The construction project of the Moklen ethnic house, Sea Gypsy architecture in Southern Thailand

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ABSTRACT: The Moklen are an ethnic minority in Southern Thailand, known as Sea Gypsies. The Tsunami in the Indian Ocean in 2004 affected their houses which are now being transformed by modernization. Moklen ethnic houses are fast disappearing. The construction project shows the indigenous knowledge of the Moklen towards natural resources, rituals, and concepts, including the structural characteristics of construction. In particular, body-based units of measurement are an important part of building knowledge and technique in design methodology and construction. This research reveals local resources and classification units to understand the nature of vernacular architecture. Research in Tubpla village shows 10 units of measurement with 4 units used in the basic construction and application of units in components, including the significant traditional proportions in floor and height planning.

1 INTRODUCTION

The Moklen are an ethnic minority in Southern Thailand, known as Sea Gypsies. In the past, they had a nomadic lifestyle on the sea and made a temporary housing in the monsoon season. They then gradually settled on coastal land with mangroves to develop their own housing style. There are around 20 villages of Moklen settled on the coast of Phang Nga province, in Takuapa and the Tai Muang district (Ivanoff 2001). The Tsunami in the Indian Ocean in 2004 was a serious event for them, affecting their houses and land (Chumchonthai Foundation 2012). Some villages relocated inland for future safety. Other villages still keep their original livelihood but are being transformed by modernization. Moklen ethnic houses are fast disappearing and as such are life-changing. The house styles are simple and temporary, but unique and originally developed by the Moklen’s indigenous knowledge and techniques. It may now be the time to evaluate their housing culture.

2 THE CONSTRUCTION PROJECT OF A MOKLEN HOUSE

A field survey of a Moklen village in Phang Nga Province, Takuapa and the Tai Muang district in 2013, found that mostly the Moklen housing form had changed. In Tubpla villages in the Tai Muang district, traditional Moklen houses can still be found.

The construction project started with the idea creating the place to invite visitors in the village. With the support of the village leader, a newly built house is built by cooperation of the elder Moklen and skilled villagers. The construction of a traditional Moklen house preserves the cultural aspect of a Moklen ethnic house still further.

The project started at the end of February and finished in the middle of March 2014. The construction process was recorded thoroughly with a video camera, including interviews with the villagers to gain local knowledge of a Moklen house and its construction. In addition, the survey of the Moklen houses in surrounded areas provided information to support the study.

3 A MOKLEN ETHNIC HOUSE

3.1 Tubpla Moklen Village

The Tubpla community has a current population of around 900, of which, more than 80% are Moklen (Fig. 1). The Tsunami in the Indian Ocean in 2004 caused the deaths of seven Tubpla villagers. Several vessels were shipwrecked, and equipment and livelihoods were destroyed. However, although the community’s houses were not damaged by the Tsunami but because of the much loss and damage, the organizations provided the aid to the affected community, and in particular the Rotary Foundation provided new two-story prefabricated houses; permanent blockhouses replaced the traditional Moklen houses (Chuchart 2014). Modernization also had an impact by changing the appearance of the Moklen house.
The restrictions with construction materials which originally came from the accessible mangrove known as Pa Kongkang Klong Thungmaphrao, created limitations in building a Moklen house. After the Reserved Forest Act was issued in 1954 (Kittipat 2014), the resources from mangroves come under the Treasurer of the Department of Marine and Coastal. Cutting large quantities of wood, such as for construction is illegal, except with the acknowledgement of the officer of the department.

3.2 Construction Process

- Construction materials were collected, and cutting wood in mangroves shows that the Tubpla community has a deep understanding of the area. They know the best locations for cutting wood, the grouping of trees, and types of wood suitable for construction. However, some construction materials cannot come from nature like before, so it is necessary to request permission from the landowners involved in the purchase.
- Construction preparation starts with material preparation, and the required size and length of timber by measurement. The past method has changed and the components are prepared in sizes to fit perfectly with the assembly and construction of the house; builders choosing to cut the timber after installation. Other components will be prepared such as weaved bamboo walls, roof units, etc.
- The main pillar is at the center of the house and is the most important component. A ritual at the hole of a main pillar takes place to ask for the protection of the house, and put the valuables and pit the pillar into the holes. The positions of other pillars are decided by the measurement from the main pillar.
- The wooden scaffold will be used to make the Pae Wien (roof beam) around the house, which strengthens its whole structural frame. The same scaffold will then be moved up to be used for the roof structure. The main floor structure will be installed, paving the roof units, to take advantage of preventing rain from coming in and providing shade when working on the floor structure. Next, making a plain gabled wall frame to install prepared bamboo walls, and door (Fig. 2).
- The front balcony is an important element in a Moklen ethnic house. After the main building is completed, a balcony called Nok Charn will be added by joining the pillars to the main building.

3.3 Features of a Moklen ethnic house

3.3.1 Architectural Form

- Floor plan

There are two types of Moklen houses, based on the number of pillars. Six pillars create a small design, easily and quickly built, and nine pillars provide the standard type with a width of around 4 meters and a length of around 5 meters. A rectangular shaped area is well managed and arranged by the elevated floor inside. The wall layout can be flexible to follow the requirements of the owner. The house in the project has a wall layout decided mainly for the visitor activity and thus the area in front of the house is open to set up the flexible space or visitors. The house consists of a living area, sleeping area and kitchen, while a balcony, Nok Charn, is used for working during the day (Fig. 3). As the Moklen give priority to daughters, the size of the house basically depends on the number of daughters, expanding the floor area by adding sleeping rooms.
- House dimensions

At present, the Moklen house usually has a floor level height of around 1 meter, and the space under the floor is used for keeping livestock. However, in the past, the house was built in the forest so it was higher to prevent danger from wild animals. For this house, the height of the floor level was approximately 1.60–1.70 m. The height from the floor level to the beam is around 1.70 m and the highest level at the top of roof is approximately 5.40 m and slope of the roof is nearly 40°.

3.3.2 Construction technique

The structural principle of the Moklen house is a bundle structure where dual components are connected together by rattan rope in order to be attached to another component, as detailed in Figure 2.
Figure 2. Construction process and joint details of the construction project of Moklen ethnic house.
Moklen have mostly continued to keep the traditional forms and methods of construction as well as using original equipment in construction, such as axes and machetes. However, modern equipment such as a saw is used to make things easier.

4 DESIGN METHODOLOGY

4.1 Body-based units of measurement

Body-based unit measurements are used in the construction of Moklen houses. The knowledge of using a part of the body in building design has been passed from generation to generation. It is used for designing house plans and measuring the size and length of components. Research found that the Moklen use the units based on the hand (H) and arm (A) and some parts of the body (B) For example: from the navel to the floor, etc. It can be summarized as below (Table 1) and demonstration of body-based measurement (Fig. 4).

The interviews found that the elder Moklens still used the names of the measurement units in the Moklen language while due to the merging of the Thai culture, the later generations included some use of international measurement units. The knowledge of body-based units of measurement is still apparently shown in this construction project. The units used in the construction of a Moklen house show the area as gray bars, and it was also found that each generation of Moklen use different measurements such as (A-3), which is a unit that elder Moklen use, while later generations use (A-2).
4.2 Application of units for building forms

- **Floor planning**
  The floor planning of a Moklen house is determined by the arrangement of pillars, the wood measured in the required length is used as a ruler for planning the size of the house. The width of the plan is decided by nine times of (A-2) and the length is 12 times of (A-2). The width and length of the house are divided in half to arrange pillar span.

- **Height planning**
  Height planning for a Moklen house is determined by the length of the pillar and the depth of the pillar hole. Six side pillars have nine times of (A-2) and center pillars length; and three center pillars 12 times of (A-2) length. All of the pillars will be inserted into the holes on the ground at a depth of (A-4). The difference in pillar length, three times the length of (A-2) and the distance of the pillar span on the front is 4 ½ × (A-2), create the slope of the roof the slope of the roof is 37°. At floor level, there is no certain principle for it, but it can be seen when also based on the requirements of the house owner. However, the height of the house owner can be used to determine the level of floor height, which is 165 cm.

  The result from the study is that it can be concluded that Moklen use a proportion of the length of 9 × (A-2) and 12 × (A-2) both in floor and height planning in a traditional house.

4.3 Application of units for building components

The application of the body-based unit with the building elements A-2 (Ar Hut, Hut, Sok Shee, 46 cm) are the main units used for the pillar 9 × (A-2) and 12 × (A-2) and most of the main structure components, such as floor and roof structures, will be prepared for longer than 1 × (A-2) to serve as a space for binding the components together. (Table 2) For example, the layout of a building 9 × (A-2) and 12 × (A-2) long, have prepared elements of wood 10 × (A-2) and 13 × (A-2) long, respectively.

The application of measurement for roof units is A-1 (Hut, Sok Klom, 35 cm) the length of the roof unit is 4 × (A-1). Such length would contribute to the distance of the structure to support roof units. The unit (H-3) (Ar Eu Kam, Kueb, 14 cm) is used for the overlap distance of the roof units (Fig. 5).

After construction is finished, it can be concluded that the major units used in the design of a Moklen house are A-2 (Ar Hut, Hut, Sok Shee, 46 cm). Then A-1 (Hut, Sok Klom, 35 cm), H-3 (Ar Eu Kam, Kueb, 14 cm) and A-4 (Per Ark, 67 cm). The Moklen use body-based units of measurements by simple estimated speculation; this is because the elbow is a medium scale that can be applied to both short and long.

5 CONCLUSION

The study of Moklen ethnic house construction shows how the building process begins and how the traditional Moklen form is retained. This also includes the rituals and concepts of construction, and provides knowledge of accessing resources for the selection of construction materials. In particular, the use of body-based units of measurement in construction, and the application of different units to design and construct, concluding with 10 units with 4 units used in the basic construction. The study also shows the different uses of various units for each generation, and found that the most used is the (A-2) and (A-1) or elbow. This is the basic unit of measurement used in almost all parts of the construction. In addition, the ratio of 9 × (A-2) and 12 × (A-2) is used both in floor and height planning.

This construction project shows the indigenous knowledge of Moklen passed from generation to generation. Especially body-based units of measurement, an important part of building knowledge and technique in design methodology and construction, it also shows the construction management of a Moklen house under difficulty of present conditions, which will be useful in retaining knowledge of Moklen traditional house construction in the future.
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REFERENCES


Figure 5. Application units in floor plan and cross-sectional plan of Moklen ethnic house.