine elements from outside cultures into native culture, 6) able to provide direction of cultural development, 7) developing from generation to generation (Widyanti, 2015).

Every local wisdom certainly has values that can be practiced including: 1) uniqueness in the social system, 2) uniqueness in the political system, 3) uniqueness in the survival system, 4) uniqueness in cultural products. These values are used as a guide to life and a reference for behaving in society, this indicates that local wisdom contains elements of intelligence, creativity, and local knowledge from individuals in the local environment (Astri, 2011). Based on the explanation of local wisdom, according to these experts, it is very reasonable that local wisdom can be said as a system of knowledge or habits that characterize a society.

# Structural System and Local Cultural Wisdom in The Traditional Architecture of Kenali Lampung Which is Currently Starting to be Rare

Pipiet Arini Putri, Ema Yunita Titisari, and Respati Wikantiyoso

## 3. Result and Discussion

### Traditional House in Indonesia as a Natural Adaption Strategy

In the relationship between architecture and culture, traditional houses in Indonesia are seen as a form of adaptation strategy to nature (earthquakes) through engineering construction structures or connection and support systems with the exploration of local materials such as stone, wood and bamboo (Rapoport, 1969).

The earthquake itself produces vibrations, in the form of: primary waves that vibrate coincide with the direction of propagation, secondary waves that move perpendicular to the direction of propagation and large waves that travel on the ground (Mangunwijaya, 1988). The earthquake vibration will affect the building, in the form of: the inertial force caused by the acceleration of the earthquake on the building mass and can cause the building to vibrate according to the ground vibration, the rolling force (caused by the S force which is repeated back and forth) causes the building to bend at the bottom and Torsion (caused by differences in the location of the center of mass stiffness and the center of the earthquake) makes the building rotate about the x-axis (Subekti, 1997). The reaction of wooden buildings to earthquakes, in the form of: flexibility (rigidity and plasticity), namely the stiffness of elements or joints that form plasticity; damping and stability (friction and spring) ie absorption of vibrations to counter inertial forces; elasticity and ductility, namely the ability of the building to undergo plastic deformation without collapsing; and hyperstatics created by beam elements that form plastic hinges (Wangsadinata, 1975).

### Traditional House Building Structure Recognize

Like other traditional houses in Indonesia, the *Kenali* traditional house also has a philosophy in the head, body and legs of its architectural form. However, what makes the difference is the columns or legs of the traditional *Kenali* building, which seem separated from the body and head. In contrast to other traditional houses, for example, the Meranjat wooden house which is quite famous in its construction, namely the column part stands up to the base of the roof of the building or the column part of the building directly supports the roof load.

The shape of the foundation of the *Kenali* traditional house is relatively the same as the foundation of other traditional houses in Indonesia, namely the foundation that uses stone pedestals. The stone pedestal is not only a place for distributing the load on it, but also as a place to separate the wood material from the soil so as not to quickly damage the wood material, which is the main material of the *Kenali* traditional house.

In addition, stone pedestals also function to dampen and reduce ground movement against the structure of the building above it so that the building can remain standing in the event of an earthquake.

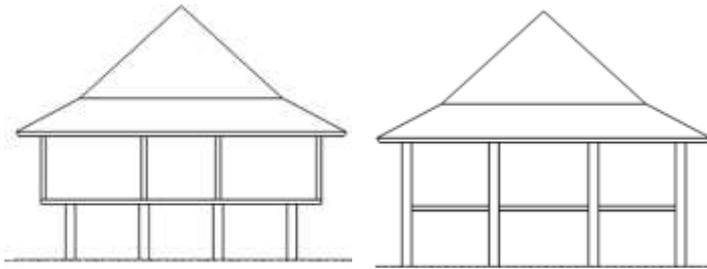


Figure 2 and 3. Kenali Traditional House and Meranjat Traditional House

The part of the column or the lower leg that the structure above lifts on serves to give the effect of flexibility on the building as a whole. This is an adaptation to the conditions of the *Kenali* area which is prone to earthquakes and the upper structure, namely the body and head, has a rigid structure using purus and pen joints in each part of the construction.



Figure 4 and 5. Kenali Traditional House and the Foundation of the Base

### Traditional House Construction Recognize

Construction on the traditional *Kenali* wooden house is separated into two parts, namely the construction of the rigid top which is superimposed on the construction of columns and beams with a roller or joint system. The beams that bind the columns and the floor are arranged in four layers, with the first 2 layers of octagonal beam cross-section and 2 layers above which are rectangular beams. From the arrangement of the wooden construction, it can be concluded that the construction of the *Kenali* traditional house was made as a way of anticipating the building against earthquakes that often occur in the area.



Figure 6 and 7. Kenali Stilt House Construction

Two octagonal beams arranged longitudinally and transversely are made to support the floor beams above and are stacked on the columns below. For floor beams

## Structural System and Local Cultural Wisdom in The Traditional Architecture of Kenali Lampung Which is Currently Starting to be Rare

Pipiet Arini Putri, Ema Yunita Titisari, and Respati Wikantiyoso

with a rectangular cross section in the first layer, they are installed longitudinally and transversely which become one with the floor construction. The beams for the top floor are installed in only one direction and serve as a support for the column walls of the house and the wall itself. This makes the construction system of this house building mutually supporting, pressing, pinching and pulling.

### Traditional House Construction Recognize

In terms of earthquake-resistant building structures, the critical point is located at the connection (Siddiq, 2001). The connection found in the traditional *Kenali* house is the confluence of joint octagonal umpak-columns and floor beams-wall-column walls-roof beams that are limited in nature. The combination of these two connection properties is used to overcome earthquake forces, namely where the nature of the joints on the pedestal is an effort to reduce earthquake vibrations that reach the floor beams and the clamping properties of the wall beams that make the roof act like a pendulum to stabilize the building when it receives earthquake forces, and both The connection causes friction as a vibration damper and is a means of energy dissipation (Prihatmaji, 2003).



Figure 8 and 9. Support Systems, Pinch, Push and Pull Systems

In the connection system drawing, it can be seen that the wall column has a tubular purus or compression joint that penetrates two rectangular floor beams that are installed transversely and longitudinally. While the two beams pull each other based on the nature of the block, so it is clear that the support, clamping, compression and tension system in the connection system becomes a rigid unit but can still cause friction between construction elements.

The construction of the stairs uses a purus system and is locked using wooden pegs, with this being seen that traditional Lampung houses do not recognize connections using nails.



Figure 10. Stairs Construction

All connection solutions in every *Kenali* traditional house construction have the right techniques and systems according to the function, intent and purpose of each construction element, there are even some philosophical meanings implied in each detail element.

### **Local Wisdom of Traditional Architecture Recognize**

The traditional *Kenali* house located in the city of Liwa is one of the local wisdoms of ancestral architecture that is full of philosophical and cultural meanings. In terms of the shape of the building, the ornaments and the layout of the building are applied from the need for kinship values that occur according to the local culture. The size of the house that is not too large in a traditional house located in a highland or hilly area shows that the effect of house layout on land surface changes is also not too large. Therefore, cut and fill activities due to the construction of traditional houses can be avoided so that the soil surface structure naturally does not change.

The traditional *Kenali* house in the city of Liwa which is included in the type of house on stilts has a very good adaptation to local natural conditions, where its natural location is a highland and is mostly affected by frequent earthquakes. The house on stilts is built on a plateau with a floor height ranging from 1.5-2 meters. The high floor surface is not only able to avoid damage or loss due to weathering and threats from wild animals, it also has a cultural philosophy that believes that the bottom of the building is the animal world.

At the end of the roof of the *Kenali* house there is a "Culu Langi" or spirit ladder made of copper, while the attic section of the roof is a place to store furniture and heirlooms. According to the belief of the *Kenali* village community, if a family member dies and is placed under the "Culu Langi", the corpse will not smell and rot even if it is left for 5 days. The traditional form of the *Kenali* house has a lateral load-bearing structural system that different from other traditional Lampung houses. The difference lies in the lateral force-resisting structure through the central loading of the building in the form of rigid construction on the middle and upper structures that provide a load on the main pedestal and column with the aim of the building being heavy and stable when exposed to lateral forces.

The types of wood used in making the traditional *Kenali* house are Merbau, Nangi, and Bungur wood. Merbau wood is used for the boards of the house, Bungur wood is used to make the pillars of the house, and Nangi wood is used to make the roof of the house. In the past, the traditional houses of the Lampung people were built by indigenous people who were assisted by the Meranjat community from Palembang. One house is built in about two to five years. The length of the process of making this house depends on the availability of materials in the forest. The person who is allowed to cut wood for the purpose of building a house is only the head of the family and the process must also pay attention to a good day according to their beliefs. If the day is not good or not, the community believes the wood will not last long and is full of diseases in it.

Each village in the Lampung area has its own handler who is in charge of determining the time, and other rituals when building a house. Before the construction of the house, there will usually be charity activities held by the family who will build the house, namely by making red, white, and yellow porridge, as well as grilled chicken rice. Yellow is believed to be the spirit's favorite color, so yellow porridge is provided. They invited their neighbors to eat the alms food together.

## Structural System and Local Cultural Wisdom in The Traditional Architecture of Kenali Lampung Which is Currently Starting to be Rare

Pipiet Arini Putri, Ema Yunita Titisari, and Respati Wikantiyoso

This regional identity needs to be maintained so that we have characteristics. This characteristic will be very important for our nation and country, especially in terms of politics, economy, and culture. A country that can maintain its own culture will be considered stronger than a country that only participates. A culture that is maintained will develop tourism because humans love things they have never met.

Local architecture culture is important to continue and develop. This is because tradition is the spirit of a culture and without tradition, it is impossible for a culture to live and last (Artininggrum, 2012). In addition, the tradition of the relationship between individuals and their communities can be harmonious and the tradition of the cultural system will be sturdy (Artininggrum, 2012). Continuing a culture or tradition doesn't have to repeat in the exact same way that it eliminates creativity. But it can continue the character of local wisdom as a concept in the building by applying new forms and methods with more modern materials.

#### 4. Conclusion

Lampung Province is one of the regions in Indonesia that contains a lot of local wisdom. As in other areas in general, Lampung province also has a traditional traditional house of Lampung which contains local wisdom left by the ancestors of the area, both philosophical values to the shape, structure and construction of a typical traditional house. *Kenali's* traditional architecture has the value of local wisdom that is specific and easy to learn, such as in terms of architectural styles, types of structures, building materials and finishes as well as site adjustments to traditional traditional houses, showing a broad understanding of the scope and adaptation to their environment. The pattern of life and kinship system of the traditional *Kenali* community is reflected in the form and philosophy of the buildings they create. The form and system that supports the building is one of the traditional *Kenali* community efforts to complete and explore their natural and cultural potential. In terms of structure, construction and connection systems in traditional *Kenali* house buildings, it is also included in local wisdom that can be developed and has good value and technology as an alternative for building construction completion and natural disaster management for now. From the description of the discussion about the traditional *Kenali* house above, it can be seen how the wisdom of the ancestors in adapting to the environment, society and in the face of natural disasters. Therefore, the local culture and wisdom contained in the traditional architecture of the *Kenali* must be developed and preserved by the younger generation, especially its descendants, so that the values contained and abandoned by these ancestors do not quickly become extinct.

#### References

- Artininggrum.(2012). *Modul Arsitektur Vernakuler*. Jakarta: Universitas Mercubuana.
- Astri, H. (2011). Penyelesaian Konflik Sosial Melalui Penguatan Kearifan Lokal. *Jurnal Aspirasi*. 2 (2): 151-162.
- Dahlioni., Soemarno, I., & Setijanti, P. (2015). Local Wisdom In Built Environment In Globalization Era. *International Journal of education and Research*.
- Hasbi,R. (2012). *Modul Sejarah Arsitektur Dunia*. Jakarta: Universitas Mercubuana.
- Rapoport, A. (1969). *House Form and Culture*. N.J: Englewood Cliffs

- Siddiq S. (2001). Beberapa Tinjauan Aspek Bahan, Konstruksi dan Struktur Bangunan Tradisional Indonesia (catatan kuliah), Magister Arsitektur, ITB.
- Prihatmaji, Y.P.(2003). Perilaku Rumah Tradisional Jawa “Joglo” Terhadap Gempa. Yogyakarta, *Penelitian*.
- Mangunwijaya, Y.B. (1988). *Pertimbangan-pertimbangan Pengaruh Alam, Gempa Bumi dalam Pengantar Fisika Bangunan*, Djambatan, Jakarta.
- Marpaung, L.A. (2013). Urgensi Kearifan Lokal Membentuk Karakter Bangsa Dalam Rangka Pelaksanaan Otonomi Daerah. *Yustisia Jurnal Hukum*. 2 (2), 120-131.
- Nugroho, R. (2017). Pengaruh Kearifan Budaya Lokal Terhadap Hunian Masyarakat Pengrajin Tempe di Kampung Sanan Malang. *Local Wisdom: Jurnal Ilmiah Kajian Kearifan Lokal*. 9(2): 118-130.
- Soedigdo,D., Harysakti,A., Budayanti U., & Tari. (2014). Elemen-Element Pendorong Kearifan Lokal Pada Arsitektur Nusantara. *Jurnal Perspektif Arsitektur*.
- Subekti, B. (1998). Upaya Mengurangi Resiko Kerusakan Akibat Gaya lateral pada Bangunan Kolonial Belanda di Bandung, *Tesis Program Magister Arsitektur ITB*.
- Supiyah. (2018). Menggali Nilai Kearifan Lokal Suku Besemah Melalui Kebudayaan Guritan. *Jurnal Criksetra*. 7 (2), 46-59.
- Tondi, M. L. & Iryani, S. Y. (2018). Nilai Dan Makna Kearifan Lokal Rumah Tradisional Limas Palembang sebagai Kriteria Masyarakat Melayu. *Langkau Betang*. 5(1), 15-32.
- Vitasurya, V. R. (2016). Local wisdom for sustainable development of rural tourism, case on Kalibiru and Lopati village, province of Daerah Istimewa Yogyakarta. *ProcediaSocial and Behavioral Sciences*. 216(6): 97-108.
- Wangsadinata,W. (1988). Pengaruh Gempa terhadap perancangan Arsitektur Bangunan (makalah seminar Peranan Arsitektur dan Struktur dalam Perencanaan Bangunan Tinggi), *FTSP Universitas Trisakti*.
- Widisono, A. (2019). The Local Wisdom on Sasak Tribe Sade Hamlet Central Lombok Regency. *Local Wisdom: Jurnal Ilmiah Kajian Kearifan Lokal*. 11(1): 42-52.
- Widyanti, T. (2015). Penerapan Nilai-nilai Kearifan Lokal dalam Budaya Masyarakat Kampung Adat Cireundeu Sebagai Sumber Pembelajaran IPS. *Jurnal Pendidikan Ilmu Sosial*. 24(2): 157-162.