

## The Main Structure of Walina and its Preservation in Boven Digoel

Y I P Hematang, S Octavia, and A Topan

Department of Architecture, Faculty of Engineering, Musamus University, Merauke, Papua, Indonesia.

[yashinta@unmus.ac.id](mailto:yashinta@unmus.ac.id)

**Abstract.** Walina (Kombai Tribe Tree House) in Boven Digoel can stand on an old tree, becoming a curiosity for researchers to analyse the main structure of Walina which is tread on a tree. Then it will be known the importance of maintaining material from Walina which depends entirely on Papua's natural forests. If there is no forest preservation, then it will be important about Walina's sustainability in the future. The purpose of this study is to produce an analysis of the function of the basic pole structure forming the Walina belonging to the Kombai Tribe and material from the local forest as a compiler of the walina structure and forest preservation for the continued existence of Walina. This research uses descriptive survey method research method.

### 1. Introduction

The Kombai Tribe Tree House is a traditional house that has been inherited from generation to generation by the ancestors of the Kombai Tribe in Boven Digoel. This house is one type of traditional house from four other types of houses. The Tree House is also called Rumah Tinggi by the Kombai Tribe. The indigenous language is called walina, which means Rumah Tinggi.

This house is inherited traditionally but there are no specific rules regarding the dimensions of the house. The dimensions of the house are realized based on the number of people in the house. If the number of residents and the number of families is increasing, the dimensions of the walina will be greater. The dimensions of the house are also adjusted to the size of the diameter of the old tree chosen to be the basic structure of the house.

Tree houses are also owned by other tribes in Boven Digoel, namely the Korowai tribe. But based on interviews with the people of Boven Digoel, there is a difference between the Kombai Tribe Tree House and the Korowai Tribe Tree House. Further research is needed to examine deeper the differences and fundamental similarities between the two tree houses of each tribe.

Further research can enrich the Nusantara Architecture. In Ref [1], the Nusantara Architecture according to Josef Priyotomo is not Traditional Architecture, although both point to the same architectural figure, namely architecture that was developed by so many children of the nation or ethnic groups in Indonesia. The Nusantara Architecture has placed itself as one of the wealth of the

nation's identity. Ref [2] also revealed that appropriate and integrated research and development of Nusantara Architecture needs to be implemented immediately.

When knowing and seeing Walina directly, the first thing that occurred was how the structure and construction of the main pillar of walina. Walina stood on a large tree and was very old. Trees commonly used as a base for walina are mango trees, rambutan trees, and other trees that are strong and firmly rooted. On the tree, there is the first pole that directly sits on the tree branch.

The pole which will then need to be observed in terms of its structural concept. This is to be able to enter the development of knowledge and learning of building structures in the future. The concept of structure at the bottom of the walina pole can inspire the discoveries of structural theory as well as explain the theories of building structures that have been studied. The local wisdom of the Kombai Tribe in establishing Tree House is an interesting thing to learn. By learning how the Kombai Tribe is wise and dependent on nature itself, it is expected to be a good learning model when designing buildings in the future.

Furthermore, because walina has knowledge that is important to be learned, awareness of the preservation of walina needs to be maintained and realized. The results of the study indicate the magnitude of the link between Walina's preservation and nature conservation. All constituent elements of walina come from Papua's natural forests. Once the importance of preserving the forests of Papua for the continuity of the existence of walina.

Ref [3] said the phenomenon of globalization [3] and modernization makes the architecture more universal and creates cultural homogeneity. With globalization, the existence of local knowledge may be questioned, especially in built environment as a result of human culture.

## **2. Research methodology**

This research is inductive exploratory research, namely research with an inductive approach that is exploratory. Ref [4] revealed that research with an inductive approach is research that has stages: facts are collected and then formulated in theory (which is produced through the process of comparison of facts). In terms of the selection of research methods, this study uses a descriptive survey method.

### *2.1. Data collection techniques*

The sampling technique is done non-randomly (nonprobability). According to Ref [5], the non-probability sampling technique is a sampling technique that is carried out by a specific location and has strong reasons for using the sample. The non-probability sampling technique used is a purposive sample type. Samples were taken at the Walina owned by Mrs. Aci Rumi, owner of Er-Wande Lambo Studio in Boven Digoel. Based on the results of interviews with the local community, in the Mandobo District there were only two Walina owned by the Kombai Tribe, one of which was Mrs. Aci Rumi's walina. One of them is the walina has been damaged and cannot be used again as an object of research.

### *2.2. Time and location of research*

This research was conducted in May 2019 in Mandobo District, Boven Digoel Regency, Papua Province.

### *2.3. Data analysis techniques*

The analysis was carried out by doing a descriptive analysis that is by analysing the collected data then producing conclusions from the results of the study. The results of the study were analysed by formal observation techniques, namely direct observation in the field and also by interviewing the relevant sources, namely the maker and also the owner of the walina.

### 3. Discussion

Tree Houses in Boven Digoel are inhabited by the Kombai and Korowai Tribes. These two tribes are one of the five major tribes of the indigenous tribes that inhabit Boven Digoel. Five other tribes of other indigenous tribes include: Muyu Tribe, Auyu Tribe, Mandobo Tribe, Kombai Tribe, and Korowai Tribe. Each tribe has a different language, so also the naming of elements of each traditional house is also different. Ref [6] said Indonesia is a nation with cultural diversity and area. This is caused by a lot of uniqueness of culture in everyday life.

The Kombai Tribe Tree House is also commonly referred to by the community, namely Rumah Tinggi. The function of walina is as a residence during a war. Because of its high position in the trees, children and the whole family can take refuge during the war. But as time goes by now Tree Houses function only as houses.

#### 3.1. *Walina structure*

A building as an architectural work must have three criteria, namely Firmness (Strength), Aesthetics (Beauty) and Utilities (Uses). Firmness or which means strength related to the structure of the building. The structure is an important part of building that distribute the load of the building. Building structures in general are divided into upper structures (roofs), main structures (building bodies consisting of walls, columns, beams and floors of buildings) and sub structures (foundations).

The basic principle of traditional home technology is the simplicity of structure, connection details and systematic type of construction Ref [7] as well as the Walina. The house plan of the Walina in the form of a simple plan is symmetrical without any division of space, this causes a simple roof structure with a simple gable model. The roof structure is only in the form of two logs that form a triangular frame that rests on the beam that binds the wall. A simple truss frame with transverse wooden beams that functions as a recording for truss stiffeners and where the roof cover rests. The tightest truss distance is caused by wood material having a limited burden on structural loads and building loads [8].

Frame walls that are the framework of the body of an important building to form space. Wall frames generally consist of columns, walls and floors that form into space. As is common in wooden houses, the Walina house also consists of columns and walls. But unlike the case with wooden buildings in general where the column bears the burden and continues to the foundation, then at the walina house, the column only functions as a wall stiffener because the overall load of the building is carried by the tree trunk where the house is standing.

The floor of a building in a wooden building is part of the main structure consisting of a main girder and a girder which functions as a beam on which the floor boards rest. Floor girder that will channel the load structure and live load (human) to the column then the column that will distribute the load to the foundation. At Walina, the floor of the house also consists of a girder which is arranged rather tightly with relatively small dimensions of the beam to minimize the weight of the building itself. The difference in the structure of the Walina traditional house floor lies in the load distribution system. At the stage house in general, the girder distributes the floor load to the column then goes to the foundation, while at the walina, the girder distributes the load to the tree trunk where the house stands and also the column on the wall stands on the floor girdle so that the column indirectly burdens the girder.

#### 3.2. *Preservation of walina*

The constituent elements of walina are all from the local forest around Boven Digoel, the Forest in Iwot. The following is a description of the material in question including the following:

**Table 1.** Walina's materials from Papuan forest.

	Function	Local Language
Rattan	Inter pole binder	<i>Ri</i>
Root of Pandanus Forest	Roof Cover Layer	<i>Mbia</i>
Sago Duri Midrib	Wall Layer	<i>Ndalia</i>
Gagar/Nibum	Floor layer	-
Bitanggur Trees	Poles	-
<i>Tali Mangkok</i>	Inter Pole Binder	<i>Kumbamo</i>
Old Tree	Basic Place of establishment of the House	-

From the description above it is known that if nature and forest are not maintained and preserved, then the existence of an original walina such as knowledge of the Kombay Tribe tradition will be lost. In the future, Tree Houses can appear but have changed in terms of their constituent materials. Preservation of buildings that have traditional values can also be done by collaborating with information technology. Ref [9] said that the inventory stage of research results could be done by mapping methods with the help of information technology.

#### 4. Conclusions

After the research ends, there are a number of things that can become conclusions and also become suggestions for future development, including the following:

##### 4.1. Conclusions

- Tree houses are also owned by the Korowai and Kombai tribes with similarities and differences.
- Tree Houses of Kombai Tribe has a local language called Walina.
- As is common in wooden houses, the walina also consists of columns and walls. But the column only functions as a wall stiffener because the overall load of the building is carried by the tree trunk where the house is standing.
- The building material for walina is predominantly from Papua Forest.
- If the forest is not maintained, the sustainability of the walina can also be threatened.

##### 4.2. Suggestions

There are still many things that can be explored from Walina as long as they are based on the basic purpose of developing science. But, it must be done wisely and synergized well, politely, ethically, and responsibly with all parties. Both the academics, the government, cultural observers, environmentalists, the public, and Boven Digoel traditional leaders from each of the major tribes in Boven Digoel.

#### References

- [1] Bakhtiar, Waani JO, Joseph R. Tipe Teori Pada Arsitektur nusantara Menurut Josef Prijotomo. *J Media Matrasain*. 2014;11(2):32–47.
- [2] Pangarsa GW, Titisari EY, Ridjal AM, Ernawati DJ. Tipologi Nusantara Green Architecture. 2012;10(2):1693–3702.
- [3] Dahliani D, Soemarno I, Setijanti P. Local wisdom in built environment in globalization era. *Int J*

- Educ Res. 2015;3(6):157–66.
- [4] Setyowati E. Metodologi Riset Dan Statistik. UPT Universitas Diponegoro Press Semarang; 2013. 236 p.
- [5] Eriyanto. Analisis Isi: Pengantar Metodologi untuk Penelitian Ilmu Komunikasi dan Ilmu-ilmu Sosial Lainnya. Prenada Media Group; 2013. 510 p.
- [6] Kartika T. Verbal Communication Culture and Local Wisdom: The Value Civilization of Indonesia Nation. Ling Cult. 2017;10(2):89.
- [7] Steven Richard Kamurahan. Struktur Dan Konstruksi Rumah Panggung Masyarakat Kampung Jawa Tondano (Jaton) Ditinjau Dari Prinsip-Prinsip Bangunan Tahan Gempa. Media Matrasain. 2018;15(1):1–8.
- [8] Topan A, Octavia S, Soleman H. Analysis of the semi-permanent house in Merauke city in terms of aesthetic value in architecture. J Phys Conf Ser. 2018;1025(1).
- [9] Hematang YIP, Wayangkau IH. Mapping of Historical Building in Merauke uses a Geographic Information System (GIS) as a Form of Collaboration of Engineering Science. In: Proceedings of the International Conference on Science and Technology (ICST 2018) [Internet]. Paris, France: Atlantis Press; 2018. Available from: <https://www.atlantis-press.com/article/55910875>

### **Acknowledgments**

Research resource persons are: Mr. Lukas Eluaru (maker of Tree House) and Mrs. Aci Rumi (owner of Tree House) in Boven Digoel.