

Hidden Calculation on Patterning the Warp and Weft Threads with Double Ikat Technique: *Gringsing* Textiles

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Abstract: The double-ikat weaving technique only exists in three places in the world: Indonesia, India, and Japan. In Indonesia, the only place that practices double ikat weaving technique is Tenganan Pegringsingan village in Bali, which produces *Gringsing* textiles. The process of creating *Gringsing* textile is laborious and time-consuming; both the warp and the weft threads must be patterned and dyed independently prior to weaving. Hence, a detail calculation is required to match the pattern in the warp and the weft. To understand and document the calculation or computation on creating *Gringsing* textiles, ethnography research methodology along with visual computation analysis are involved. The researcher interviewed, observed, and participated with the activities of creating *Gringsing* textiles on-site, then analysis the data with visual computation to complement the ethnographic study. This study can be used as documentation for Tenganan Pegringsingan village specifically and other scholars generally. Besides, this research introduces a sequential method of ethnography and computation to investigate a hidden computation on other traditional textiles.

Keywords: *ethnography, computation, Gringsing, double ikat weaving, Tenganan Pegringsingan*

Introduction

Gringsing textile is produced in Tenganan Pegringsingan village in Bali and is constructed with a double ikat weaving technique. A technique that only exists in three places in the world: India, Indonesia, and Japan. The double ikat weaving technique is a technique that requires patterning on both yarns, the warp and weft, prior to weaving. While a single ikat only requires either one of the yarns—warps or wefts—to be patterned prior to weaving. The single ikat weaving technique practiced in many places in Indonesia and is simpler compared to the double ikat weaving technique. While the double ikat weaving technique only practices in one place in Indonesia, which is Tenganan Pegringsingan village.

People in Tenganan Pegringsingan village treat *Gringsing* textiles as a sacred cloth that is used as an object to be offered and worn during religious ceremonies. Interestingly, *Gringsing* textile not only is used by the people from the village but also from the outside village within Bali Island. According to Kohn (1933), “*Gringsing* is structured from two local words: gering and sing. Gering means sick or ill, and sing means no” (p.314). Therefore, *Gringsing* carries a meaning of both protection from and avoidance of illness. In order to avoid illness, people in Tenganan Pegringsingan belief that once the environment is in balance, then it brings protection to the villagers. The concept of balance reflects the process of creating *Gringsing* textiles, where people in this village belief by patterning both—the warp and weft—will provide balance so that the meaning of protection can be achieved.

As the double ikat weaving technique is rare and complicated, matching the warp and weft threads prior to weaving involves complex calculation, which usually delivered from generation to generation through oral tradition. In 1975, Ramseyer and Gigi conducted a study in Tenganan Pegringsingan village by recording and documenting the process of creating *Gringsing* textiles.

They published the result into three different articles and recordings (Ramseyer 1979;1983;1985). Although Ramseyer and Gigi have recorded the process of making *Gringsing*, a detail calculation on how the patterns applied to the threads were not explored. Battenfield (1978) used Gigi's studies as the fundamental theory to create a double ikat textile in her studio; however, the result was far from the original. It missed the actual calculation from the weavers. Other researchers have studied *Gringsing* textiles focusing on patterns development (Gillow, 1992; Gittinger, 1979; Sadevi 2014; Mujaddidah, 2016) found that from 20 patterns, it developed into 27 patterns of *Gringsing* textiles; these studies emphasize on the types of patterns without elaborated on the technique. Although Pebryani (2019) had mentioned the technique of creating *Gringsing* textiles, the explanation was more on the connection between the meaning of the *Gringsing* textiles related to the process creation, not as a standalone explanation of the calculation. Hence, there is a need to document how detail calculation applied to both the warp and weft threads in the double ikat technique. In the end, this documentation is valuable for the people in the village and other scholars, especially as information about the double ikat technique that is complex and rare.

Methodology

The process of understanding the calculation of the warp and weft threads conducted with ethnography research methodology. The qualitative data collection consisted of interviews and observations. The researcher audiotaped 14 interviews and videotaped 10 hours of observations, with specific questions around the process of creating a pattern in the warp and weft. The data were transcribed and coded to create categories of cultural meaning, including sub-categories of the structure of *Gringsing* textile, calculation of transferring the threads to the warp and weft frame, and wrapping both threads.

The Structure of *Gringsing* Textiles

The process creating *Gringsing* textiles involves intricate calculation to precisely match the patterns on warp and weft threads. The warp and weft threads must be patterned prior to weaving in the double ikat weaving technique. This technique requires a tedious procedure for creating patterns on the warp and weft. The warp threads are located vertically on the loom, while the weft threads are interlacing between the warp horizontally from right to left. To match and balance the patterns on both warp and weft, the artisans have to calculate the number of threads with a specific formula. These calculations are reflected on how the artisan's times and divide the number of threads. The act of calculating is called computation.

To reveal the computation behind generating *Gringsing* textiles patterns, understanding the structure of *Gringsing* is necessary. *Gringsing* textiles structure consists of verge, border pattern, and body patterns (as can be seen in the figure 1. below). The *Gringsing* textile in figure 1 is called as *Gringsing* talidandan, and the overall pattern in *Gringsing* textile is built upon a repetition of a fundamental unit—a fragment of *Gringsing* textiles that is repeated, see figure 1 for clarification.

A *gringsing* textile can be divided into four parts equally (A), as can be seen in figure 1. When observing this quarter part, the smallest part (B) is called a fundamental unit. This fundamental unit is a parameter for the artisans to decide how many threads for the warps and wefts are needed to create a pattern.

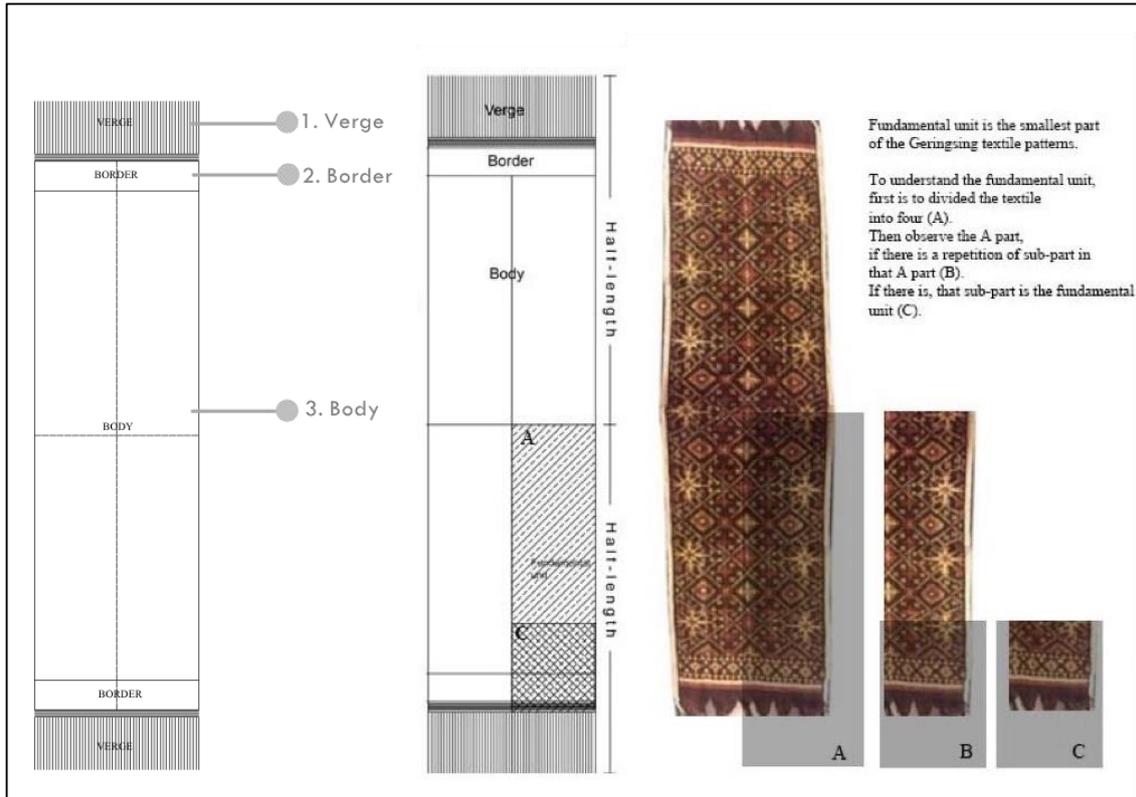


Figure 1. (left & middle) structure of *Gringsing* textiles; (right) *Gringsing* talidandan

The fundamental unit brings information of how many threads needed for the width and height size.

Patterning the warp and weft

The process of patterning the threads to the warp and the weft is done separately because each has a different calculation. Prior to the patterning, the threads transferred to the warp and weft skein. The warp skein is the thread facing vertically in the loom, while the weft skein interlaces horizontally within the warp threads.

The warp threads

Gringsing textiles have five widths. Each width has its name: 14 (anteng), 24 (patlikur), 37 (wayang putri), 40 (petangdasa), and 42 (wayang kebo). These numbers (14, 24, 37, 40, 42) are called as *buluan*. One *Buluan* consists of several *tigeh*; the way to calculate *tigeh* is by counting how many textiles that the artisans want to produce in one-round production, and then times two—each textile requires two *tigeh*, and one *tigeh* has 16 threads.

In transferring the threads to the warp frame, referred to as *ngelimbengan*, the makers pass the threads from one wooden stick to another by circling both woods to create the number eight without breaking up the threads; as a result, at the end of the weaving process, the fringes become connected. The figure 2. below shows an aerial view of the device for *ngelimbengan*.

The sequence of transferring the yarns to the warp frame involves five steps.

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- (1) The process of *ngelimbengan* requires several rounds, the first using two groups of threads, each consisting of 16 threads. These 16 threads are divided into four sub-groups, each with four threads. As seen in figure 2. below, the wooden stick in the right image

shows the placement of the 16 threads in the four sub-groups while the wooden stick on the left shows the 16 threads joined tightly into one group. There are two tied groups on the left and eight sub-groups on the right.

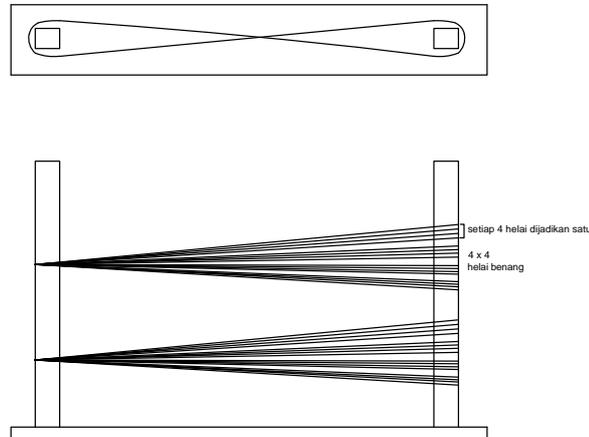


Figure 2. (upper) View the *ngelimbengan* device seen from above; (below) The *ngelimbengan* tool is showing the arrangements of the threads.

- (2) A specific rule is applied to reduce the eight sub-groups into the four on the right: the first thread group is combined with the eighth, the second with the seventh, the third with the sixth, and the fourth with the fifth.

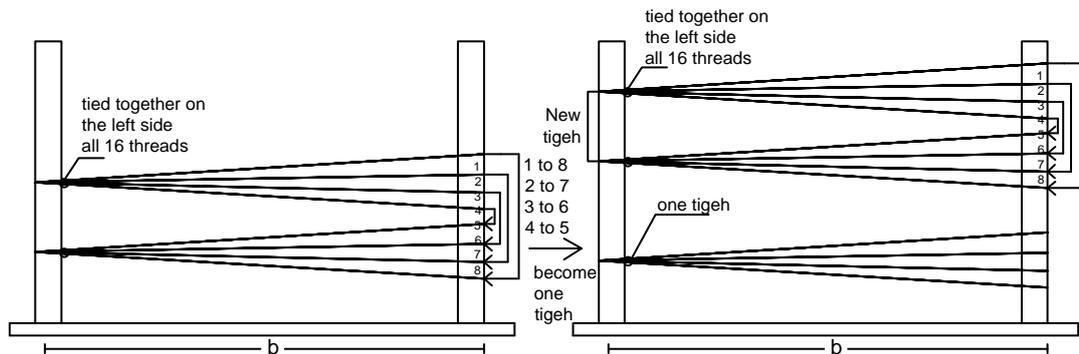


Figure 3. (left) The left image refers to the explanation of step two; (right) the right image refers to the explanation of step three.

- (3) The result from Step Two is referred to *tigh*; two *tigh* indicates one textile. In this case, the pattern maker does the *ngelimbengan* for four textiles, so this process is repeated four times, as shown in figure 3.
- (4) The combination of threads is slightly different when combining each set of *tigh* into one *bulan*. In this case the first combines with the fifth, the second with the sixth, the third with the seventh, and the fourth with the eighth. Once one *bulan* is set up, the process can be continued to create up to 12 *bulan*. See figure 4. for clarification.

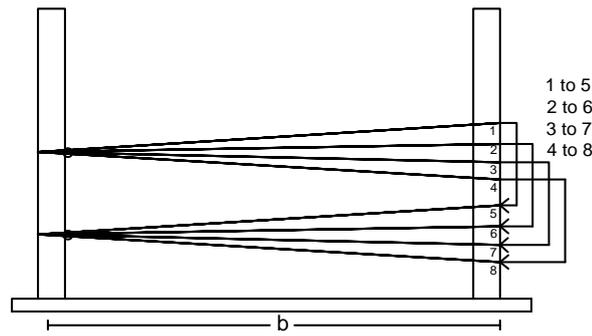


Figure 4. Combining *tigh* into *buluan*.

(5) The image below on the left shows 12 *buluan* ready for *sipat*, a process of providing lines on the yarn; once this step is done, the warp frame is prepared to be wrapped as can be seen on the image below, figure 5.

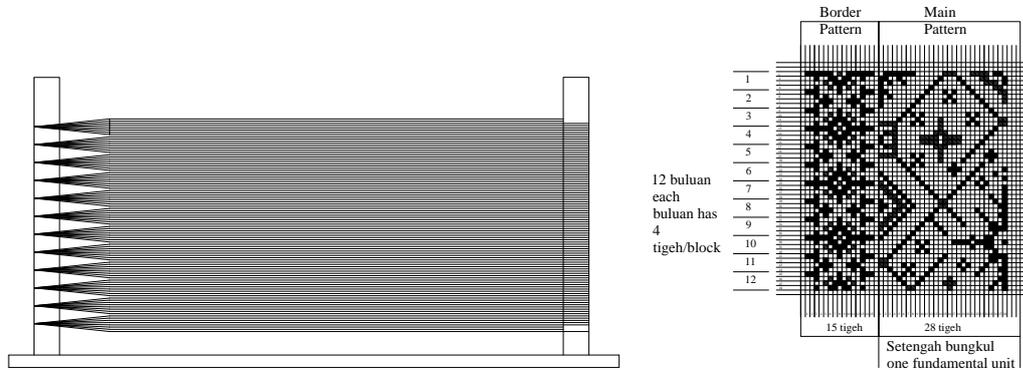


Figure 5. (left) Skeins with *sipat* ; (right) the fundamental unit of *Gringsing talidandan patlikur*

The weft threads

In general, the length of the textile is about two meters. Each textile has a repetition of the fundamental patterns—set of unit patterns that are repeated more than once to create full patterns. In general, there are only two length sizes for the *Gringsing* textile: regular and tubuhan, which is three times longer than the regular size. The *Gringsing* talidandan patlikur discussed here has a regular size, approximately two meters in length. The process of transferring yarns to a weft frame is referred to as *ngerengang* or *sutagi*. Based on the fundamental unit, *gringsing patlikur talidandan* needs 56 *tigh* for the main pattern and 15 *tigh* for the border patterns, meaning there are 71 *tigh* in total.

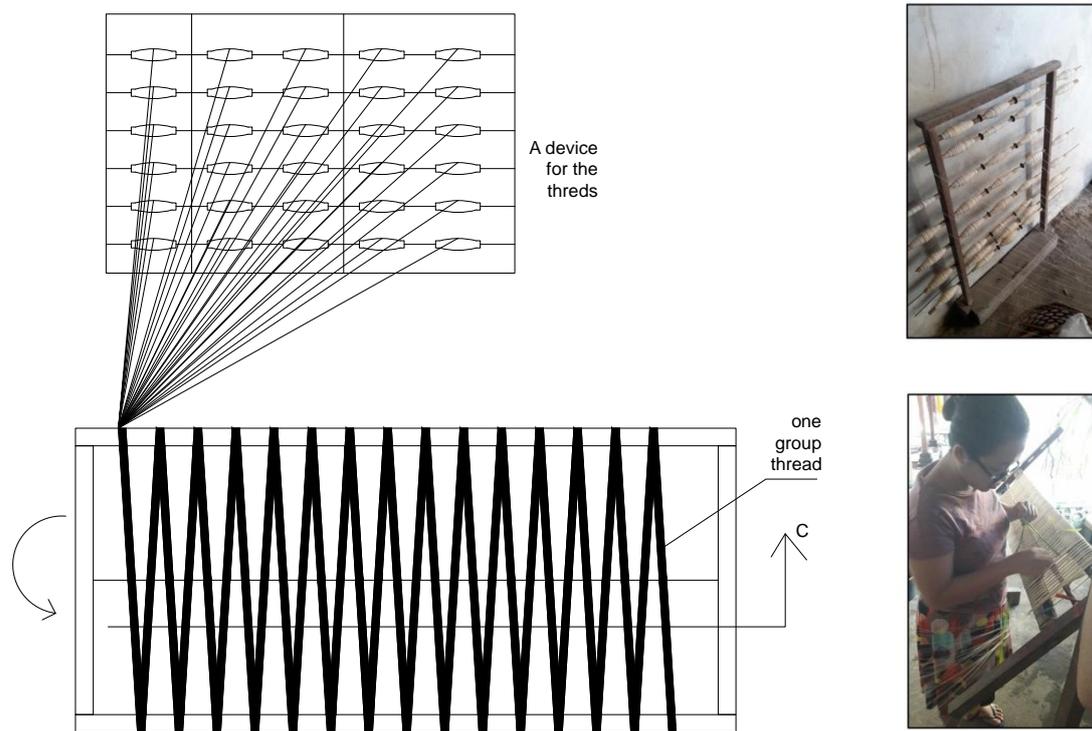


Figure 6. The Illustration of *ngerengang* for the weft frame

The *ngerengang* process transfers the threads from the spools to the weft frame. Since the pattern maker plans to create four textiles, one action of pulling the threads will bring 28 threads since one textile needs seven threads (usually one textile needs only four threads, but sometimes the maker creates more in case one break). The process of transferring the threads to the frame, or *ngerengang*, is done by spinning the frame on its axis. One *tigeh* has 28 threads, and one *buluan* for the weft frame consists of 3 *tigeh*. So, the weft frame for the *Gringsing patlikur talidandan* has 71 *buluan*, with three *tigeh* in each. The makers count one *buluan* by counting one *tigeh* on top and two *tigeh* on the bottom or two *tigeh* on top and one *tigeh* on the bottom. Each *buluan* is tied with a rope.

Wrapping the threads

The warp frames. Wrapping, or *medbed*, is a process of wrapping the threads to protect the yarn from the dyeing process. The wrapping occurs after the threads are in the frame. Both the warp and weft frames have been given *sipat*, a process of providing lines on the yarn, prior to the wrapping. The person doing the wrapping has to provide plastic ropes in two colors corresponding to the pattern's example, typically a blue rope for the threads to be dyed light yellow and a red one for those to be dyed red. Those not wrapped are dyed black at the end.

The weft frames. *Medbed* weft threads involves *ati*, which locates the middle of the weft yarn. The pattern maker always starts wrapping from the middle/*ati* before continuing to the left or right, meaning *ati* is the parameter for wrapping the weft yarn.

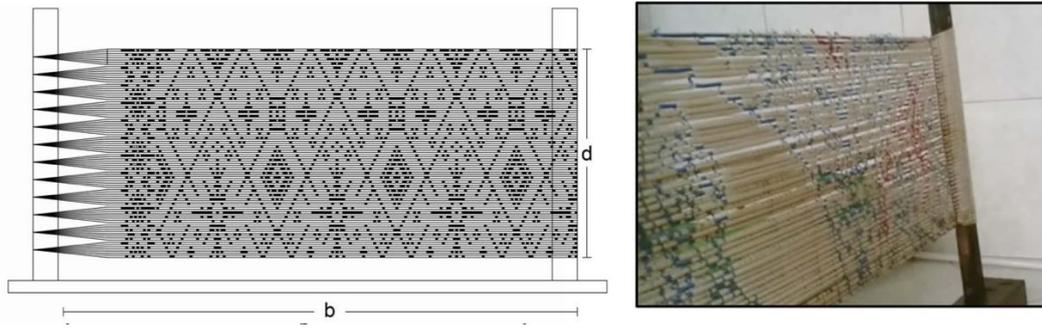


Figure 7. Wrapping the warp threads

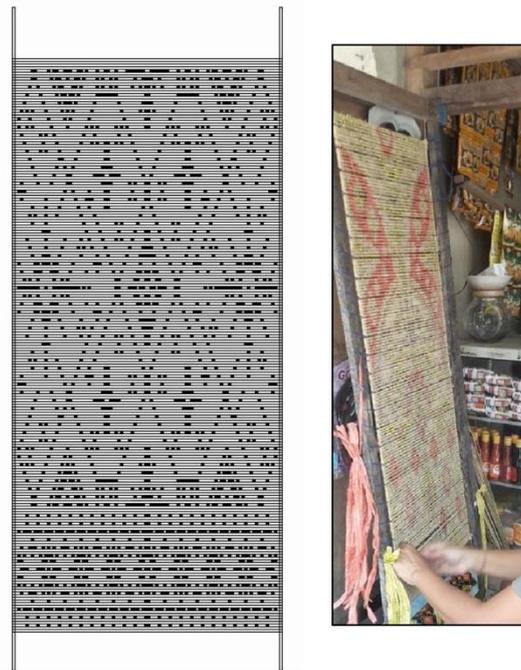


Figure 8. Wrapping the weft threads

Conclusion

Documenting the calculation of the weft and warp directly from the site is beneficial for both, people in the Tenganan Pegringsingan village as well as the outsider who are interested to know how the double-ikat weaving technique calculation on the warp and weft. This demanding process is needed to be preserved and documented as the process of transfer knowledge still rely on oral tradition. The warp and the weft are symbolically present the concept of balance that is believed by the people in the village. Intersecting horizontal and vertical threads that contain pattern is a representation of balance. In addition, the definition of *Gringsing* is no sickness or protection; ethimologically *geringsing* comes from the word *gering* means sick and *sing* means no. Thus, balance interlacement between the warp and the weft that contained patterns performs protection, which strengthens with calculation to match precisely the warp and the weft.

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