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Braids on Early Japanese Banners

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INTRODUCTION

The silk braids which adorn some banners in the Hōryūji and Shōsōin collections represent the four basic types of braids from the seventh and eighth centuries in Japan (Fig. 1). Of the four, type I, the square braid, is found primarily as hanging cord. Type II, the four-ridge flat braid with a twill pattern, was used as trimming around design figures.[1] Types III and IV, the oblique ribbed twine braid and the braid with a plain-weave pattern respectively, are flat and generally wider than the first two types. They compose the "head," "tongue," and "arms" of some banners, giving a necessary firmness to the shape of the banners (Fig. 2). Narrow braids of Type III were occasionally used as edge trimmings. To my knowledge, no banner adorned with braids from later era has yet been found.

Some braids in the Hōryūji collection have been attributed to be of Chinese origin.[2] It has been generally understood that braiding techniques were also brought to Japan by Koreans in the sixth century. I have not yet had a chance to trace the Japanese braiding techniques back to their origin.

The construction of these braids has puzzled modern braiders versed in traditional Japanese braiding techniques known as *kumihimo*.[3] Kumihimo braiders felt that the uniformity of the patterns as well as the difficulty of handling the large number of the fine gauge strands of the loose degummed silk in such long lengths as one finds in the ancient braids eliminated the possibility of their having been made with braiding techniques other than kumihimo. On the other hand, it proved difficult for them to replicate the pliancy of the old braids. They also realized that the build-in structural symmetry of ancient square braids does not agree with that of square braids made using kumihimo. I believe such discrepancies have arisen because the ancient braids were not made with kumi- himo techniques using elements with individually separated working ends, but rather with loop-manipulation techniques in which working ends of elements were tied into fixed pairs.[4]

I have reconstructed this method of braiding from three manuscripts written around 1800 AD and labeled it *kute-uchi*, or "hand-strap braiding," borrowing a term used in them.[5] The loops, or paired elements tied to the hand-strap, kute, forming a loop, are supported singly on the fingers or held in the hands. A beater is the only tool required. The adopted name, however, is used in a wider context than was meant in the nineteenth century, when the more elaborate techniques used in the middle ages had already been long lost.

Although similar techniques known collectively as loop-manipulation are found throughout the world, the Japanese methods have proven to be the most developed.[6] The most common world-wide practice is to support the loops singly on the fingers (finger-held method) and transfer each loop through the inside or over the other loops. In Japan, they are also held in the hands (hand-held method) and transferred around the outside of the other loops as

well.[7] Because of thesetwo modes of loop transfers and the fact that more loops can be used with the hand-held method, Japanese techniques have developed to a unique height during the twelfth century.

In order to prove my hypothesis that the ancient braids were made with loop-manipulation and not kumihimo, I conducted an extensive analysis of construction methods, and surveyed the ancient braid specimens by existing data from published sources.[8] I also made replicas and compared them with the originals. In each of four types of braids found on the ancient banners, kute-uchi braids proved closer to the original than kumihimo braids.

In *kute-uchi,* the elements are stretched between the fixed head end to working looped ends where they are mounted on the fingers or aligned over the hands (Fig. 3, 4). The braiding elements, even if they are soft non-plied silk such as used in Shōsin braids, do not tangle or wear out because they are transferred by one loop at a time while they are held taut. For braids with a large number of elements, several braiders collaborate sitting side by side.

The number of elements used in the old braids with a solid structure is a multiple of an odd number, such as 28 (=7x4), 56 (=7x8), and 72 (=9x8). To make the kinds of braids found in historical braids using kute-uchi would require either an odd number or a multiple of an odd number of loops, which makes the basis of the number of elements an odd number times two. In contrast, using kumihimo, the number of the loops would more likely be based on an even number, such as 32 (=8x4). Color designs of the majority of old braids are based on an odd number. If braiding starts with an odd number of loops in hand, as kute-uchi does, it is only natural to compose a color design based on an odd number. Moreover, the braids made using kute-uchi turn out to resemble closely the old specimens in pliancy and appearance, while using kumihimo techniques involve complex and contrived procedures yet results are far less satisfactory.

TYPE I: SQUARE BRAID. (Fig. 1 left)

Twenty of the 240 surveyed square braids in the Shōsōin collection are listed as having belonged to banners.[9] Six among them have been identified as hanging cords. Many among the 84 specimens listed as being of unknown origin could have belonged to banners. The majority of the square braids are 1.5 to 3.5 mm (1/16" to 5/32") wide and less than 100 cm (40") long.

Before examining the old specimens, let's discuss the kute-uchi construction procedure for square braids and the structural characteristics of the braid.

The principle for constructing square braids using kute-uchi or loop-manipulation is essentially the same regardless of ethnic origin, the number of the loops used or how the loops are held; An odd number of loops is more often used, and they are distributed initially so that one hand gets the extra one (Figs. 5, 6, left).[10] For an even number of loops, they are allotted equally to each hand (Figs 5, 6, right) While the maximum number of loops that can be used is usually seven for the single-person finger-held method, a larger number of loops can be used with the hand-held method.[11] The loops are transferred one at a time, from one hand to the other in one pick and twisted a half turn before being deposited on the other hand. The procedure is mirror symmetric

and all loops circulate in a serial order. In the structure thus produced, each of the two elements forming a loop is interlaced as an individual element composing two superimposed layers. This makes the number of elements of the square braid the number of loops times two.

A square braid is described more specifically as a four-ridge tubular braid with a twill pattern. The square braids constructed using loop-manipulation always have an irregular twill pattern. While those made with an odd number of loops having a twill pattern, such as 3/4/4/3 or 4/5/5/4 and a trapezoidal cross section, those made using an even number of loops have a twill pattern, which may be 2/3/4/3 or 3/4/5/4, and a cross section of an irregular quadrangle (Fig. 7). They would never have a true square cross section such as those made using the kumihimo technique. Since those made using an odd number of loops are less skewed than those made using an even number of loops, the former predominates in any culture where square braids are made by means of loop-manipulation.

The Shōsōin square braids

According to the statistics published in the survey records of the Shōsōin braids carried out by the Office of Shōsōin, out of 240 registered square braids, including those used for the banners, two thirds had the element number of an odd number x 2 (Tab. 1).[12] Those with elements of an even number x 2 amount to only one third. Actually, it is these statistical facts that prompted me to seek the possible use of loop-manipulation techniques in Japan. We already know that these statistics are not anomalies if the braids were made by means of loop-manipulation. This, however, was a great puzzle to the traditional kumihimo braiders because in the methodology of traditional kumihimo the norm for square braids is to have elements of an even number x 2, and a true square cross section. My examination of a 16-element Shōsōin square braid from a photograph among the Office of Shōsōin survey has shown that it did not have a true square cross section but had exactly the same skewed structure (3/4/5/4) as those made using kute-uchi. The statistics, the reaction of the traditional braiders to them, and the skewed cross section of the Shōsōin 16-element square braid demonstrate that the Shōsōin braids are not consistent with the norm of the methodology of kumihimo. The reason must be that the ancient method could only make skewed structures. Thus kute-uchi is the strongest candidate technique for these braids.

Another piece of evidence as strong as above statistics is the mirror symmetric color pattern of the Shōsōin square braids (Fig. 8). The patterns result from the mirror symmetric nature of the construction procedure, which is characteristic to kute-uchi. Such patterns do not occur if the braids were made using the rotationally symmetric kumihimo procedure with a conventional color arrangement.

TYPE II: FOUR-RIDGE FLAT BRAID WITH A TWILL PATTERN. (Fig. 1 second left)

This type of relatively narrow and thin braid suitable as trimmings can be made using a procedure similar to that of square braids. The loop is twisted only when it is transferred from, say, the left hand to the right and not twisted in the opposite movement (Fig. 9). All type II ancient braids characteristically have an even number of elements and the numbers of the float of the two center ridges

differ from each other by one. These characteristics match exactly those of braids made using kute-uchi. While braids with the same structure can also be made using kumihimo, these features are not characteristic of kumihimo braids of this type. The pliancy of ancient braids also matches kute-uchi in contrast to kumihimo braids, which are generally firmer.

THE CONSTRUCTION TECHNIQUES FOR TYPES III and IV

Whereas the techniques for type I and type II braids have been found among those reconstructed from historical sources, no Japanese bibliographic record has yet been found of those for type III and type IV braids. I, therefore, devised procedures to replicate these two types of braids, which work differently from those for the first two types of braids. Rather than constructing two superimposed layers as do the first two, they construct a single layer.[13] I have chosen loop-manipulation rather than other techniques as more viable techniques for constructuing these braids.

The devised techniques have proven to produce braids that have structural characteristics that agree with those of ancient braids.

TYPE III: THE OBLIQUE RIBBED TWINING BRAID (Fig. 1 second right)

In type III braids, paired elements form an oblique ribbed pattern by twining around the elements in countered courses and covering them entirely There are two varieties of type III braids in the collections; one has the same pattern all the way, the other a periodical pattern inversion. The color pattern used most often for the former is a chevron, and for the latter, double columns of diamonds. Braids composing the "head," "tongue," or "arms" of some Hōryūji banners and two narrower braids listed as a hanging cord and trimming of Shōsōin banners are of the former variety. Those with a pattern inversion exist only in Hōryūji collection. They may have been pendant ornaments to a canopy.

Each element of all Hōryūji type III braids consists of a single end of Z double-ply silk or gold threads. Paired elements are again Z-twisted. In the Shōsōin braids of this type, paired elements are twisted in Z in one half of the width and in S in the other.

My hypothetical procedure has been substantiated by a recently-uncovered fifteenth-century English treatise on finger-held loop-manipulation.[14] The treatise documents instructions that operate on the same construction principle as mine for making both varieties of oblique ribbed twining braids.

From several mis-aligned twining patterns found in some specimens as well as the fact that the smallest number of elements in the specimens is 36, I have proposed a hand-held method rather than finger-held (Fig. 10). The loops are twisted as they are passed one by one from one hand to the other. All loops in the Hōryūji braids are twisted counterclockwise, and are twisted opposite to each other in the right and left halves of the Shōsōin braids. The outermost loops are then transferred inside through the loops to the midpoint. The two transferred loops are then crossed, one passing inside through the other.

My analysis predicted that, in a braid made using this hand-held procedure, the width would tend to increase in the area where the rib pattern is less compact. I confirmed this tendency from the measurements taken of a photograph of Shōsōin braid # 32.[15] In kumihimo, there is no such relationship

between width and firmness of braids because the width is controlled by the braider and the firmness by bobbin weight. I also anticipated that the working mechanism of the procedure would make it impossible to produce a firm braid, such as those made using kumihimo. The firmness of the braids can be observe in the angle of their chevron pattern. When braids are firmer, the angle gets wider. To compare the firmness of the braids of this type, I measured the ratio of the length of a color pattern cycle to the width at the area where the pattern cycle is measured.[16] The ratios measured proved to be between 1.8 to 2.1 in kute-uchi braids and the Hōryūji and Shōsōin specimens, while the ratios for similar kumihimo run from 1.2 to 1.8 (Table 2). The important fact is that there is no way to change these ratios at the braiders' will for kute-uchi, yet they are remarkably close to that of the original. The wide variation in the kumihimo measurements indicates that various factors of the technique were tampered to make a better replication. As the data suggest, however, they have not quite been successful. The ratio for conventional oblique ribbed twine braids of today runs from 1.2 to 1.4.

TYPE IV: FLAT BRAID WITH A REGULAR INTERLACING PATTERN (Fig. 1 right)

The two variations in type IV braids in the collections are one with a plain-weave pattern and the other with a 2/2 twill pattern. All those used in the Shōsōin banners, forming the "head," "tongue," or "arms," are of the former variety. They were also used as edgings on large banners about 126 cm (50") wide.

Twenty nine braids of this type, listed as having belonged to banners, are 7 to 11 cm (2 3/4" to 4 1/4") wide. Their conspicuous design characteristic is that the oblique plain-weave pattern is formed by paired double-ply yarns twisted in opposite directions. That the paired yarns, not the individual yarn ends, indeed were used as the basic element in constructing these fabrics can be discerned from specimens decorated by beads strung through the paired yarns. The number of elements, ranging from 52 to 68, includes both odd and even numbers.

Of some wide braids of this type, the curvature of the elements that run obliquely in the structure reverses at mid-length, implying that the braids were made from the center towards the ends. The fact makes sense if loop-manipulation were used but not if kumihimo were used.

I have devised a finger-held method capable of producing flat braids with a regular pattern in which loops work as elements (Fig. 11). One of the two shanks of the loops is composed of an S double-ply yarn and the other of a Z double-ply yarn. Loops are held in the palms-up position and the small fingers are used to pick a shed and transfer the loops. This finger position complies with the Japanese folk practice of today[17] as well as those depicted in picture books of the Edo period (Fig. 3).[18] While the folk technique produces type I and type II braids described earlier, my devised technique constructs a flat braid with either a plain-weave or twill pattern, depending on the pick selected. Since each braider can hold only eight loops at most, several braiders, as many as nine, must collaborate to accommodate the required number of elements.

This method produces naturally the paired parallel elements that never cross each other and the uniform twists of the double-ply yarns, characteristic of ancient specimens. My conjecture that an analogous one-person technique must be used today in Peru and Bolivia to make three-strand flat braids that decorate ends of some woven bands, has been confirmed by Elayne Zorn.[19]

CONCLUSION

As a whole, I have found that by using kute-uchi, I could accurately and easily reproduce not only the ancient braids used on seventh and eighth-century banners but also most other braid relics produced throughout the middle ages in Japan. More importantly, with kute-uchi, I could account for the peculiarities of these braids.

My acknowledgement extends not only to those who directly helped me in this research, but also to those who spent countless hours measuring hundreds of specimens, without which my research would not have been possible.

NOTES AND REFERENCES

[1] Ridge: A longitudinal alignment of oblique floats.

[2] Matsumoto, Kaneo, "Kumihimo: sono hassei kara Hōryūji no kumihimo made=Braids: Up to the Hōryūji braids." *Nihon no bijutsu=Japanese Arts.* pp. 17-39, no. 308, 1992.

[3] In this paper the term "kumihimo" is used to refer only to the traditional Japanese stand-and-bobbin techniques or braids made using the technique, not as a generic word for braid or braiding. In kumihimo, the stand supports the component strands and the weighted-bobbins, on each of which an individual strand is wound. Each working end of the strands is free to each other. The strands are transferred in either a rotationally or mirror symmetric fashion forming an oblique interlacing pattern.

[4] Element: a single end or multiple ends of yarn set into the structure as one unit.

[5] Kinoshita, Masako, *Nihon kumihimo ko gihō no kenkyū = Study of archaic braiding techniques in Japan.* Kyoto: Kyōto Shoin, 1994; "A braiding technique documented in a nineteenth-century Japanese treatise *'Soshun hikō'*," *The Textile Museum journal 1986.* pp 47-65, 25, 1997.

[6] For the majority of individual reports on 1-m techniques, refer to Speiser, Noemi, *The manual of braiding.* pp 146-147. Basel: privately published, 1991 (1983). Kanomi, Takako, *Shinwa no hitobito = People of myths.* Kyoto: Shikōha: 1991, p. 260 (Eng. p. 321); Kitamura, Noriko, "Dōgu o tsukawazu ni kumu hōhō ni tsuite no kiroku=A record on a no-tool braiding technique," the Master's dissertation, Tama Art College, 1975; Lebedeva, N. I., "Prîadenie i tkachestvo vostochnykh slavîan v. XIX-nachel xx v. (Spinning and weaving in eastern Slaves in the 19th to early 20th c.)," *Trudy Instituta Etnografii im. N. N. Mikluho-Makalaîa* n. s., pp 497-506, 31, 1956. Two braiders in the altar piece, "Historia de la Virgen María (Story of the Virgin Mary)," att. Nicolás Zahortiga, 1465, Church of St. Mary of Tarazona, Spain; Many Japanese illustrations from 17th-19th c.

[7] The Sultanate of Oman is the only country other than Japan where hand-held loop-manipulation has been reported; Crocker G. and Glover B., "An Omani braiding technique fro camel reins," *The Journal of Oman studies.* pp 103-106, v. 5, 1979.

[8] Office of Shōsōin, Nara, Japan, *Shōsōin no kumihimo = Braids in Shōsō-in*, Tokyo: Heibonsha, 1974.

[9] Braids in Shōsō-in (Note 8).

[10] There are basically two ways of holding the loops in the finger-held method: palms-up, and palms-down. To transfer the loops, the index fingers are used in both; in the latter small fingers and occasionally ring fingers are also used.

[11] A one-person 9-loop procedure from Morocco has been reported by F. Sober, "Treatise on the making of laces," (see note 14) has one-person 8-loop procedures.

[12] Note 8, (Braids in Shōsō-in), p. 27 (Eng. p. iv).

[13] Note 5, (Archaic Braiding).

[14] "Treatise on the making of laces," *Tollemache book of secrets,* British Library, MS Harley 2320. Publication of Noemi Speiser's analytical research is forthcoming.

[15] Note 8, plate 71.

[16] This method is more accurate than measuring the angle by a protractor.

[17] Note 6 (No-tool braiding technique). Through my own enquiry, I received three more reports. Note 5 (Archaic braiding, pp.51-52.)

[18] Edo period = 1615-1867AD.

[19] Personal verbal communication, 1992.

Table 1. Statistics according to number of elements in the Shōsōin square braids.

no. of elements	odd no. x 2	even no. x 2	odd no.	unable to count
no. of specimens	160	78	(0)	2
%	66.7	32.5	0	0.8

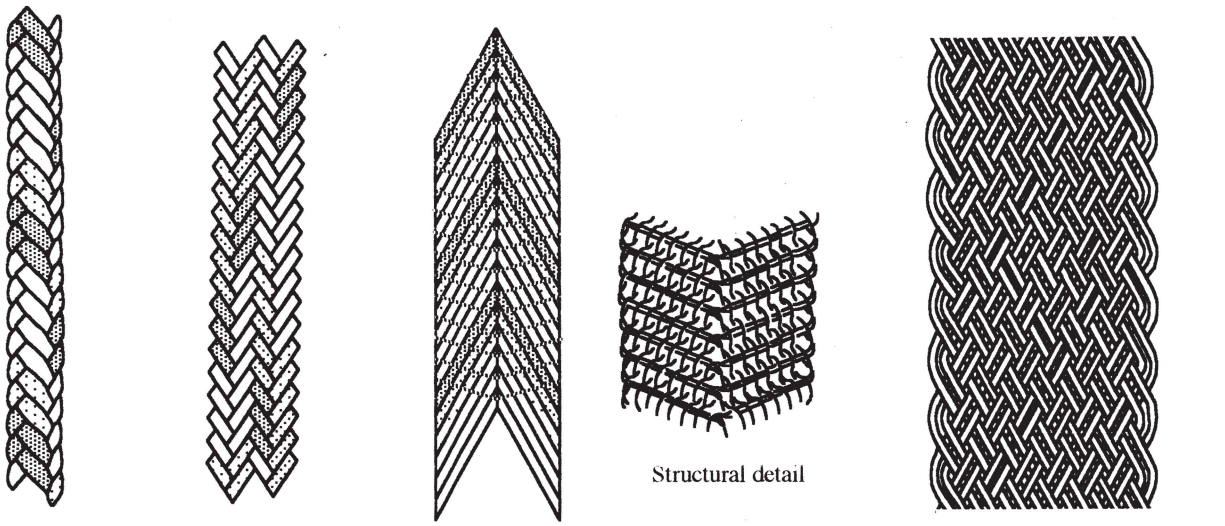
The number in parenthesis is added by M. K.

Table 2. The ratios of the lengths (H) of a color-pattern cycle to the width (W) of Hōryūji and Shōsōin braids, their replicas made using the loop-manipulation and those made using stand-and-bobbin techniques.

(Other than K. Kinoshita's and my own samplers, the measurements have been taken from photographs.)

Accuracy of measurement: 0.5 mm

	source of material	H mm	W mm	H/W	H/W mean value
specimen	*Braids in the Shōsō-in*	7.5	4	1.9	
#32	plate.71	8.5	4	2.1	
		9.5	4.5	2.1	
		10.5	5.1	2.1	2.1
no. of	replica	31	20	1.6	
elements	made using kumihimo	31	20	1.6	
36	(Dōmyō Exhibit '78)	31	20	1.6	1.6
	replica	51.5	30.5	1.7	
	made using kumihimo	58.5	33.5	1.8	
	(Dōmyō Exhibit '82)	58.5	33.0	1.8	1.8
	replica sampler made using	24.4	12.9	1.9	
	loop-manipulation	26.2	13.0	2.0	
	by Masako Kinoshita	27.5	13.6	2.1	2.0
specimen	*Braids in the Shōsō-in*	49.5	28.0	1.8	
#332	plate 22.	49.0	28.0	1.8	
		49.5	27.0	1.8	1.8
	sampler	37.0	27.5	1.3	
no. of	made using Kara-kumi	37.0	27.0	1.4	
elements	stand-and-bobbin technique	37.0	27.5	1.3	
92	by Kazuko Kinoshita	36.0	27.5	1.3	1.3
	replica sampler made using	51.5	28.0	1.8	
	loop-manipulation	53.1	28.0	1.9	
	by Masako Kinoshita.	52.9	28.0	1.9	
		52.5	30.0	1.8	1.9
no. of ele.	fragment of Hōryūji	9.7	5.6	1.7	
116	ribbed twine braid	10.5	5.6	1.9	1.8
no. of ele.	fragment of Hōryūji	7.5	4.2	1.8	
120	ribbed twine braid	7.3	3.9	1.9	1.9
no. of ele.	replica of a Hōryūji banner	119/2	48	1.2	
48	(Dōmyō Exhibit '79)	118/2	49	1.2	1.2



TYPE I
square braid
(16-element)

TYPE II
4-ridge flat braid
(18-element)

TYPE III
Oblique ribbed twine braid

Structural detail

TYPE IV
Flat braid with a plain-weave pattern

Fig. 1 Four basic types of braids in the Horyuji and Shosoin collections

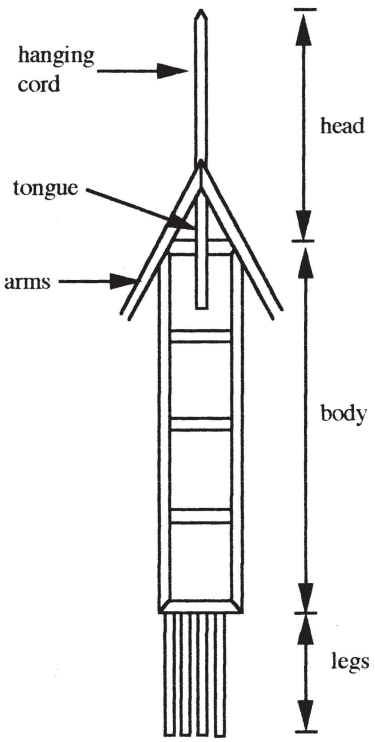
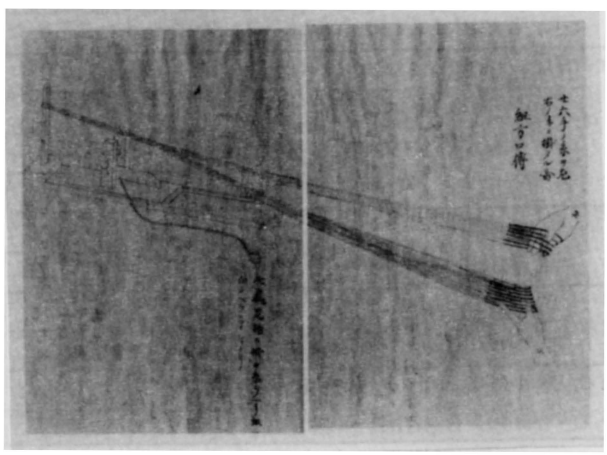
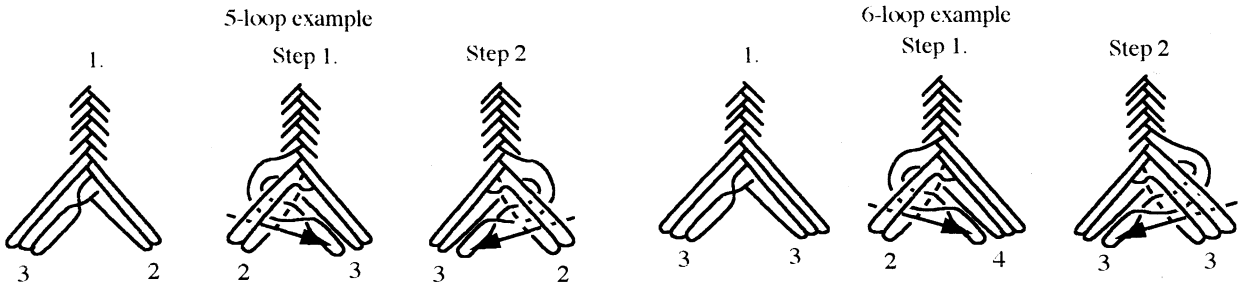


Fig. 2 Names of parts of a typical ancient banner.

◀ Fig. 3
"Braiders," in Wakoku shoshoku ezukushi=(Pictures of Japanese artisans) (1685) by Moronobu Hishikawa is an adaptation from a late 15th- c. picture scroll, Shichijūichi-ban shokunin utaawase emaki= (Poetry match of seventy-one pairs of artisans), ill. att. M. Tosa. The original has been lost.

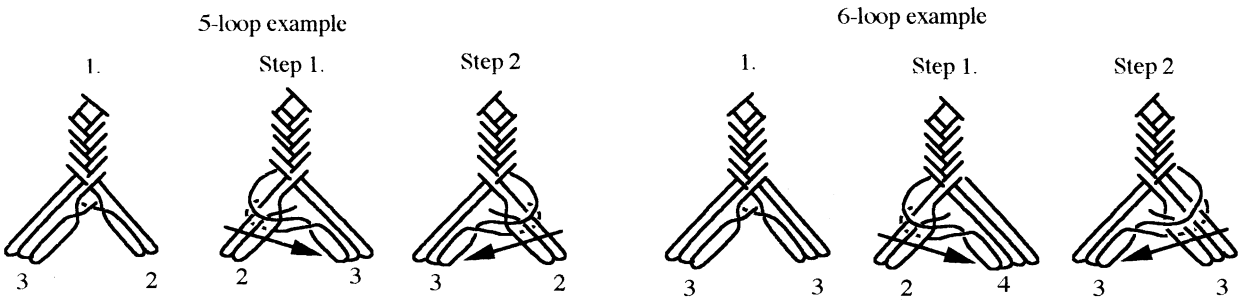
▼ Fig. 4
"The manner of holding the twenty-six strands in the left and right hands"; Braiding by oral transmission, from *Thesaurus for ceasing war*, ca 1800.





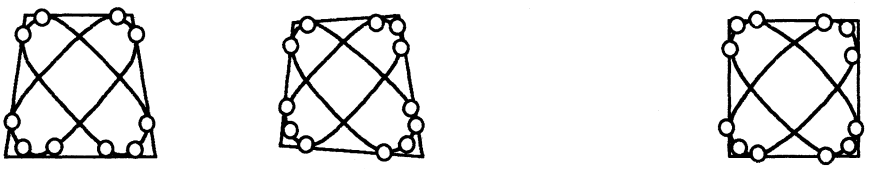
1. Initial allotment of loops. Step 1: transferred loop is twisted. Step 2: transferrd loop is twisted.

Fig. 5 Loop-manipulation procedure to make square braids, in which transferred loops go THROUGH the INSIDE of other loops. Used in both FINGER-HELD and HAND-HELD methods.



1. Initial allotment of loops. Step 1: transferred loop is twisted. Step 2: transferred loop is not twisted.

Fig. 6 Loop-manipulation procdure to make square braids in which transferred loops go AROUND the OUTSIDE of other loops: An option for HAND-HELD method.



with 5 loops.
3/2/2/3 twill

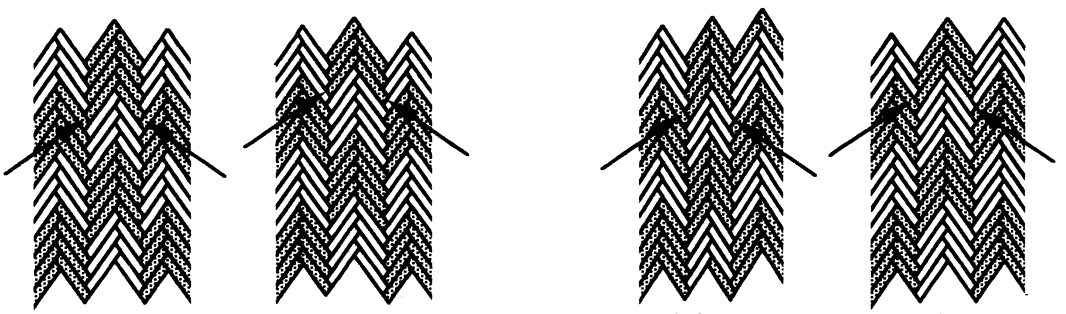
with 6 loops.
3/2/3/4 twill

12 elements (an even num. x 2)
3/3 twill

Structures of Shōsōin square braids have the same skewed cross sections as those made usin loop-manipulation:

Square braids made using the traditional kumihimo procedure have a true square cross section.

Fig. 7 Diagrammatic side view and cross section views of Shōsōin square braids.



14 elements

16 elements

Shōsōin braids have a mirror-image symmetric pattern; typical of loop-manipulation.

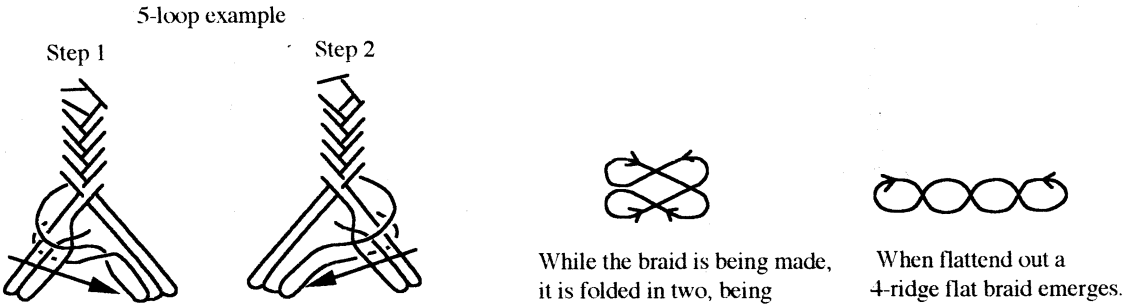
14 elements

16 elements

Typical color patterns of kumihimo square braids. 14-element square braids are not typical of kumihimo.

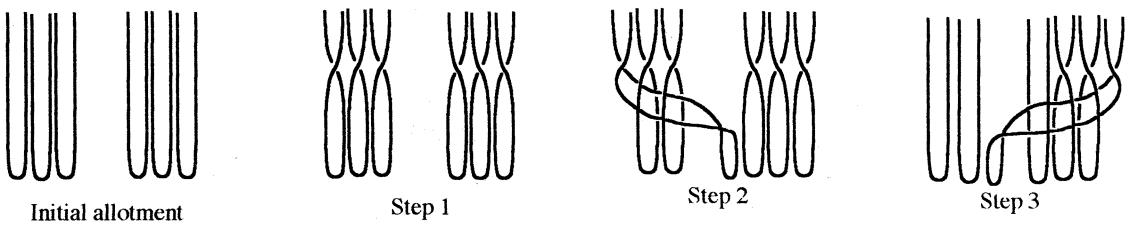
The outer-most ridges in each diagram has been added to show the connection of the pattern around the braids. Left two ridges and right two ridges are the same ridges.

Fig. 8 Flattened-out patterns of the Shōsōin square braids.



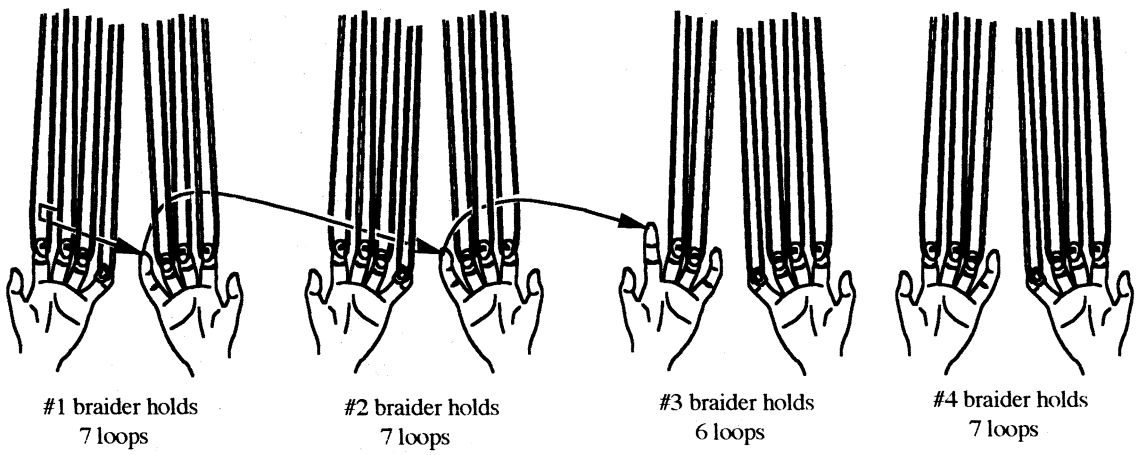
Step 1: Transferred loop is twisted.
Step 2: Transferred loop is not twisted

Fig. 9 4-ridge flat braid with a twill pattern



Intial allotment: Loops are distributed equally or one more to one hand than the other.
Step 1: Loops are twisted a half turn.
Steps 2 and 3: The outermost loops are transferred through inside of other loops. They are not twisted.

Fig. 10 Procedure to make oblique ribbed twine braids using loop-manipulation.



Step 1: The farthest-left loop is transferred to the left index finger of #3 braider.
Step 2: The loops held by #1 and #2 braiders are shifted back to the left. The right index finger of #2 braider is left empty and the left index finger of #3 braider is filled.
Step 3: The structure is tightened.
Then #3 and #4 braiders perform the mirror-image processes of steps 1, 2 and 3.
And the steps from the beginning are repeated.

Fig. 11. Loop-manipulation procedure to make flat braids with an oblique over-one-under-one interlacing. Example: Shōsōin braid #27. Number of elements:27