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FACTORS CAUSING THE DISAPPEARANCE OF THE TIHANG CONSTRUCTION SYSTEM IN STILT HOUSES ALONG THE KUIN RIVER, BANJARMASIN CITY

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ABSTRACT
Stilt houses are one type of vernacular architecture found throughout Indonesia. Each stilt house has its own construction system that has been used for hundreds of years. One of the construction systems found in the stilt houses along the Kuin River in Banjarmasin City is the Tihang Construction. This construction technique uses continuous ironwood poles from the foundation to the roof support beams and is used as the main structural pillar. There is a new phenomenon where the Tihang Construction is starting to be rarely used in today's era. This study then aims to determine the factors causing the disappearance of the Tihang Construction system in stilt houses in the Kuin River area of Banjarmasin City. This study used a qualitative exploratory method with field surveys and interviews. From the survey results, a total of 37 stilt houses were randomly sampled, and 11 houses were selected to become interview respondents. The results of this study indicate that the Tihang Construction is no longer used due to changes in spiritual beliefs among young people. The use of tihang was originally a belief held by nobles who owned stilt houses in ancient times, so that their homes would last longer and not be easily abandoned by their occupants. This belief turned out to be contrary to the ease and efficiency of the construction of stilt houses, so that this construction system lost its sustainability and began to be abandoned.

KEYWORDS: riverbank stilt house, riverside stilt house, stilt house, Tihang Construction, vernacular architecture, wetland

Rumah panggung merupakan salah satu jenis arsitektur vernakular yang tersebar di seluruh wilayah Indonesia. Setiap rumah panggung memiliki sistem konstruksi tersendiri yang secara turun-temurun telah digunakan selama ratusan tahun. Salah satu sistem konstruksi yang ada di rumah Panggung di sepanjang Sungai Kuin Kota Banjarmasin adalah Konstruksi Tihang. Konstruksi ini merupakan teknik menggunakan tiang Kayu Ulin yang menerus dari pondasi hingga balok penyangga atap dan digunakan sebagai tiang struktur utama. Terdapat sebuah fenomena baru dimana Konstruksi Tihang ini mulai jarang digunakan di zaman sekarang. Penelitian ini bertujuan untuk mencari faktor penyebab hilangnya sistem konstruksi Tihang pada rumah panggung di area Sungai Kuin, Kota Banjarmasin. Penelitian ini menggunakan metode kualitatif eksploratori dengan survei lapangan dan wawancara. Dari hasil survei, terdapat total 37 rumah panggung; kemudian dilakukan random sampling sebanyak 11 rumah sebagai responden untuk wawancara. Hasil penelitian ini menunjukkan bahwa Konstruksi Tihang mulai tidak digunakan lagi karena terjadi perubahan kepercayaan spiritual pada masyarakat muda. Penggunaan tihang pada awalnya merupakan kepercayaan yang dimiliki oleh para bangsawan pemilik rumah panggung pada zaman dulu agar rumah mereka bertahan lama dan tidak mudah ditinggalkan oleh penghuninya. Kepercayaan ini ternyata bertolak belakang dengan kemudahan dan efisiensi dalam pengerjaan konstruksi rumah panggung, sehingga sistem konstruksi ini kehilangan keberlanjutannya dan mulai ditinggalkan.

KATA KUNCI: *rumah bantaran sungai, rumah tepian sungai, rumah panggung, Konstruksi Tihang, arsitektur vernakular, lahan basah*

INTRODUCTION

One of the dynamics of vernacular architecture in Indonesia is the gradual abandonment of some or all components of vernacular houses. This change serves as a cultural marker that accommodates cultural events and all cultural activities taking place within a building (Butudoka, 2023). The change is the result of a complex interaction between social, economic, technological, and cultural factors. Based on a study of the factors influencing changes in vernacular and traditional houses by Damayanti and Kusdiwanggo (2024), five main factors are causing this phenomenon. The first factor is human needs, which have increased over time. Many new spaces are needed to support economic needs, resulting in changes in the function of space (Tarigan, 2019). For example, what was originally a terrace turned into a

grocery store, or a kitchen transformed into a storage room. There are also changes, such as the addition of new bedrooms, due to the increasing number of family members (Oktaviana et al., 2023). This addition of space often does not prioritize uniformity with the old house materials, so that, in terms of spatial patterns and appearance, this house no longer has a pure vernacular architectural style.

The second factor is the ongoing development of technology (Sardjono & Nugroho, 2015). The current generation tends to favor more practical and cost-effective technologies. As a result, traditional vernacular house construction methods are declining, being replaced by simpler and more affordable alternatives. For instance, the use of wooden dowel joints to connect floors to walls is increasingly being replaced by cast concrete.

The third factor is the shift in human understanding. The current generation's expectations regarding comfort and privacy in a home are changing. The traditional concept of a large family room, where the whole family gathers, is becoming less relevant. People now tend to prefer smaller, more enclosed living spaces that prioritize privacy and comfort.

The fourth factor is ideological change. Today's younger generation is moving away from the spiritual beliefs that were important to ancient societies. For instance, the belief that carvings on house walls were necessary for keeping homes cool is increasingly seen as a myth. This shift in mindset has significantly influenced contemporary home styles. Vernacular homes, which were once rich in cultural significance, are being replaced by modern technologies, materials, and designs that emphasize comfort and practicality for their occupants. The final factor is cultural acculturation. Acculturation refers to the changes individuals experience as a result of interacting with other cultures (Simorangkir et al., 2017). With the advent of the internet, people can explore and learn about different cultures and the housing styles from various regions and countries. This exposure has led to the blending of cultures from around the world and tends to diminish the prominence of our native culture.

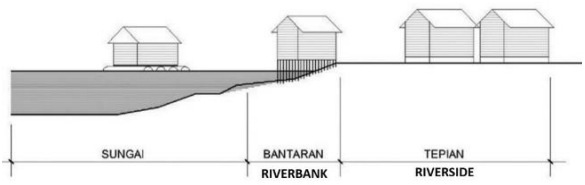
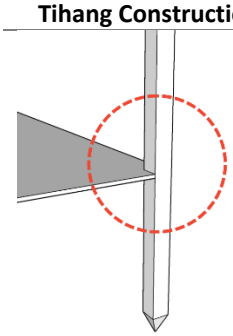
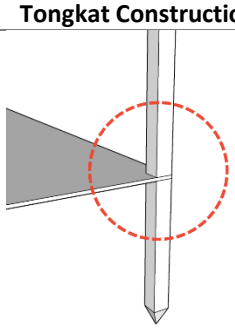


Figure 1. Typology of riverbank and riverside stilt house (Source: Afdholy, 2017)

The stilt houses also experience this dynamic of change in vernacular architecture on the riverbanks and riversides of Banjarmasin City, South Kalimantan. By definition, a riverbank stilt house is a house with a stilt structure located directly on the riverbank, with part or all of its foundations located in the river area. Meanwhile, a riverside stilt house is a house located on the riverside area, usually separated by a road (Mentayani, 2019). For more details, please refer to the image below.

There are two traditional construction systems native to riverine communities: Tihang Construction and Tongkat Construction. Tihang Construction (continued pillar) is a continuous system of posts or columns, extending from the foundation to the roof support beams. Tihang construction typically uses long lengths of ironwood as the main structural support for a stilt house (Huzairin & Andini, 2022). Tongkat Construction (discontinued pillar) is a structural system consisting of ironwood logs connecting the foundation to the floor beams. The column structure, from the floor slab to the roof beams, uses different or discontinuous wood called 'Tongkat' (Seman & Irhamna, 2011). Below is a comparison of Tihang Construction and Tongkat Construction.

Table 1. Comparison between Tihang Construction and Tongkat Construction (Source: Author's Analysis)

Tihang Construction	Tongkat Construction
	
Continuous column or pillar from the foundation to the roof beams (continued pillar)	The column pillars are separate from the foundation pillar and connected with wooden joints (discontinued pillar)

Currently, there is limited research that explores the details of Tihang and Tongkat construction. Only three studies specifically mention these terms. The first is by Huzairin (2020), which discusses the typology of traditional Banjar architecture and includes the Tihang and Tongkat systems. The second study, conducted by Huzairin & Andini (2022) examines elements of the wooden structural system in traditional Banjar houses. This study identifies 17 structural elements, among which the Tihang and Tongkat constructions are included. The third study by Oktaviana et al., (2023). investigates the physical changes in traditional Banjar houses. It notes that the structural components of stilt houses generally retain

their original structure and have not undergone significant alterations.

Based on previous research, there has been no research that links the use of Tihang Construction and Tongkat Construction with the location of stilt houses (riverbanks or riversides) and whether this construction is still widely used today. Based on literature studies and initial observations, the author has a hypothesis that Tihang Construction is currently starting to be rarely used because all the literature only mentions Tihang Construction found in traditional houses that are over 100 years old. This study will focus on finding out how many houses still use Tihang Construction and try to find the factors causing this Tihang Construction to be abandoned by the river area community of Banjarmasin City.

METHODS

This research uses a qualitative exploratory method. Results of this research method are intended to understand meaning, understand uniqueness, construct phenomena, and develop hypotheses (Sugiyono, 2021). This research consists of three stages. The first stage is a literature study, the second is a field survey, the third is in-depth interviews, and the final stage is a descriptive conclusion. The following is a flowchart of data collection in this study.

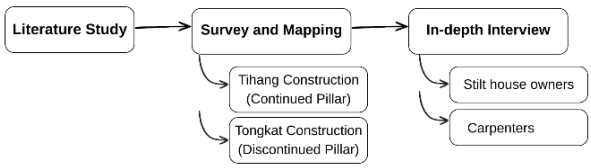


Figure 2. Data collection flow
(Source: Author's Analysis, 2026)

A literature study was conducted to gather references and theories on the causes of changes in traditional and vernacular houses. Following this, a field survey was carried out to assess how many stilt houses still use Tihang Construction and Tongkat Construction. The results of this survey will provide preliminary data to determine whether Tihang Construction is currently experiencing minimal usage. The survey area was selected along the riverbank and riverside of the Kuin River in North Banjarmasin. The focus of the mapping is on houses that utilize wooden construction systems, deliberately excluding those built with concrete. The Kuin River area is considered historic, as it marks the early development of Banjarmasin. Consequently, the mapping results are expected to represent Banjarmasin's riverside areas accurately. After the survey is completed, in-depth interviews will be conducted with several owners of stilt houses along the riverbanks and riversides. These interviews will aim to gather information regarding the age of the houses, any structural repairs that have been made, and the reasons for choosing Tihang or Tongkat Construction for their homes.

In qualitative research using the in-depth interview method, there is no limit to the number of samples to be interviewed. In research by Hennink & Kaiser in 2022, regarding sample size in qualitative research, it is stated that data saturation will be reached after 9 to 17 interviews. This number will then be used as a reference, and interviews will be stopped when respondents' answers reach data saturation, when no new answers can be found from the interview. To identify the factors causing the abandonment of Tihang construction, follow-up interviews will be conducted with 3 to 5 carpenters. The carpenters selected are natives of Banjarmasin with over 20 years of experience and family-based knowledge. This criterion was applied to obtain respondents with experience and a better understanding of the characteristics of the riverside community, thus providing more valid opinions for this study. The interviews will conclude with a summary of the factors contributing to the abandonment of the Tihang Construction system in the Kuin River area of Banjarmasin.

This study is limited by its focus on identifying the factors causing the abandonment of Tihang construction in the Kuin River area of Banjarmasin City. This research is a preliminary qualitative study of Tihang construction. A structural analysis of the strength comparison between Tihang and Tongkat construction requires more in-depth data and quantitative research, and will therefore be pursued in further research.

RESULTS AND DISCUSSION

Results of Field Survey and Interviews with Homeowners

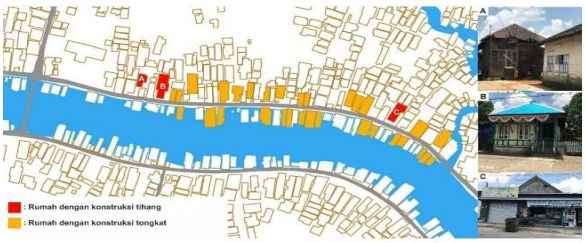


Figure 3. Field survey results
(Source: Author's Analysis, 2026)

Field surveys conducted along the Kuin River revealed that 37 houses still utilize solid wood construction. Among these, only three are built using Tihang Construction, while 34 employ Tongkat Construction. The stilt houses along the banks of the Kuin River are arranged in a linear pattern that follows the river's direction. In contrast, the houses located behind them

align with the road pattern, harmonizing with the river's shape.

A total of 34 houses using the Tongkat Construction system are marked in orange on the map above. Three houses using the Tihang Construction are depicted in red on the map above. They are named houses A, B, and C. Houses A, B, and C are located in the riverside area, while all houses on the riverbank use Tongkat Construction. Houses A, B, and C are almost 100 years old. Stilt houses can generally last up to 100 years because the construction system is deliberately made adaptive to the location where it is built (Nyssa et al., 2022). There is one house that is over 100 years old but is no longer occupied, namely house A. Based on their shape, these three houses are included in the traditional Banjar houses of the Palimasan and Palimbangan types that were then modified by the homeowner. The form of modifications made to house B is the addition of a garage space and a change of roof material.

Meanwhile, in house C, the yard area of the house was changed to a grocery store so that the front facade area of the house is closed. This change is very common and occurs a lot in stilt houses in this area, according to research by Oktaviana et al., (2023). Although these three houses have undergone several modifications to their function and building materials, the structural parts still use the same ironwood stilt structure system and Galam wood foundations as when they were first built.

The mapping of stilt houses along the Kuin River reveals that only three old vernacular houses, nearly 100 years old, still utilize the Tihang Construction method. In contrast, all other conventional stilt houses employ the Tongkat Construction system. This indicates that the community has largely abandoned the Tihang Construction system in favor of the Tongkat Construction method, which supports the author's hypothesis.

Figure 4 House facade with Tongkat construction (Source: Author's Documentation, 2026)

The orange houses on the map represent simple wooden dwellings still inhabited by the local people. In terms of design, these houses do not exemplify traditional architecture but retain the characteristic stilt houses typical of wetlands. In this area, many houses also serve as businesses, such as shops, food stalls, and other establishments. Below is a picture of stilt houses that use the Tongkat Construction system.

To identify the factors that influence stilt house owners to use Tongkat Construction, random sampling interviews were conducted in 10 of the 34 houses. After the 10th house, no new answers were found, so the authors determined that data saturation had been achieved in the final interview. Below is a summary of the interview results from the 10 houses.

Table 2. Results of interviews with owners of stilt houses with Tongkat Construction

Categories	Response Variations	Number of Houses
House Age	50-80 years	6
	80-90 years	3
	90-100 years	1
Repairs to structural parts	None	8
	Sungkat addition	1
	Suai addition	1
Repairs were made by	Carpenters	10
Routine maintenance on structural parts	None	10
Reasons to use Tongkat Construction	Following the advice of the carpenter	7
	Cheaper and faster to finish	3

Interviews revealed that most of the houses with Tongkat Construction were between 50 and 80 years old, and these houses underwent minimal structural repairs. Only one house had sungkat added, and one house had suai added. Sungkat is a new floor beam added above the old floor beam with the aim of raising the floor level or even out a sloping floor. The homeowner stated that the sungkat was added because one of the house's foundation pillars had subsided, causing the house to tilt. Suai is a diagonal bracing beam that connects the foundation pillars. Suai is commonly used in stilt houses, and based on interviews, it sometimes comes loose due to river currents, requiring re-insertion. In all the houses using Tongkat Construction, there was no routine structural maintenance; repairs were only carried out by carpenters on damaged parts. The homeowners' primary reason for using Tongkat Construction was that the carpenters recommended it, while other reasons included lower costs and a faster construction process.

Based on these findings, we conducted direct interviews with carpenters to understand their

reasons for choosing Tongkat Construction over Tihang Construction when constructing stilt houses in the riverbanks and riverside area. The research then continued by conducting interviews with homeowners who used Tihang Construction. Of the three houses, only one owner was willing to be interviewed, namely, house C. House A is no longer occupied, and the owner of house B was not willing to be interviewed. From the interview results, house C was built in 1936 and has been occupied for generations (it is 90 years old at the time of writing this research). During this time, no repairs have been made to the structural parts. Repairs were only done to non-structural parts such as walls, ceilings, and floorboards. Visually, this house is still very sturdy and neat, as shown in the image below.

Figure 5 Condition of house C
(Source: Author's Documentations, 2026)

From the results of the survey and interviews with owners of stilt houses with the Tihang and Tongkat Construction system, several findings were found, such as:

1. Most stilt houses, whether on riverbanks or along the riversides, have not undergone any structural changes or improvements.
2. The Tihang Construction system is found exclusively in riverside houses and is only used in three old vernacular houses that have been inhabited for generations.
3. The Tongkat Construction system is used in all riverbank stilt houses.
4. The Tongkat Construction System is still replicated and used in stilt houses in riverside areas.

These findings revealed a unique finding: Tihang Construction is not used in riverbank areas, even though these riverbank houses are nearly 100 years old, similar to the vernacular houses along the riversides. This finding will then form the basis for interview questions with carpenters in the next phase of the research.

Results of the Interview with the Carpenter

Table 3. Results of interviews with Carpenters A and C

Questions	Carpenter A	Carpenter C
Have you ever built a stilt house with Tihang Construction?	Never, only ever made Tongkat Construction	I have, but it was a long time ago.
Between Tihang and Tongkat, which construction do you tend to choose?	Tongkat, because I only ever built Tongkat.	Tongkat, because it is easier to work with
Why choose Tongkat Construction?	Because nowadays most stilt houses use Tongkat Construction.	Now there is no longer any Ulin wood with a length of more than 4 meters to be used as a Tihang.
Which is more durable, Tihang or Tongkat Construction?	The construction of Tongkat is durable if the joints are installed correctly.	Equally durable, Tihang is more difficult to install.

From the interview with the owner of the stilt house, several recommendations for carpenters were obtained, namely Carpenter A, Carpenter B, and Carpenter C. Carpenter A has experience as a

carpenter for approximately 23 years, Carpenter B has experience of approximately 35 years, and Carpenter C has experience of approximately 40 years. There were obstacles when conducting the interview; informants A and C were working elsewhere and were not willing to do a face-to-face interview, so only a telephone interview was conducted. The interview could not be conducted in detail due to time constraints by the informants, so only a few questions could be asked. Below are some of the results of interviews with Carpenters A and C.

Carpenter B is willing to conduct an in-person interview. He has over 35 years of carpentry experience and has inherited his carpentry skills from his parents. He has worked on dozens of stilt houses, including new construction, partial renovations, and minor repairs.

Based on the interview results in table 4, there is a similar opinion among carpenters A, B, and C, namely that Tongkat Construction is easier to work with. In the interview with carpenter B, it was found that the use of Tihang Construction from the beginning was due to the beliefs of the former Banjar community. They believe that a house without a tihang will result in its durability and will be easily abandoned by its owner. However, according to the source, the use of this Tihang will actually weaken the structure because when there is subsidence in the foundation, the house pillars will also sink and can cause the floor beams of the house to tilt or even come loose from their joints. Further studies are needed regarding quantitative analysis of the Tihang and Tongkat Construction structures to prove the carpenter's argument.

Table 4. Interview Results with Carpenter B

Questions	Answers
What is the most difficult part of building a stilt house?	Foundation. This part requires great care and precision when working on the wood joints.
Is there an influence of river tides on the work?	No. Even though the river is at high tide, construction can still be carried out.
Which is more difficult, building a house on a riverbank or on the riverside?	It is more difficult to work on the foundations of a stilt house on the riverbank because of the strong river current.
Is the Tihang construction still often used when building stilt houses?	Nowadays, most people use Tongkat. Tihang are only used if the homeowner requests the addition of the Tihang at the corner of the house, and this is usually only done in older homes.
What are the advantages and disadvantages of Tihang construction?	Tihang construction is actually less suitable for installation in wetlands, especially river areas. When one of the foundations sinks, the pile will pull the rest of the house towards the slope. Once the entire structure tilts, the house will be impossible to repair.
If Tihang construction is not good, why is it used in old stilt houses?	Since ancient times, the Banjarnese have used tihangs for purely philosophical reasons. They believe that if a house doesn't have a tihang, it will quickly be abandoned. In terms of structural strength, tihangs don't actually contribute anything. It's not uncommon for homeowners to request that tihangs be installed after the entire construction is complete. This makes installation easier because the wood is precisely sized and then installed over the pre-installed floor joists.
Is it possible for Tihang construction to be used in riverbank houses?	Impossible. Because the rivers in Banjarmasin are so deep, even to be able to plant the galam wood, it must first be connected with Ulin Wood to reach the riverbed. Therefore, tihang are never used in riverbank houses.
Is Tongkat construction better than Tihang construction?	Tongkat construction is actually the best because it makes repairs easier. If there's damage to one part of the foundation or a pillar, it can be repaired only in that area.
What causes many stilt houses to still survive structurally?	Because the wood used is Ulin Wood, this wood will last a long time if proper installation techniques are used at the foundation and pillar joints.

It's natural that this Tihang construction can only be found in traditional houses of the past and is no longer used today. The people who built traditional Banjar houses in the past were nobles who strongly believed in traditional beliefs (Amelia et al., 2024). Meanwhile, for ordinary people, building a traditional house with long, large ironwood pillars was a luxury that was difficult to afford. Over time, they preferred Tongkat Construction because it was much easier and cheaper in terms of cost and installation techniques.

A unique finding from this study is that the Tihang Construction cannot be used in riverbank areas because the depth of the riverbed makes it impossible to use a single, long, solid pole installed from the foundation to the roof beam. This aligns with the mapping in this study, which found that the Tihang

Construction is only found in riverside areas. The Tongkat Construction is more flexible in use and can be connected to the poles, making this system more feasible to install in riverbank areas.

The gradual abandonment of the Tihang Construction system in the Kuin River area of Banjarmasin City demonstrates that, despite strong community belief in their traditions, economic factors are still stronger than those beliefs. Even culturally inherited construction techniques can change and be abandoned. In the context of stilt houses, it can be concluded that the sustainability of the Tihang Construction technique cannot be guaranteed due to its high cost, installation difficulties, and the shifting public perception of a particular belief system.

CONCLUSION

The results of this study identified three main factors causing the abandonment of the Tihang Construction system in stilt houses in the Kuin River area of Banjarmasin City. The first factor is the increasing human needs that have developed over time. Today's society, which seeks practicality and efficiency, prioritizes convenience and efficiency in building its homes. Tihang Construction is considered impractical and economically inefficient, and is therefore no longer used by both homeowners and carpenters. On the other hand, this is also related to the second factor, namely the increasing development of technology. People prefer using Tongkat Construction because it is more efficient in terms of installation. The use of the latest material technology, such as rust-resistant nails and screws, makes installing Tongkat Construction easier and faster. The final factor is the ideological shift towards traditional beliefs. The younger generation no longer believes in houses that are easy to abandon because they do not use Tihang Construction. This belief is not even known to the residents of the houses who served as informants in this study.

It can be concluded that the use of the Tihang Construction system in riverbank and riverside stilt houses in Banjarmasin City has been an inefficient system from the start in terms of cost and time. Meanwhile, in the specifically riverbank area, this Tihang Construction is indeed impossible to use because the foundation is positioned on the riverbed. The basis for the use of Tihang based on beliefs cannot be maintained sustainably. This is also supported by the scarcity of ironwood materials which are now very difficult to find in lengths and sizes that can be used as vernacular house Tihangs. Over time, there will inevitably continue to be changes in the morphology of buildings architecturally, and many parts that were originally traditional are now being abandoned. Although currently no longer used, the disappearance of this Tihang Construction system is a fact of the dynamics of vernacular architecture that can be studied. This study also found a gap in further research related to the study of the influence of the use of Tihang and Tongkat Construction on the structural resistance of stilt houses. This research is intended to serve as a basis for further research on Tihang and Tongkat Construction in stilt houses in Banjarmasin.

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