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Functions and Meanings of '*Pengurip*' in Balinese Architecture: Interpretation of the Manuscript Asta Kosala Kosali

I Nyoman Nuri Arthana[1], Dr. Ir. Murni Rachmawati, MT[2],
Prof. Dr. Ir. Josef Prijotomo, M.Arch[3]

[1]*Student of Architectural Doctoral Program, Institute of Technology Sepuluh Nopember,Surabaya, Indonesia*
[2]*Promotor Student of Architectural Doctoral Program, Institute of Technology Sepuluh Nopember,Surabaya, Indonesia*
[3]*Co-Promotor Student of Architectural Doctoral Program Institute of Technology Sepuluh Nopember,Surabaya, Indonesia*
Corresponding Author: Nuri Arthana

----------***ABSTRACT***----------
Balinese architecture in its construction process uses a written guideline called Asta Kosala Kosali, which is in the form of an ancient manuscript shaped lontar. It is not known when the script of Asta Kosala Kosali was written, which is clear until now this manuscript is still used as a guideline for building traditional Balinese construction. One that is regulated in this text is the procedure for determining sikut (measurement or dimensions). Where in every determination of the sikut, especially in wood material, always followed by giving a pengurip. This means the pengurip has an important position in determining sikut in the process of construction Balinese architecture. Therefore this study was conducted to find out the meaning and function of pengurip on Balinese architecture explored from the Asta Kosala Kosali script. This study is important to be able to reveal the architectural knowledge contained in the Asta Kosala Kosali manuscript, especially relating to the construction process which begins with the determination of measurement or dimensions. Because the object of this study is in the form of a script that is placed as a text, the assessment will be carried out using the interpretation method. The results of this study indicate that the pengurip function in the Balinese architectural construction process is an element that provides flexibility and ductility both to material processing and to its construction. While the meaning of pengurip is as an element that makes Balinese architecture is a customize building.

Keywords: *function, meaning, typing, interpretation.*

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I. INTRODUCTION

Architecture is formed because of needs such as the need for conducive environmental conditions, security, and so on. This need requires certain treatments or ways of addressing objects such as available building materials and construction technology[1]. What is stated shows that in realizing the architecture of attention to building materials and the use of appropriate construction technology are the first and foremost. As Mies van der Rohe's view is quoted by Klassen[2], that architecture is a beautiful building that begins when we compose the elements attentively. Compiling means connecting, uniting, assembling and bringing together, and this is an understanding of construction. This view illustrates that basically architecture is constructed. In the construction process there are several elements involved, such as the party carrying out, the method and tools used, including the guideline used as a reference.

In Bali traditionally in realizing Balinese architecture uses written guidelines in the form of a manuscript known as the lontar Asta Kosala Kosali[3]. This lontar contains philosophical aspects, ethical aspects and technical aspects of building procedures. Philosophical aspects related to the procedures for ceremonies and spells held when to construction a building. Ethical aspects are related to the conduct of behavior and ethics in construction. And technical aspects related to the layout of the building, determination of the type of material, determination of the measurement and dimensions of the building and the material to be used. Specifically with regard to the determination of measurement and dimensions, the stages begin with making gegulak, as a basic module of measurement and dimensions in construction process. Basic Making of gegulak is a measure parts of the body of the building owner[4]. Gegulak in the form of bamboo blades which are notched contains units of measure, such as depa, hasta, tampak, cengkang, lengkat, rai, nyari, guli, and so on. After the hitch is set, the next step is determining the sikut or measure. The sikut is determined on the basis of the gegulak that has been made beforehand and is based on the manuscript of lontar Asta Kosala Kosali. In

each determination the measurement of the sikut unit in Gegulak will be added with the pengurip according to the type, dimension and function of the building to be constructed. Guidelines for deciding on the pengurip that must be used are arranged in the manuscript of lontar Asta Kosala Kosali.

Pengurip in the dictionary of the term Balinese architecture is defined as the one who gives life, or also referred to as pelebih which means the part that is overstated[5]. In this context the meaning that will be used is the pengurip in the sense of being an pelebih. In each determination of the sikut (measure) elements of the building that will be constructed the pengurip is always used. This means that the pengurip has an important function and meaning in determining the sikut elements of the building to be constructed. The question is what is the function and meaning of pengurip in construction of Balinese architecture? This question will be answered through this study.

II. CONSTRUCTION IN ARCHITECTURE

In the discussion of construction, cannot be separated from the discussion of the structural system [6]. The system is a unity of relationships between elements in a formation. The structural system is a conjuction of construction elements that work in a system that causes a building to stand firm. Construction refers more to the process of elements assembled and connected so that it becomes a unity. Structure determines the shape that will occur. While the strength is determined by the material and construction.

Klassen [2] explains that construction in Latin comes from the word "struere" which means to sow, scatter, sow, also has to do with the English word "to strew" which means to spread. Struere then gets the prefix "con" meaning to bring together or connect, so that it becomes "con-struere" which means to compile and connect. In Webster's dictionary, con + struere is identical to the word construct which means to build form, or devise, by fitting part or elements together systematically, which means building or finding forms by matching parts or constituent elements together systematically. Thus it can be said that construction is an attempt to build a formation by composing, matching, combining elements forming systematically.

By placing the definition of construere identical to construction, its meaning according to Webster's dictionary is the act or process of construction and manner or method of building. This shows that the definition of construction involves three main things, namely 1) action or effort carried out, 2) the process or stages that are carried out or carried out, and 3) the method or method used. These three basic things constitute an inseparable unity in the formulation and incorporation of form elements. On the other hand Klassen [2], in his description of architecture as construction by referring to Mies van de Rohe, also stated that there were two elements involved in construction, namely poiesis and techne elements. Poiesis is all things that cause an object to exist from nothing, whereas techne is the ability to do something based on the principles involved. The poiesis element is more to the goal of achieving beauty, by considering things that are not real (intangible), thus what is needed is aesthetic ability. Whereas the techne element is more to the goal of achieving robustness, which refers to the skill in assembling tangible elements, thus requiring constructive structural capabilities. Thus it is clear that between construction and architecture there is a close relationship, where architecture exists because it is constructed.

III. BALINESE ARCHITECTURE CONSTRUCTION PROCESS

In the process of embodiment of Balinese architecture, there are written sources that are used as references or guidelines in the form of lontar. The lontar in question is the lontar of Asta Kosala Kosali. According to Nyoka [7], this manuscript in the form of lontar is thought to have existed since the 16th century during the glory of the Suecapura empire led by king Dalem Waturenggong (1460-1530) and the arrival of Danghyang Nirartha in 1478. The existence of this lontar also shows that since then development in Bali, using the lontar of Asta Kosala Kosali as a guide.

Broadly speaking, the construction of buildings in Bali through three stages, namely; the pre-construction phase consisted of nyapuh karang, nyanggra and ngurip gegulak, nyikut and ngeruak, and mendem dasar, and then continued by the construction phase begins with nglakar, ngaug, nasarin, ngakit and ngasren activities and the post-construction phase includes activities to ngulihin karang, ngurip and mlaspas for a sacred place followed by ngenteg linggih, [3]. Each activity at each stage begins with a ritual led by Pedande or Pemangku. The direction in the implementation of the development was technically led by an Undagi, whose duty began from the nyikut karang to the ngasren guided by Asta Kosala Kosali. Undagi in carrying out his duties is assisted by the Tukang and Sangging. The Tukang is responsible for carrying out physical work in accordance with the terms and direction of Undagi. And Sangging has the duty to give an aesthetic touch to every element of construction. In determining the measure or dimension for both the construction site and each building using the standard of the owner's house. Thus there are five parties involved in the construction process on Balinese architecture, namely; 1) Pedande or Pemangku, 2) Undagi, 3) Tukang, 4) Sangging and 5) Sang Adrebe Umah.

The implementation of the construction process in the past was carried out in mutual cooperation, where at that time (16th century) the culture of the people that developed in Bali was a communal agrarian culture, [8]. The community lives together in togetherness that fosters, so that all forms of activities are carried out together and help each other. The craftsmanship work tools available at that time were in the form of kapak, timpas, paot, kantil and pengotok, moreover the agrarian society that did not have the ability or special skill in craftsmanship, so that the tools they owned were not specifically a means of craftsmanship. At that time modern craftsmanship such as saws, drills, shavings and so on were not known. Cutting material using an kapak, splitting it using timpas, punching holes using paot, smoothing the results of cuts and hemispheres using kantil, and hitting using a pengotok. The availability of limited tools and proficiency in craftsmanship will certainly affect the way and results of work.

Even the construction technology at that time was still limited, with knowledge gained through experience and passed down from generation to generation. The connection system is still very simple using song (hole) and purus (groove) reinforced with lait (peg) and always located right on the pedestal (above saka / column). Unification or integration of construction elements is carried out with the lidah and alur system using reinforcement in the form of pegs and bonds. Not known at that time there was a reinforcement system with nails, both nails made of wood or bamboo or iron / metal. Limitations of proficiency in craftsmanship, types of equipment available and knowledge of construction technology result in the form of the resulting building having a limited span module.

Based on the stages of the construction process of Balinese architecture above, nyanggra and ngurip gegulak activities became the beginning of the entire development series. Gegulak is made of bamboo slats (± the width of the middle / one and a half fingers), which are given notches a unit of measure of the length of the body members of the building owner or anthropometric. Gegulak as a benchmark for determining sikut (measure and dimensions) in the traditional construction process in Bali, can be viewed as objects and as a basic measurement module. As an object gegulak is a bamboo with the width of anyari, which is given a notch as a marker of the size of the human body. As a basic module, measurement of gegulak is a collection of units of measurement of parts of the human body. This unit of measure, like; apegadeg (one pegadeg) that is the length of a human standing from the base of the sole of the foot to the upper limit of the head, adepa (one depa) is the unit of measurement of the length of the human hand with the palm open, measured from the tip of the left middle finger to the tip of the right middle finger, ahasta (one hasta) namely the length from the elbow to the wrist, the alengkat (one lengkat) is the length of the tip of the thumb to the tip of the middle finger, amusti (one musti) is the size of the hand to the tip of the thumb, arai (one rai) size the length from the base of the thumb to the tip of the index finger, anyari (one nyari) is the thick size of the index finger, it atampak (one tampak) the length of the foot size from the heel to the tip of the big toe, aguli (one guli) the length of the first segment of the middle finger, and many others. All of these measurement units provide evidence that it is true that the determination of the unit of measure is based on anthropometry, because at this time there is no known metric measurement tool.

IV. SCOPE AND METHOD OF STUDY

This study was carried out in the realm of architectural scholarship, in which case the architecture was embodied in a construction process. The main problem that will be studied is the meaning and function of pengurip in construction, especially wood construction on Balinese architecture. This study will be carried out in two aspects related to the construction process, namely the meaning and function of the pengurip in the context of space and time in the past, where the construction is carried out using the tools available at the time and measurement tools based on the size of the parts of the human body (anthropometry) as a benchmark. The main object of the study is in the form of a manuscript lontar Asta Kosala Kosali which is a guideline used in the process of construction of Balinese architecture.

Because the object to be studied is in the form of a script that is placed as text and studies will be carried out on meaning and function, the approach to be used is a qualitative approach, with the main method being interpretation. Prijotomo [9], states that the study of manuscripts as text based on interpretation methods basically consists of two activities namely interpretation and translation. Interpretation is done to reveal the contents and meaning hidden behind the text. Translation is done to move the results of the interpretation from the original place (written text) to the new place (architecture). In this case three stages are carried out, namely; (a) the transfer of text into architectural text, (b) interpretation to reveal knowledge and (c) testing the validity of the results of the interpretation. What is held by Prijotomo will also be applied to the study of the lontar of Asta Kosala Kosali to reveal the function and meaning of pengurip in the Balinese architectural construction system.

V. PENGURIP IN MANUSCRIPT ASTA KOSALA KOSALI

Gegulak is made of three types, namely for long sizes, such as; depa and hasta. For medium size, like; tampak, lengkat, cengkang, telek, and kacing. And for small sizes, like; gemel, nyari, sirang, musti, rai, and guli. The next activity is to follow or determine the measure and dimensions of the material in this case is the wood to be used. In the following process, the unit of measure that has been set in Gegulak becomes the basic benchmark and then added to the pengurip. Determination of the sikut to be used is based on the lontar of Asta Kosala Kosali. Thus the sikut (measure) in this case is a unit of measure of length in gegulak plus pengurip. The unit of measure is also based on the smallest unit of measurement of the human body.

The following is one example of the lontar Asta Kosala Kosali manuscript that relates to the determination of size, where the pengurip is present.

Nyan sikut ing sasaka, kaweruhakna de nira, geng ning sikut, jebarnya 111, panjangnya 27 rai, maurip anari, istri asih mwang Bhatara Asih phalanya. Yan mepek, 20 rai, tanpa urip, ala ika, bengka, nga, doyan gering anglayang sang maumah. Yan 20 rai, maurip anari, ayu ika, pitra asih, nga.
Meaning:
This is sikut of the column, you should know. The wide sikut is 111, the length of 21 rai, with a single urip, will cause the wife and Bhatara to be dear. If it's full of 20 rai, without urip, that's not good, the name is bengka, often those who live there are illness or losing energy. If 20 rai, with one nyari ofurip, it's good, is called PitraAsih.

This quote if translated into architecture means that the measure of the (dimension) saka (column) is 111 stacks of kepeng money. While the length of the column is 27 rai (the length of the index finger from the base to the tip) with penguripanyari (one nyari). On the other hand, the overall quote of the text also shows that if the length measure is not accompanied by a pengurip, it will have a bad effect. This can be observed from the statement in the text, where if it is full of 20 rai without pengurip, is called bengka, who lives there will be illness of losing energy. And if 20 rai with anyari (one nyari) is called pitra asih, this is good.

Another content from the lontar manuscript of Asta Kosala Kosali which relates to the determination of measure, to be more convincing of the presence of pengurip and its importance in the measure system, as follows (in a jineng building):

Nyan sikut ring jro kengetakna de sang anglakwana undagi, lwirnya:
Jro ning sunduk dawa, tebah adegan, maurip asirang, mantri sasaran, nga. Muwah tebah adegan maurip asirang, mwang anari kacing, devi anangkis singha, nga, lumbangnya 3 nari, maurip aguli madhu, dedel sunduk ika teleknya aguli madhu laita aguli madhu, basaraga, nga.
Meaning:
This is sikut jro (middle, deep, hole), it should be remembered by those who carry out the work of undagi (carpentry), namely:
Measurehole of long sunduk, a tebah column, with one sirang of pengurip, is called Mantri Sasaran. If a tebah column, with one sirang of pengurip, and anyari little finger, is called Dewi Anangkis Singha. And also the sikut of sunduk are wide, 3 nyari, with one guli madhu of pengurip, notch the sunduk, with deepness one guli madhu. Lait / stake which causes not to falter / one guli madhu, is called Basaraga.

The first message conveyed by this text is the confirmation of the measure of the sunduk and lait, which is important in relation to ensuring the reliability of construction. Dimensions of sunduk hole atebah saka (column) with asirang of pengurip. And atebah saka with pengurip asirang plus anyari kacing. The width of Sunduk is 3 nyari with the pengurip aguli madhu, notch as deep as aguli madhu. Lait as a reinforcement, the thickness is aguli madhu. From the verse this text shows the presence of the pengurip in each sikut determination. The dimensions of this hole of sundukalso show the dimensions of the sunduk itself.

Two manuscript quotations above the guidelines for determining sikut (measure and dimensions) of saka and sunduk of bale whose material is wood. This manuscript also gives an overview of the important position of pengurip in each sikut determination of elements of building construction made from wood. And at the same time prove that, 1) the benchmark measure used is the size and dimensions of the parts of the human body (anthropometry), 2) the connection system used is song (groove) and purus (tongue) with reinforcement in the form of lait (peg), 3) craftsmanship what is used is simple, obtained from hereditary experience, and 4) the equipment used is also still simple, therefore the work marks are still visible on the material that has been processed.

VI. MEANINGS AND FUNCTIONS OF PENGURIP INBALINESE ARCHITECTURE

The reading of the meaning and function of the pengurip will be placed in the context of past space and time, where at that time, the availability of measuring instruments and working tools of limited craftsmanship. The measuring instrument used in the form of gegulak made every time the construction process will be carried out, based on the size of the owner's body or anthropometry. Work tools used, such as kapak, timpas, paot, kantil and pengotok. In relation to this context, the interpretation of the meaning and function of the pengurip in relation to the traditional measurement system is carried out by asking a number of questions, among others, first, what is the pengurip? Secondly, why or for what sort of pengurip is always used in every determination of sikut? Third, what are the consequences of the presence of pengurip in the construction system? The answer to the first question will reveal the pengurip function in the Balinese architectural construction system. And the answer to the second question will reveal the meaning of pengurip in the Balinese architectural construction system.

6.1. Understand the 'pengurip' in a measure system on Balinese architecture

The pengurip is derived from the base word urip given the prefix pe. In the Balinese dictionary [10], mentioning that urip means life, life or age, which gets pengater (prefix) pe, which can mean having (ability or value). Thus pengurip can mean, has the ability of life or life. And it can also mean having an age value (range from birth to death). Pengurip is often also referred to as overload, which means that the part is overstated, [11]. According to Jiwa [5], in the context of Balinese architectural terms, urip means additional or residual measure in building construction.

Based on the search for etymology and terminology above, pengurip in the sense of having the ability to live or life can be understood as an element that gives ability related to things - matters relating to life. Life means that it continues to exist, move and work as it should, [12]. So in this context the notion of pengurip can be understood as an element that gives the ability to something to remain, move and work according to its nature. On the other hand pengurip means also has an age value, this indicates that the pengurip has a range value, thus the value is not absolute. And the pengurip in the sense of the exaggerated part shows that the extracter is definitely a part of something added. In more terms, the elements used to add are exactly the same as the added elements. Whereas in the sense of being an additional measure or residual measure, the pengurip can be interpreted as an additional measure that can be reduced, in this case the reduction does not spend all the extra measure but leaves it. This means that, if the extra measure is exhausted, then a measure is no longer called pengurip.

From the interpretation carried out on the understanding of pengurip above it can be concluded that the pengurip is an additional part of something that has a range of values so that it is not absolute, where the additional part can be reduced without spending the additional part itself. This understanding of the pengurip will be used as a basis in interpreting the functions and meanings of the pengurip in the next analysis process.

6.2. The function of 'pengurip' in the Balinese architecture construction system

Functions by experts are defined in different perspectives and different contexts, therefore this study puts itself in the sense of function as utility, fitness for purpose and ability with power. In the position of the function as a utility, Handler [13], defines the function as the ability of the building to carry out its duties and the resulting impact for those who use it. While Voordt [14], in the context of ability, function is defined as the ability and strength given by something that is non-material. Based on this understanding, the interpretation of the pengurip function will be carried out on the material aspects, as in the definition of Handler.

As explained above, the determination of sikut (measure and dimensions) is based on the size of the parts of the human body (anthropometry) as a basic module called gegulak, including the determination of the pengurip in it. The use of the measure of the human body as a basis for measurement is due to at that time there was not yet known metric measurement tool that guarantees precision and measure consistency. Unlike the use of gegulak, where precision and consistency of measure are difficult to achieve in one measurement. Precision and consistency of material measure will be achieved slowly in the material processing process. It is in this situation that the pengurip is needed, to provide an opportunity to process the material to achieve the final measure as desired and the same for each part of the building construction. This means that in the context of the use of anthropometric measures, pengurip shows its duty as a flexibility provider on the measure and dimensions of the material.

Wood materials are processed using tools and limited craftsmanship skills. These two factors also become the cause of the pengurip has an important meaning in determining the measure and dimensions of the material. The use of material processing equipment, in the form of kapak, timpas, paot, kantil and pengotok, of course in cutting, splitting, punching and even smoothing the material will not directly get the measure and dimensions of the material that is precise and consistent between one material and material from another construction part function the same. It takes a process that is repetitive, little by little, and step by step.

Likewise, when connecting material and assembling parts of construction, it is carried out with a repetitive process. Limitations of proficiency in craftsmanship contribute to the repetitive process, little by little, and step by step. Knowledge of craftsmanship gained through experience and carried out from generation to generation, especially in the culture of agrarian society, shows that craftman are not the main work of society. Therefore, in the material processing process, size flexibility is needed in this case is pengurip. As a measure of more part of construction material, in the context of the tools and expertise used to process it, the pengurip shows its function as an important element to maintain the usefulness of the material in construction.

If in the determination of the measure and dimensions of construction material there is no pengurip, in the context of the absence of a metric measuring instrument, the simplicity of the equipment, and limited knowledge of craftsmanship, the consequence is that there is no guarantee that the material processed can be maintained in a precise and consistent measure and dimensions. As a result, there is little error in processing, the material will no longer be used as intended at first. And that is why in every determination of sikut (measure and dimensions) in the process of constructing Balinese architecture, pengurip is always present and becomes an important element.

6.3. The meaning of 'pengurip' in the Balinese architecture construction system

In general, meaning can be interpreted as an expression or symbol of expression or symbol which includes what is expressed, represented and shown, [15]. Meaning is have the quality connotative (additional meaning) and denotative (literal meaning), where the two characteristics of meaning are determined by the ability of the observer to read the meaning itself. Based on the context of the time used for exploration of meaning, Siwalatri [16] states that there are synchronic and diachronic meanings. Synchronic meaning is the meaning explored in a certain time context, while diachronic meaning is the meaning seen in the context of its development and change over time. Based on this understanding of meaning, a study of the meaning of pengurip in the Balinese architecture construction system will be carried out by placing meaning as an expression in a certain time context, in this case when the construction process uses anthropometry based measuring instruments, construction material processing equipment available at that time and limited knowledge of craftsmanship.

The pengurip as a unit element in a traditional sikut (measure and dimension), uses the size of the owner's body as a benchmark, so each building is produced through the construction process, even though the type is the same, the sikut standard used is the same as in the lontar Asta Kosala Kosali, but the area (large) or dimensions and proportions that occur are not the same. This is due to differences in the shape and dimensions of the body in each individual human being, as stated by Parwata [17] that every human being is outwardly different in terms of shape and dimensions of body size. Referring to the research of Roche and Davila (1972) related to the anatomy of the human body, Suardana [18] states that differences in the shape and dimensions of the human body are caused by genetic factors, age, sex, ethnicity, and body position. This difference indicates that each building will be in accordance with the posture and proportion of the body of the building owner. Thus it can be stated that Balinese architecture is customized or custom-built (built according to the size of the owner's body).

From a technical-constructive point of view the use of pengurip as an exaggerated part and can be reduced when material processing is carried out, using simple tools and limited craftsmanship skills will produce construction that is not precise (exactly right). Therefore, the resulting construction is a construction that is not rigid, but construction that moves, sways or has ductility. Moreover, it uses the technique of connecting and assembling construction elements with a purus system (tongue) and song (groove) with reinforcement in the form of lait (pegs). This non-rigid or flexible construction system is a solution to the seismic potential in Bali. Historically, the biggest earthquake ever occurred in Bali in 1815 which was famous for the events of ‘gejer Bali’, the next big earthquake with a magnitude of 7.6 on the Richter scale occurred on July 14, 1976. And other earthquakes that often occur in Bali. This shows that Bali belongs to the seismic zone with relatively high frequency, both tectonic and volcanic earthquakes, [19]. Empirically it was proven that when an earthquake occurred, traditional Balinese buildings built with the construction process based on the lontar of Asta Kosala Kosali, did not experience construction structure failure or collapsed, only swaying to the rhythm of the earthquake.

VII. CONCLUSION

Based on the study above, it can be concluded that the pengurip is an additional part of something that has a range of values so that it is not absolute, where the additional parts can be reduced without spending the additional part itself. The pengurip function in the Balinese architectural construction system on the one hand functions as a flexibility provider for construction materials and on the other hand serves to maintain the usefulness of construction materials. And the meaning of the pengurip in the Balinese architectural construction system is custom-built / customizing and construction that has ductility. On the other hand, methodologically in

uncovering the functions and meanings of the pengurip through the reading of the text, the methods and stages held and the method of reading used by Prijotomo [9] in his exploration of Javanese manuscripts, can be applied to the exploration of Balinese manuscripts (lontar Asta Kosala Kosali).

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