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The Phenomenology of *Lamban Tuha*: The Local Wisdom of South Sumatra Traditional Architecture

Ari Siswanto[a,b*], Azizah Salim Binti Syed Salim[b], Nur Dalilah Dahlan[b], Ahmad Hariza[c]

[a] *Faculty of Engineering, University of Sriwijaya, INDONESIA*
[b] *Faculty of Design and Architecture, Universiti Putra Malaysia, MALAYSIA*
[c] *Faculty of Human Ecology, Universiti Putra Malaysia, MALAYSIA*

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ABSTRACT

Local wisdom of traditional architecture is towards extinction along with the existence an increasingly neglected traditional house, including the one who understands it reduced drastically. *Lamban Tuha* in South Sumatra has demonstrated the ability to adapt to its environment and able to withstand natural catastrophes. The study used phenomenological method to reveal information from the first person who is considered experts on the local wisdom of *Lamban Tuha*. This study shows the construction of *kalindang* provide an excellence effect of providing high flexibility in case of earthquakes. The separation structure between lower, middle and upper parts is done to give building more flexible. Local wisdom is reflections of valuable experience which can be utilized as the concept of a sustainable housing development in the context of anticipate natural disasters. The existence of *Lamban Tuha* is an interesting experience that can be used as thoughts on designing earthquake resistant buildings.

1. Introduction

South Sumatra has a rich history of diverse culture that is very stunning in architectural treasures. Culture is an expression of society in adapting to an environment adapted to the

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

necessities of life. One of the cultural heritages in architecture is traditional *ulu* house type called *lamban tuha*. *Lamban tuha* which means ancient house reflects the traditional house which resist to earthquake. Typical houses in Surabaya village are *ulu* house and *gudang* house. *Ulu* house is the common term for a traditional house outside the city of Palembang while *gudang* house types can be found in all areas in South Sumatra (Barendregt, 2003; Siregar and Abu, 1985). *Ulu* house recognized by the local community and are classified as *lamban tuha*, currently amounted two houses. The existence of *lamban tuha* 1 very impressive considering the house has been occupied for 11 generations. According to the heirs, *lamban tuha* 1 was founded first in the hamlet of Canti (now a forest), then it moved to Surabaya Talang village and finally *lamban tuha* moved to Surabaya village in Banding Agung sub district which closes to Lake Ranau.

One exceptional of *lamban tuhas* are the elastic ability of those traditional buildings against earthquake that happen in Liwa, Lampung province in 1933. Both *lamban tuhas* are the only building that remained standing despite the devastating earthquake in 1933, while the other buildings in the village of Surabaya collapsed and mostly flattened to the ground. Typical system of traditional construction similar to *lamban tuha* is only about four houses including the new ones.

Lack of attention from the public and local government and the financial inability of *lamban tuha'*s owners will caused the loss of assets in term of local wisdom (Oliver, 2006). Traditional houses in South Sumatra have demonstrated exceptional indigenous knowledge of our ancestors in shaping the quality of their lives. This indigenous knowledge will regain its meaning and value in the society, we should aware of the glory of the inherited tradition. The bearers of indigenous knowledge might be developed in recent and future for sustainable housing development.

2. Methodology

Phenomenological approach is an attempt to reveal a phenomenology of the experience from a person in everyday life in the context of the time, place and consciousness (Creswell, 1998). Context of time has to do with history, important events, technology and character. Context of place has to do with users, objects, physical space, the atmosphere and the

environment of human life. While the context of feeling have to do with experience, awareness and knowledge visible and invisible. Based on the objectives, this research used phenomenological method. In addition to in-depth interviews were carried out against the respondents, this research will also see the relevance of the information provided with the environmental conditions around it, the existence of traditional houses and history of the houses. The first information obtained by previous research, community leaders, the owner or tenant on the basis of their advices, and then traced the people who have a relationship with traditional houses such as local builders, carpenters, local leaders and experts (Satori and Komariah, 2009). Data collection will be primary data which consists of in-depth interview, physical traditional houses and secondary data which consists of literature, journal and research.

3. Analysis

Three analyses are used in this research: a description, a comparison, and an evaluation. The description is about architecture style, system structure and detail of structures which are related to the environment, philosophy and their indigenous techniques. Interpretation of local wisdom of traditional architecture would be conducted as a part of description with sources of the owners / users, local community leaders, experts and local carpenters. The comparison is between the people experiences in applying local wisdom.

4. Discussion

4.1 Physical Characteristic of *Lamban Tuha*

Traditional knowledge, indigenous knowledge, and local knowledge refer to the long-standing traditions and practices of certain regional, indigenous, or local communities. Therefore, traditional knowledge also encompasses the wisdom, knowledge, and teachings of these communities. Traditional knowledge has been orally accepted for generations from person to person. The wisdom in creating natural system of thermal comfort is often found in traditional architecture (Hardiman, 2000). Slightly different, *lamban tuha* has shown evidence of local wisdom in the traditional house in anticipation of natural disasters such as earthquake. Meanwhile, result from collective local wisdom of the contextual been able to adjust over time and was attuned with nature and local lifestyle (Limthongsakul et al, 2005).

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

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Vernacular that related to the process of designed and built it usually close relation between the form and the culture. Vernacular architecture has limitation in delivering a variety of expression however, at the same time in accordance with the characteristics of different situations can create their respective places (Rapoport, 1969). Similar to the traditional buildings in most parts of Indonesia, the South Sumatra traditional house shows characteristics of timber buildings on stilts in different system structure based on the geography while others is a kind of *raft* house. Due to different environment and culture, indigenous knowledge creates traditional architecture which is adaptive with their environments. South Sumatra traditional houses could be dismantled and rebuild in another location with mostly reusing of origin housing materials. The typical construction of traditional house is with flexible nail-less joints, and non-load bearing walls.

Lamban tuha has saddle-shaped roof that rise high and put the *tiber angin* (gable end) on front and rear parts of the roof (Figure 1). The high rise roof has rake cross at the top as other *ulu* house type. Distinctive roof form, relatively high and in accordance with the dimensions of the house can create the beauty that is easily recognizable from a distance (Zumthor, 1998). The construction of roof related to large span, wind and rain in specific areas. In different geography, dwellings including roof, reflect the local knowledge, local technology and environment (Ohno and Xihui, 2008). It explained very detail about roof structure, roof layer construction and support systems for pitched roof. Conventional construction systems of pitched roof in many countries always related to environmental conditions, cultural aspects and local knowledge, it is typically seen in traditional houses such as *lamban tuha*. In general, the roof truss structure of *lamban tuha* is very simple. Minimized the weight of steep roof of traditional houses is an important issue for smart construction (Gruber and Herbig, 2007). Expenses due to own weight, the wind and earthquake can reduce the risk of severe damage to the roof.

Lower construction part of *lamban tuha* is a series of pillars that have stone footings combined with a pile of round logs in rectangular shaped without finishing. Stacks of logs with a square form support the building load known as the *kalindang*. *Kalindang* which has 7 – 11 layers of logs uses the notch on each layer as connection (Figure 5). However, not all parts of the house supported by *kalindang*. *Lamban tuha* has a stair for entrance on the front side to toward the *garang*/porch and the other in the rear for services. Porch is a transition space before

entering the house and serves for guests or a place to sit on an informal basis. The floor surface in different rooms in *lamban tuha* has no height difference.

Figure 1: *Lamban tuha* 1 (left) and *lamban tuha* 2 (right).

The composition of rooms in *lamban tuha* is very simple and tends to be symmetrical. Arrangement of rooms on *lamban tuha* is as follows:

a. *Garang* (porch), a transition space.
b. *Lapang unggak* (living room)
c. *Lapang doh* (dining room)
d. *Lapang tengah* (bedroom)
e. *Kebik* (front porch)
f. *Parogan* (side porch), storage for goods or old coconuts.
g. *Dapo* (kitchen)
h. *Pagu hantu* (attic), a place to store the heirlooms and spears sacred objects.

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

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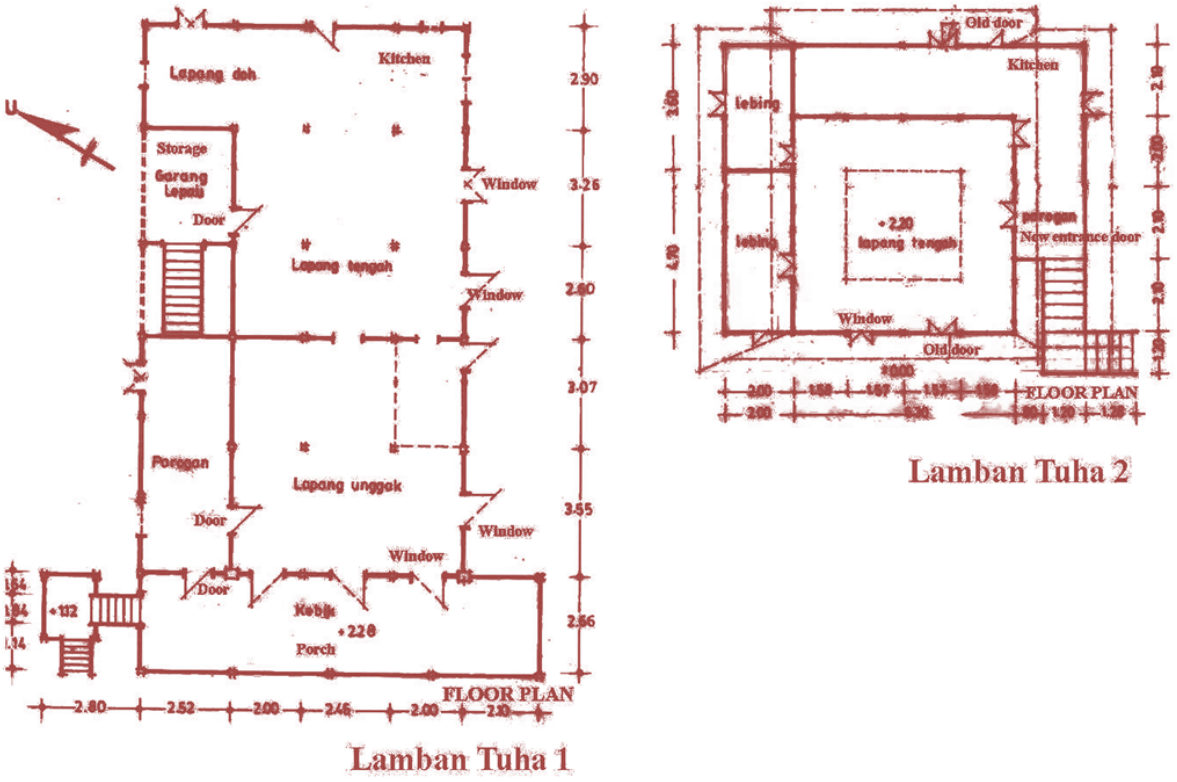

Figure 2: Floor plan of *lamban tuha* 1(left) and changing orientation of *lamban tuha* 2 (right).

Lamban tuha 1 is still the original shape as before; there has been no change in orientation and buildings addition (Figure 2). In contrast to the *lamban tuha* 1, *lamban tuha* 2 has changed the orientation of the building and built new stair due to consider the access road (Figure 2). At first, *lamban tuha* 2 facing Qibla (west), then converted facing east because the road consideration. As a result, the main entrance at the western is cut and moved to the east by making entrance door facing the north.

4.2 Local Wisdom of *Lamban Tuha* Acting as Earthquake Resistant

Based on the identification of floor plan, indigenous building materials and timber construction system, *lamban tuha* has local wisdom that can be proved by experience that is quite convincing during occupied by 11 generations (*lamban tuha* 1) and 6 generations (*lamban tuha* 2) until today. During that time, *lamban tuha* 1 has moved for three times and hit by a severe earthquake in 1933 which had destroyed all the buildings except *lamban tuhas* in the village of Surabaya. The site selection to establish *lamban tuha* based on the land that has good carrying capacity, far from the possibility of landslides or flooding. While the orientation of

lamban tuhas face the Qibla, or in this case is the west. Until know, *lamban tuhas* never hit by floods and landslides struck.

According to the informants, people who sleep in *lamban tuha* should put the head and feet directed west to the east, may not sleep in addition to that direction. They believe there are certain rules of superstitious that apply to *lamban tuhas* (Fishwick and Vinning, 1982). Attic is an important part of the house is believed to be a sacred place, so this place is respected and used to store the heirlooms of their ancestral heritage. Believe in a supernatural or who has the power associated with the presence of the house is something that is common in the past.

Lamban tuha has a simple floor plan without a rigid division of rooms and tends to symmetrical. This indicates if the relationship between family members is very close, open and has the nature of togetherness. Social life and communication between family members are very close and communal. The simplicity of the floor plan and symmetrical shape is very precise from that anticipates the influence of the earthquake. Symmetrical shapes can create a balance of construction in every corner of the house when rocked by an earthquake.

The effect of earthquake was the collapse buildings because of bad reinforcement structures, unreinforced masonry walls and brick walls. On the other hand, timber houses performed relatively well compare to brick house during the earthquakes (Maidiawati. and Sanada, 2008). Traditional houses still stand usually because of using timber structure, lighter building material, and applying flexibility of structure. Furthermore, materials and structures that are used in traditional houses have been made to reduce the effects that occur in the event of earthquake (Audefroy, 2011). *Lamban tuha*, a typical traditional house in South Sumatra has identifiable timber structure which resist to earthquake. Most of the sufferers of the earthquake are the victims of collapsed concrete structures (Gruber, 2007). Building of traditional architecture has a symmetrical shape and express in the form of floor plan and facade. The concept of the design through the axis of symmetry generally implies a balance of organization and function space with macro cosmos. Emphasizes a balance by referring to the axis is the most elementary concepts of earthquake resistant buildings. Floor plan of *lamban tuha* is a simple open plan design while the physical form of the house tends to be symmetrical

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies. Volume 4 No.2 ISSN 2228-9860 eISSN 1906-9642. Online Available at http://TuEngr.com/V04/157-170.pdf

and proportional. The horizontal load displacement characteristics of a traditional timber house can be simulated fairly well by adapting a mud wall and hanging wall models. This model is embodiment of Japanese culture that has so concern about their familiar natural disaster such as earthquake and typhoon (Fujita et al, 2004.). Most traditional houses in South Sumatra are timber houses, only a small part of the house with bamboo or a combination of both.

Figure 3: Fundamental timber construction of press, pivot, pinch and pull.

When *lamban tuha* 1 was built, indigenous building materials were collected in advance by soaking in Lake Ranau. After the perceived amount sufficient, then the house was built with no nails, just using timber connection that is fundamental of press, pivot, pinch, and pull (Figure 3). The construction of *lamban tuha* could be dismantled because it has nail-less timber construction (Figure 4). This typical construction can provide excellent flexibility in case of oscillation due to earthquakes.

Figure 4: Nail-less timber construction of *lamban tuha*.

In addition to separating the construction of the house with lower construction, the separation is also reinforced by the provision of *ijuk* (palm fibres) on the stone footing between stilts with beams, *kalindang* with beams, *kalindang* with stone footing and stack wood blocks on *kalindang* (Figure 7). Interestingly, the fibres can be seen by its presence at the bottom construction of *lamban tuha* 1 (Figure 7). The informant strongly believes that the palm fibres can serve as a sort of bearing on the structure in anticipation of earthquake. *Lamban tuha* 2 does not use palm fibres in separation between structures. This difference indicate if an understanding of fibres function of bearing structures have not understood more as a local wisdom.

Figure 5: *Kalindang* of *lamban tuha* 1 (9 layers) and *kalindang lamban tuha* 2 (11 layers).

Lamban tuha has three important parts of construction that is the bottom, the middle and the upper (Figure 6). Construction of the bottom part is the poles and *kalindang*s, construction of the middle part is the framework of the house while construction of the upper part is the roof truss. Further information mentioned that the owner of *lamban tuha* 1 had planned a strong and sturdy timber construction system but also can be flexible during an earthquake. The area around Lake Ranau is prone to earthquake disaster. Therefore, the construction *lamban tuha* 1's body is separated by lower structure, the construction of the house just rested on the structure; this gives the effect of high flexibility. In the context of house construction, there are interesting things, piles on the outer wall are not in a straight line with stilts or in other words, the outer wall is cantilever, about 30 cm from the composition of stilts.

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

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Earthquakes give bigger impact to reinforced concrete building than traditional building (Dogangun et al, 2006). Relatively, most type of traditional building performed well during earthquakes. Some tribes in Sumatera have local wisdom about timber construction which resist to earthquake. Some type of traditional timber house construction which resist to earthquake is not found in other areas such as traditional *nias* houses in North Sumatra, *gadang* house in West Sumatra and *lamban tuha* in South Sumatra. Typical wood construction shows in understanding the specific geographical conditions to adapt and survive. *Lamban tuha* 1 has *kalindang* at four points while the *lamban tuha* 2 only has *kalindang* at two points. The number of *kalindang* adapted to the dimensions of the house, the more spacious houses more *kalindang* required.

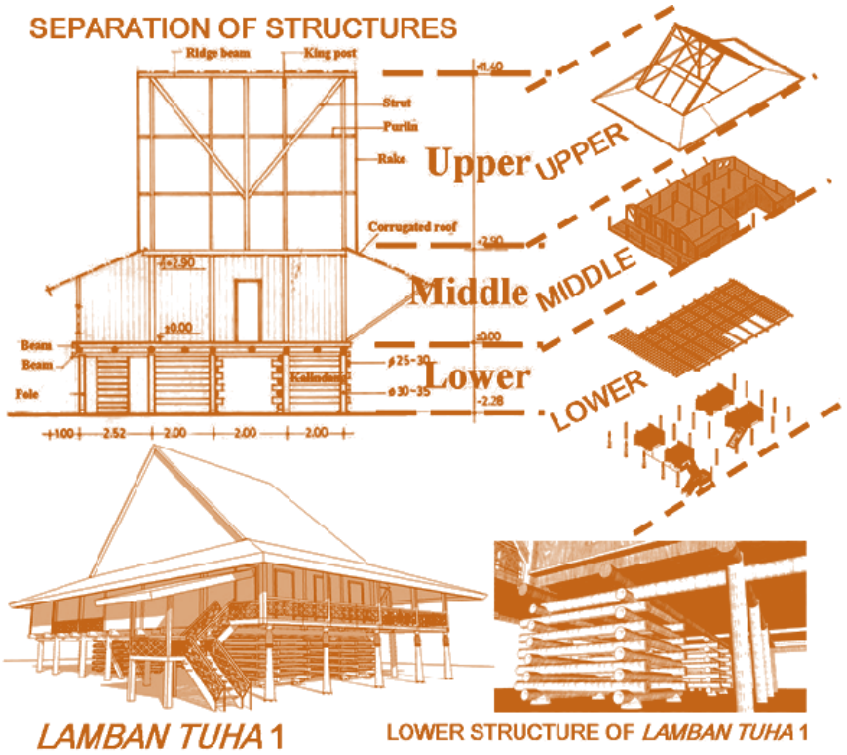

Figure 6: The separation of structure into three parts (lower, middle and upper).

Lower construction of *lamban tuha* consists of stilts and wooden blocks shaped square called *kalindang* (Figure 6). Poles and *kalindangs* as a whole bear *lamban tuha*. Poles and *kalindang*s rested on stone footing, it also provides high flexibility in case of shaking during earthquakes (Rautela and Joshi, 2008). This condition also can keep the timber from moisture and termites influence.

Based on the information, the main strength of the *lamban tuha* 1 is four pillars as main structure inside the house that bear the beams, these beams become the basis for pillars in the attic. Construction of *lamban tuha* 1 does not have a constant pillar intact from the bottom up to the roof.

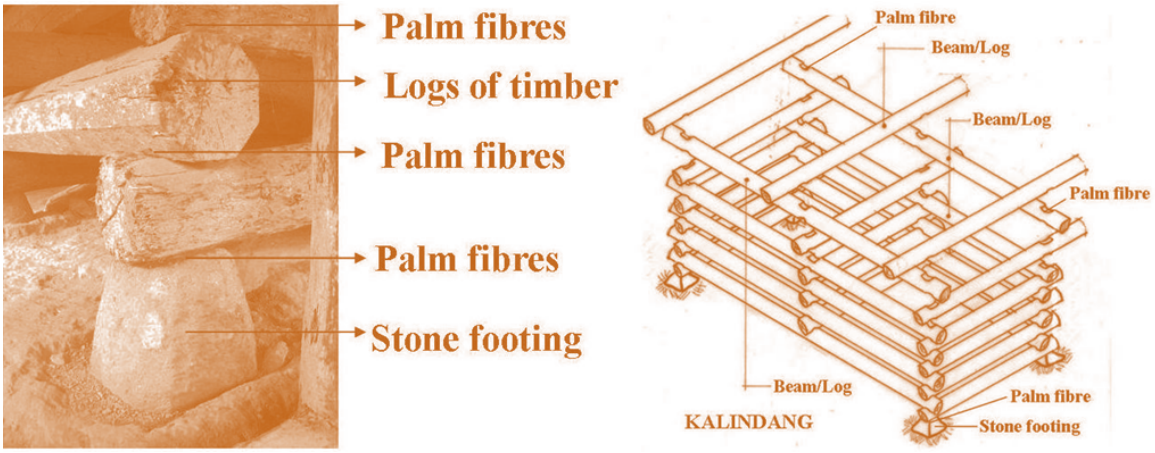

Figure 7: The lower structure of *lamban tuha* (*kalindang* and stone footings)

Traditional houses in Nias are based on the structure of vertical and slanted posts structures placed on a stone footing. Vertical posts and X and V are strengthens the element of this substructure. A three-dimensional structure offers greater resistance and has the elasticity required for not sticking in the ground (Gruber, 2007). Based on the experience of local communities, *kalindang* construction on the *lamban tuha* has a big role in anticipating the effects of earthquakes.

South Sumatra traditional architecture belongs to the grand tradition and requires special skills and expertise in indigenous knowledge. Traditional architecture is not only beautiful and elegant but also has flexible nail-less construction that has been proven to be earthquake resistant buildings. This technique adds to the flexibility of the house. Indigenous knowledge there is representing local wisdom that people have developed for centuries. It is based on long experience, adapted to local culture and environment.

*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

5. Conclusion

In principle, *lamban tuha* have different lower construction system with other traditional houses in South Sumatra. A series of stilts and *kalindangs* worked as a system that supports the load of the house. The building is only supported by wooden pillars and beams as a foundation and located above stone footing and the pile of timber logs (*kalindang*).

Besides *kalindang, lamban tuha* which has connections and details of timber without nails believed to be powerful force able to withstand earthquake shaking. The timber connections are very appropriate considering the tensile strength and shear caused by the earthquake. Placement of *kalindang* to support the weight of the house is symmetrical and synergize with stilts resting on stone footings. Overall, the timber connection practices form of press, pivot, pinch, and pull with reinforced by the dowel.

Local wisdom is reflections of valuable experience from the South Sumatra traditional architecture which can be utilized as the concept of a sustainable housing development in the context of anticipate natural disasters such as floods, landslides and earthquakes. The existence of *lamban tuha* is an interesting experience of our ancestors that can be used as thoughts on designing earthquake resistant buildings.

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*Corresponding author (A. Siswanto). Tel. +60173167312 Email address: ari_sisw58@yahoo.co.id

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Ari Siswanto is a Ph.D. Student at the Department of Architecture, Faculty of Design and Architecture, University Putra Malaysia. MALAYSIA. He is a lecturer at the Department of Architecture, Faculty of Engineering, University of Sriwijaya. INDONESIA. He received a B.Sc. in Architecture from 10th November Surabaya Institute of Technology, INDONESIA and Master of City & Regional Planning from The Ohio State University, USA.

Dr. Azizah Salim is an Associate Professor of Department of Architecture at Universiti Putra Malaysia. She received a B.Sc. in Architecture from Robert Gordon's Institute of Technology, Aberdeen, SCOTLAND and M.sc. from University College London. U.K. She holds a Ph.D. from University Newcastle-upon-Tyne in U.K. Her interest is in research related to housing and development policies

Dr. Ahmad Hariza is an Associate Professor of Department of Architecture at Universiti Putra Malaysia. MALAYSIA. He received a B.Sc. In Human Development from University Pertanian Malaysia. MALAYSIA. He received M.Sc. and holds a Ph.D. from The University of Birmingham, U.K. His research in housing involves person and environment relationship and housing studies.

Dr. Nur Dalilah Dahlan is a senior lecturer at the Department of Architecture at Universiti Putra Malaysia. She received a B.Sc. in Architecture from University of Malaysia, MALAYSIA and M.sc. In Architecture from Universiti Putra Malaysia. MALAYSIA. She holds a Ph.D. from Cardiff University. U.K. Her interest is in studies how people behave in response to their sensual perceptions when exposed to architectural ambiances developed using passive design approaches.

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