The Design of Mud-mee Silk from Graphic Pattern of Khmer Sanctuary Plan in the Lower Northeastern Part, Thailand

Sombat Prajonsant

Department of Architectural Technology, Faculty of Industrial Technology, Buriram Rajabhat University
Corresponding author: sombatprajonsant@gmail.com

Abstract

Khmer Sanctuaries in the lower part of the northeastern region of Thailand are an integral part of cultural heritage of Khmer civilization. The graphic pattern of floor plan is architectural representation, which is a universal language. However, the floor plans of Khmer sanctuaries have never been made into the designs of Mudmee or Ikat silk before. Thus, this project was aimed at creating graphic designs of Mudmee silk based on the inspirations from floor plans of Khmer sanctuary in the lower part of the Northeast of Thailand. As an experiment, local artisans were asked to produce Mudmee silk and two prototypes were created. Academic information was given to support the design, which made use of a number of processes, namely simplification, composition, and color scheme, in combination with creative Mudmee techniques derived from local wisdoms. The artisans had to apply their body of knowledge from preparation of silk threads to calculation of the numbers of warps and wefts, bleaching, dyeing, creation of Mudmee designs, and Mudmee weaving technique. It was suggested that other techniques should be applied to Mudmee silk in order to improve dimensions of the designs by using the different values of colors or combining other inspirations with Khmer temple floor plans. This would enable the artisans to develop a wide variety of designs. Certain symbols could be further represented by abstract images.

Keywords: Design; Silk; Mudmee; Ikat; Khmer sanctuary

Introduction

Weaving is known as one of the oldest handicrafts in human history. It has been practiced since the prehistoric time. Up to the present days in the lower part of the northeastern region of Thailand, including the provinces of Nakhon Ratchasima, Buriram, Surin and Sisaket, where Khmer sanctuaries are located along the trail of Khmer civilization, Mudmee silk weaving wisdoms continue to be abundant. Formerly, the designs of Mudmee in Isan or the northeast of Thailand mostly focused on animals, plants and articles, such as hook, shuttle, sticky rice container, or buildings, such as pavilion and pagoda. A study of Pakdeesuwan (2009) stated that consumers in the age group of 25-35 years liked geometric designs of Mudmee silk, harmonious color schemes, and warm and cool tones of colors. They also tended to buy contemporary patterns not the ancient ones. Many consumersstated that they did not use Mudmee cloth because it had the image of elder people's clothing. Even working people who were 30 years old or more would like to wear clothes that made them look active (Department of Industrial Promotion, 2003: 19). A study by Queen Sirikit Sericulture Center (2012) revealed that consumers would like weavers to developnew patterns and use a variety of colors. Their decision to buy silk was based on colors and patterns of the clothes. Colors and beauty of the products were significantly related to the consumers' purchasing decision and behavior whereasthe variety of patterns was significantly related to the frequency of purchases (Leuchutakul, 2006: 91-92). According to studies oflocal woven clothes in Thailand and neighboring countries, both ancient and contemporary ones, no Mudmee silk products with graphic designs inspired by floor plans of Khmer sanctuary hadnever been found before although Khmer sanctuaries were considered an essential cultural heritage in the region.

If research was conducted to develop new Mudmee silk patterns from graphic designs of the floor plans of Khmer sanctuary in the lower part of Isan and Mudmee silk products with such new

patterns were created, the new products would be able to undergo commercial production process. This would help improving silk weavers' potentials and capabilities and lead to economic developmentand new body of knowledge.Local wisdoms would then contribute to economic development of the community. Above all, such research project was implemented in response to the royal speech of Her Majesty Queen Sirikit given on 4 August 1992 at the Dusitdalai Hall, Dusit Palace that

"...Mudmee weaving is an old art of the World. Mudmee products of each country are different in patterns, but all are beautiful. For Thailand, the Arts and Crafts Center has collected more than 200 Mudmee patterns and new patterns may be developed at any time because Thai people are artistic and creative by nature..."

As a token of gratitude to Her Majesty the Queen, the researcher is determined to contribute to continuation, development and improvement of local wisdoms regarding Mudmee silk as cultural heritage of the country.

Research methodology

The design concept was based on features of floor plans of main buildings of Khmer sanctuary, including central sanctuary, cloister, and entrance. (see figure 1) Arrangement of cloth structure was inspired by Poom cloth, a traditional form of Mudmee by the Thais of Khmer descent, the structure of which was divided intoframes called "Sangwian." The central area of the cloth where the pattern lied was called "Thongpha," which was connected by two or three layers of narrow strips called "Nanang." Around the Thongphaarea, the pattern of Khmer temple's floor plan was created by means of repetition of the pattern. Components of the floor plan was transformed by means of simplification to make it suitable for creation of pattern by Mudmee techniques, which could be achieved by

determining the pattern in a table, resulting in a pattern in the form of geometric shapes. Since a display of floor plan was a universal language in architecture, reduction of details of such pattern would similarly create a sense of universality. Composition of the floor plan pattern was based on the principle of symmetric balancewith a uniform repetition in rhythm and color harmony. Local weavers of the village of Ban Sawai in Muang District, Surin Province, were asked to produce two prototypes of Mudmee silk.

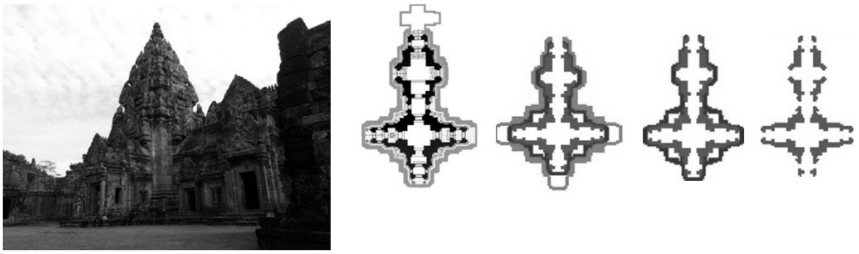


Figure 1 Prasat Phanom Rung and Floor plan of Phanom Rung sanctuary patterns.

Results

The development of graphic designs of Mudmee silk from floor plans of Khmer sanctuary in the lower Isan of Thailand was an experiment of new products since the floor plans of Khmer sanctuary had never been used as patterns of Mudmee silk before. Thus, a number of processes were used in the development of Mudmee silk patterns, namely simplification, composition, and color scheme, (see figure 2). as well as creative Mudmeetechniques derived from local wisdoms and body of knowledgeon preparation of silk yarns, calculation of the quantities of warps and wefts, bleaching, dyeing(see figure 3), and Mudmee weaving technique. (see figure 4).

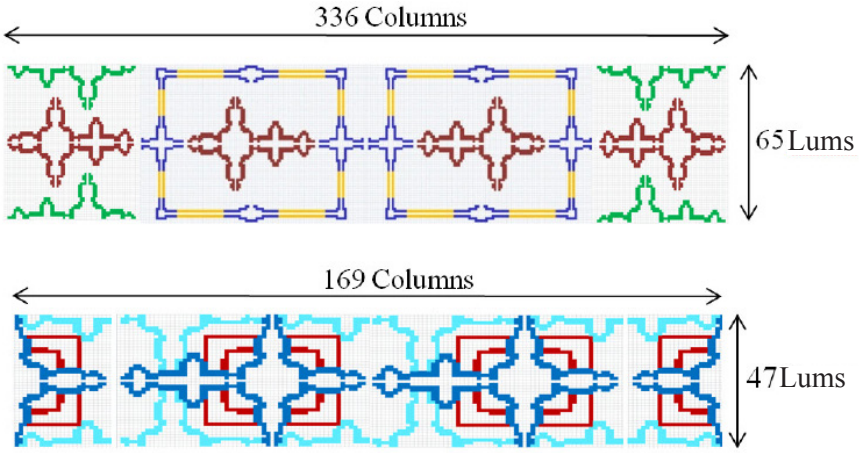


Figure 2 Pattern sketches for Knot-tying Patterns 1 and 2

Figure 3 Yellow dye was from the core of Khae plant, red from lac, and brown from mud.

Figure 4 Knot-tying and Weaving

Calculation of silk yarns

Thai-Lao people usually chose size-8-cocoon silk yarns as wefts and size-6-cocoon silk yarns as warps or size-10-cocoon silk yarns as wefts and size-4-cocoon silk yarns as warps to achieve silk with uniform texture (a size-10-cocoon silk yarn was larger than the size-8-cocoon one). Meanwhile, Khmer-Thai people often used size-8-cocoon silk yarns as wefts and size-4-cocoon silk yarns as warps. It is worth noting that a warp is smaller than a weft. The reed used was 102 centimeters in width. For a cloth of regular thickness, a reed with 42 teeth would be used. In one set of reed, there were two silk yarns

For warps, the weight of bleached silk yarns per one meter of the length of cloth was 70 grams.

For wefts, the weight of bleached silk yarns per one meter of the length of cloth was 75 grams.

Method for calculation of yarns for Khmer temple floor plan pattern of the size of 65 Lam: the process of 'Khonmee' (stretching the weft yarn along a wafting board to decide the length of yarn for the whole piece of Mud-Mee) was conducted to prepare silk yarns to get the desired length and width of silk piece by using the same number of weft yarns and suitable for the size of each pattern. This was called "Lam,"

Kheen meant the crossing of weft yarns during the design-making step. To repeat a pattern, the silk yarns had to cross with each other. When tying knots of one Kheen, two patterns could be woven. If weavers wanted to have 20 repeated patterns, they had to make 10 Kheen during the stretching of weft yarns.

Mudmee design making: the pattern of Mudmee would be created during these three following steps:

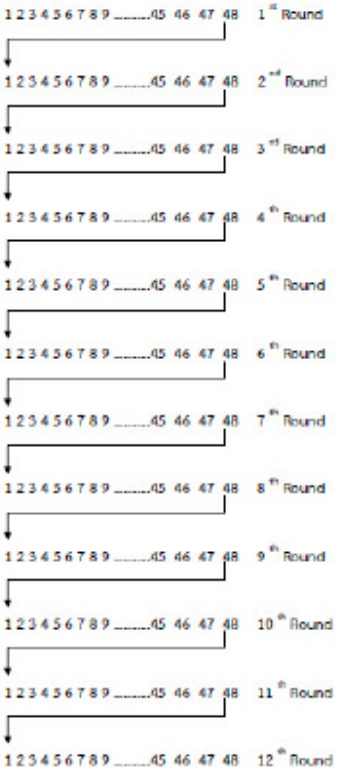
1. Determining of direction of the pattern to fix the size of the pattern (Lam);

2.'Yoke mee' would affect the pattern to be created on the silk piece and could be classified into two techniques: Meelai and Meeluad. (see figure 5 and 6)

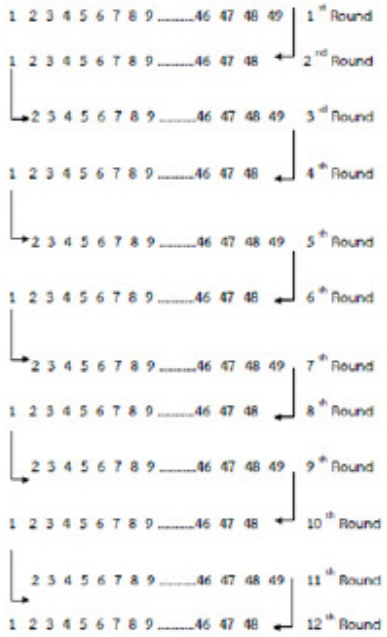
3. Tying to create the pattern on Hong or knot-tying device. (see figure 7).

As regards Meelai technique for preparation of weft yarns on Yokmee device, the number of Lam could be either even or odd. On the other hand, in the ordinary technique for preparation of weft yarns on Yokmee machine, Lam had to be in the odd number only. If the patterns on the table grid were in an even number, an empty row had to be added between the patterns to achieve the odd number of the size of patterns.

Figure 5 The process of 'Yoke mee'.

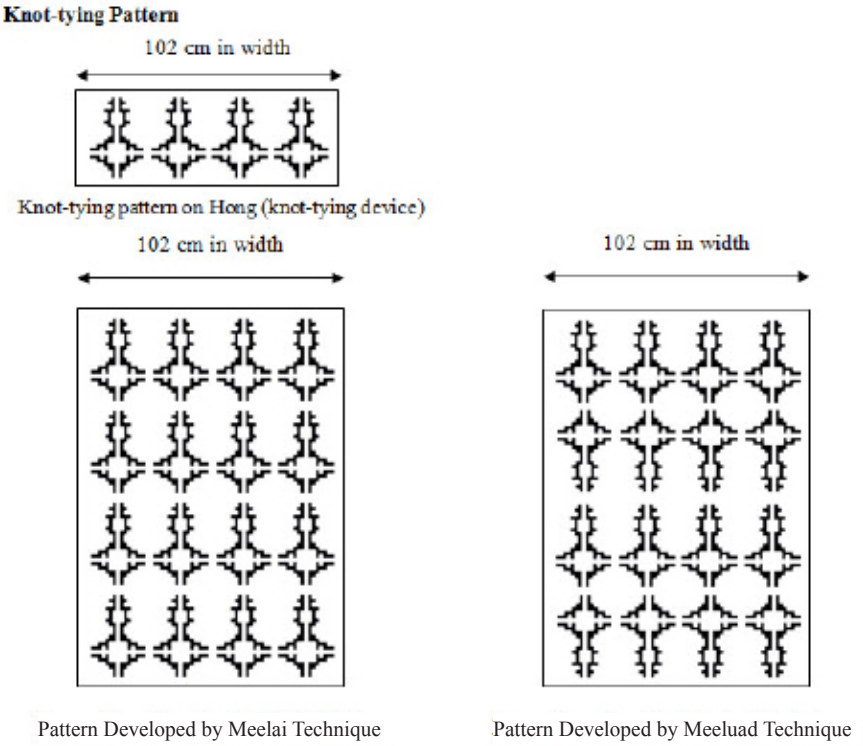


Meelai Technique



Meeluad Technique

Figure 6 Diagram of Process of 'Yoke mee': Meelai Technique and Meeluad Technique



Remark: *The one way direction pattern make of the Meelai Technique but the reflect direction pattern make of the Meeluad Technique.*

Figure 7 Knot-tying Pattern

In developing Mudmee design consisting of many patterns in combination or only a single pattern repeated rhythmically, the number of Lam along the width of Hong (knot-tying device), which was equal to the width of silk piece or 102 centimeters, had to be calculated (the length of the silk yarn wrapped around the poles on both sides of Hong for one round, when removed and divided by half, would be equal to 102 centimeters). In dividing the silk yarns placed on Hong in the vertical plane for design making, a skilled Mudmee craftswoman would not make a table grid

whereas a beginner would use a black pencil or highlighter to mark the silk yarn according to the distance measured by a ruler, usually 6-8 millimeters apart (in a highly fine pattern or small one, it would mostly be 6 millimeters apart).

If the column was 6 millimeters in width, throughout the length of Hong, there had to be a total of 170 columns.

If the column was 7 millimeters in width, throughout the length of Hong, there had to be 145.7 columns (145 columns).

If the column was 8 millimeters in width, throughout the length of Hong, there had to be 127.5 columns (127 columns).

Vertical columns were made to achieve the uniform size of Mudmee pattern and enable the designer to determine the size of the pattern in accordance with the length of the woven cloth, which was not over 127-170 columns. (see figure 8).

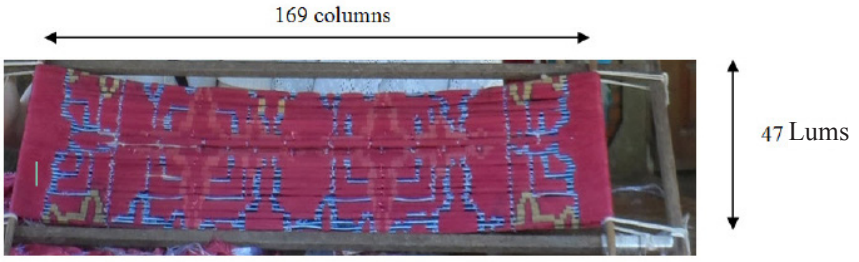


Figure 8 Knot-tying Pattern 2

Color Designs of Mudmee Silk

Mudmee or knot-tying was the process of making the pattern to appear on the cloth. It was achieved by using water-resistant materials, such as string made of banana tree and plastic rope, to tie silk yarns, which had been divided into sets. At this step, the process of 'Yokemee' would be performed to achieve the desired patterns before dyeing the silk yarns by natural or chemical dyes. Colors of the tied parts of the silk yarns would not change. When the ties were removed, the silk yarns would have different colors.

If only two colors were needed, the strings would be removed only once. If many different colors were required on the silk yarns, the tying and removal of strings as cleaning of the silk yarns might be repeated for several times or over-dyeing process (known as "Thom") would be carried out. Tying and dyeing had to be planned and practiced in a fixed order. In case of chemical dyeing, the tied silk yarns could be put in boiled water to wash off the colors (only the untied parts of the silk yarns could be washed off) by adding "smelly alkaline powder" to remove colors from or bleach the untied portions of the silk yarns (such portions would then turn into white) whereas the colors of the tied portions of the silk yarns would remain the same. Then, the silk yarns might be dyed into other colors as needed.

For some colors, after dyeing and tying, there was no need for washing, but other colors could be over-dyed. For example, if the silk yarns were dyed into blue color, if weavers wanted the yarns to be in green, they had to over-dye the blue yarns with yellow dye. If weavers wanted to have a darker tone of color, they could over-dye the silk yarns that were in light color without having to tie the silk yarns again and again to protect the dyed colors. For example, yellow could be over-dyed by red, then reddish brown (tamarind seed brown), and finally black. Over-dying process was preferred in natural dyeing where there was no bleaching process like in chemical dyeing.

Regarding local wisdoms of ancient people on selection of Mudmee silk colors, it was found that the pattern colors were usually in blue, yellow, red, green, black and white. In the old days, main color dyes were obtained from the nature, such as plants or animals. Blue was from Indigo blue tree; yellow was from core of Khae plant; red was from lac; green was from the barks or leaves of many plants; and black was from ebony tree.

A portion of the silk yarn being tied would be in white. People in the present days continued to adopt such local wisdoms and the principle of color selection when it came to chemical dyeing.

It was found that, when encoding the local wisdoms on color selection in Mudmee patterns, the values of colors used were 3, 5 and 7. In the color wheel, the values of colors were ranged from the darkest of purple (value of 1) to the lightest of yellow (value of 7). The value of 3 was assigned for blue and red, 5 for green, and 7 for yellow.

When creating certain images to compare the patterns with the color values of 3, 5 and 7 on other background colors in the color wheel, it was found that all colors could be used with other background colors, with 9 from 11 pairs continued to give outstanding colors of the patterns. This showed that local wisdoms of people in the old days were derived from accumulation of knowledge and experiments to generate a procedure that has been applied up to these days. The colors of black and white represented the local wisdom of utilization of neutral colors in the event that the color values of the pattern and background colors were close. The patterns could be more outstanding when their borders were highlighted by black and white. To be clearly seen depended on many factors, including intensity of the colors used, size of the pattern area, quantity of the pattern area, and color scheme.

There were two pattern prototypes developed. For the second prototype, rhythm of the pattern was arranged to have overlapping components. Use of colors with different values resulted in a clearer dimension of nearness and farness compared to the first prototype. As a whole, local weavers were able to produce the patterns developed, but certain adjustments had to be made due to limitations on part of dyeing and/or knot-tying techniques. (see figure 9-10)

Figure 9 Pattern 1 (Left) dmee Silk Product No. 1 (Right)

Figure 10 Pattern 2 (Left) Mudmee Silk Product No. 2 (Right)

Discussion

Based on the results of creation of Mudmee silk with graphic designs from floor plans of Khmer sanctuary in the area of lower Isan, the following points were discussed:

1) Floor plans of Khmer sanctuaries are architectural representations, which are a universal language. To develop the floor plans into the patterns of Mudmee silk, it was necessary to adjust the components by means of simplification and reduction of details, which should also create a sense of universality. This was in line with the concept of the Department of Industrial Promotion (2003: 20), which encouraged the selection of graphic designs or lined patterns shortened from geometric shapes to eliminate complexity of the patterns in order to create Mudmee silk with universal ideas. It was also in agreement with a study conducted by Pakdeesuwan (2009), which found that most of the target consumers who were female government officials in the age group of 25-35 years liked geometric designs.

2) Unique designs of Mudmee silk: the use of floor plans of Khmer sanctuary in lower Isan for design development would result in Mudmee silk patterns that were unique and reflected the identities of local community. This finding was in agreement with Sakchai Sikkha (2011: 119-132), who suggested five approaches to creation of unique fabric patterns: (1) development from ancient fabric patterns by rearranging the existing patterns to come up with the new patterns meeting the current needs; (2) development from local uniqueness; (3) development from well-known qualities in the local community; (4) development from the local culture, beliefs and legends; and (5) development from a combination of techniques, such as tie-dyeing, pattern drawing, Mudmee, Jok, embroidery, or Saew. However, Janpala et al, (2013: 207-226) suggested that designers should give importance to communication and preservation of uniqueness.

3) Composition of the graphic designs of floor plans based on the principle of symmetric balance with a uniform repetition

of pattern weaving and harmonious color combinations was in line with a study of Pakdeesuwan (2009: 167), which found that most of the target consumers who were female government officials in the age group of 25-35 years liked harmonious color combinations.

4) The finding that local weavers were able to produce the weaving patterns developed as a whole with certain adjustments being made due to limitations on part of dyeing and/or knot-tying techniques was in line with the study of Pakdeesuwan (2009: 170), which found that the weaving patterns that the weavers were able to produce had the components that the weavers were familiar with, such as symmetric balance of composition or repetition of pattern weaving in a uniform rhythm

Acknowledgements

This research study is funded by the National Research Council of Thailand (NRCT) and the Thailand Research Fund (TRF) in the Financial Year 2014.

.

References

Department of Industrial Promotion, The Industry Sector Development Bureau, Textile Industry Section. (2003). *Mudmee in a New Perspective*. Bangkok: Process Color Designs and Printing.

Janpala, J. et al., (2013). "Pattern Development of Thai Songdam Woven Fabrics for Value Addition under the Creative Economy Principle." In *Meeting documents at the 3rd National Culture Conference*, Ministry of Culture,. pp.207-226.

Leuchutakul, M. (2006). *Factors Affecting the Decisions to Buy One Tambol One Product Silk Products of Consumers in Nakhon Ratchasima Province*. Nakhon Ratchasima: Nakhon Ratchasima Rajabaht University.

Queen Sirikit Sericulture Center, Chiang Mai. (2012). *Research Project for Preparation of Guideline for Production of Silk Fabrics and Products Meeting the Needs of Customers in Thailand.* [online URL: http://www.qsda.go.th/]. Accessed on March 28, 2012.

Sikkha, S. (2011). Creation of Unique Woven Fabric Patterns of Isan. *Industrial Technology Journal of Ubon Ratchathani Rajabaht University (1, 2)*, : 119-132.

Pakdeesuwan, S. (2009). *Mudmee Silk Designs of Maha Sarakham Province in A Contemporary Context.* Master Thesis.(Media Arts and Design Program), Chiang Mai University, Chiang Mai, Thailand

Prajonsant, S. et al., (2003). *Research Report on Development of Local Wisdom Database: A Case Study of Well-Known Local Woven Fabric Products by Ethnic Groups in Buriram Province.* Buriram: Buriram Rajabhat University.

Prajonsant, S. et al., (2004). *Participatory Research Report on Development of Community-Level Standards of Local Woven Fabrics in the Northeast of Thailand: A Case Study of Mudmee Silk of the Weaver Groups in the Northeast of Thailand.* Buriram: Buriram Rajabhat University.

Prajonsant, S. (2011). *Research Report on Development of Pattern Prototypes of 2-Dimension Graphic design from Patterns of Decorative Motifs of Khmer Sanctuary in Buriram Province.* Buriram: Buriram Rajabhat University.

Prajonsant, S. (2012). *Research Report on Development of Local Woven Fabric Patterns based on 2-Dimension Graphic design from Decorative Motifs of Khmer Sanctuary in Buriram Province.* Buriram: Buriram Rajabhat University.