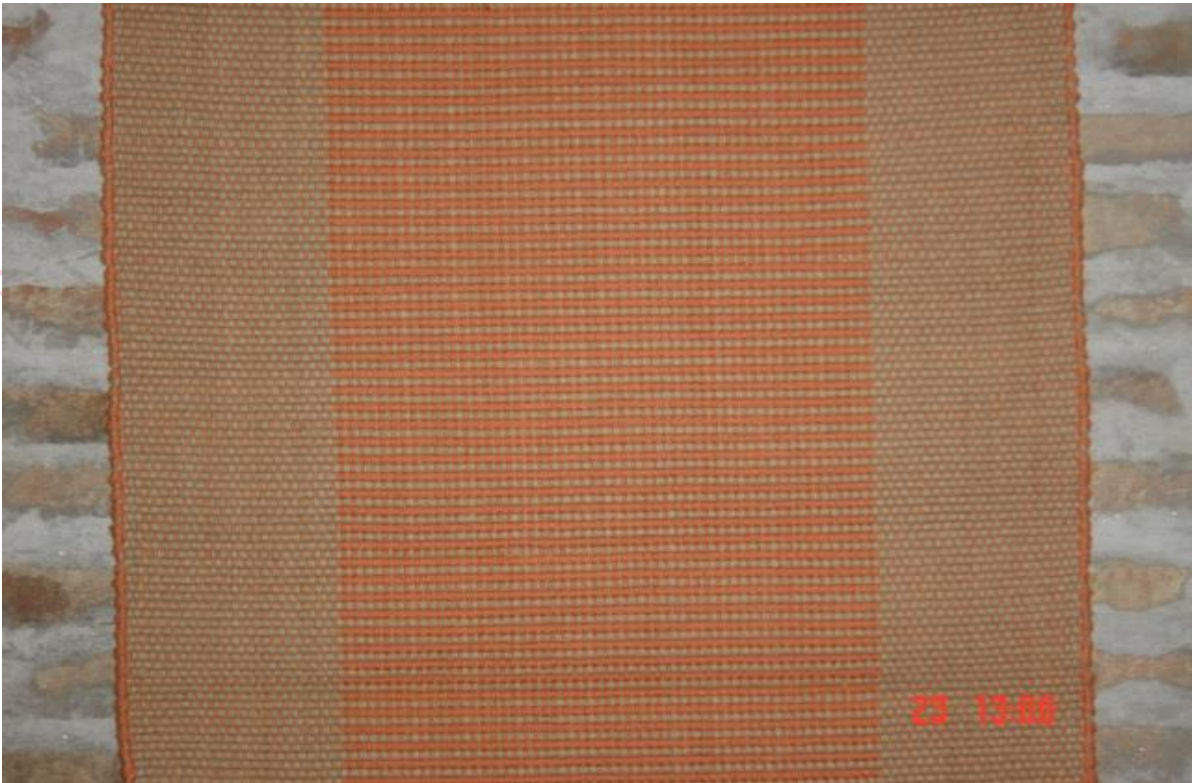


Fly Shuttle Durrie



(This document is based on durrie weaving on fly shuttle pit looms in the state of Delhi)

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1. Introduction

Till a few decades ago, the handloom durrie was considered a cheap substitute to cover the floor. It was treated as a utility item not a luxury product or statement of fashion. But now weavers have started using contemporary color and design to suit market demand and to face the competition from the carpet industry. Weavers have even started experimenting with various other raw materials like wool, chenille and even *chindis* (waste rags) apart from the normally used cotton yarns. The warp usually continues to be made of cotton yarn as it gives stability to the durrie.

A durrie is different from a carpet in not having pile as a carpet has. This makes it reversible unlike the carpet. The basic difference between a carpet and a durrie is that the durrie is made by weaving, while the carpet is produced by knotting pile yarn to warp. Durries are lighter in weight than carpets and are easy to maintain.

The invention of the fly shuttle in 1733 by the Englishman John Kay dramatically changed cloth production. The seemingly simple innovation was a major technological change. The increased speed that it enabled increased production by 4-5 times.

2. Region

Various types of durries are woven in different parts of the country. Each area has its own traditional designs, color combinations, motifs and even raw materials. With market integration, design and color are increasingly influenced by consumer demand or the requirements of buying agencies.

The fly shuttle process is used all over India in different regions to make different types of handloom fabrics and durries. Handloom durries also are of various types: *Panja* durries, fly shuttle durries, cut shuttle durries or durries woven on jacquard looms. Their cost varies depending upon their weight and process used.

Some of the handloom durrie production areas are:

Some of the durrie production areas are:

Dharwad in Karnataka

Coimbatore in Tamil Nadu

Salem for its silk and cotton durries

Sironj, Jhabua, Raigarh, Jabalpur and Shahdol in Madhya Pradesh,

Rajasthan, Uttar Pradesh, Punjab and Himachal Pradesh.

Warangal in Andhra Pradesh

3. Producer Communities

Traditionally the Ansari community was involved in handloom weaving in the areas around Delhi. Over the years, migrants from Uttar Pradesh and Bihar have trained in weaving and work under master craftsmen. Hence various castes and creeds are now involved in the activity.

4. Raw Materials

i) Yarn: Various kinds of yarn - cotton, wool, and chenille can be used to make a durrie on the fly shuttle pit loom. These yarns come in various specifications and are chosen as per the design requirement.



[Photograph 1: Bundles of Yarn]

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For weaving handloom durries, mainly cotton yarn is used for the warp and cotton yarn or wool for the weft, as per the requirement of the design. (Nowadays chenille and *chindis* are also used for the weft.). The unbleached cotton yarn is procured from market near old Delhi railway station. Cotton yarn is available at the rate of Rs. 65 per kg and the wool rate varies from Rs 150 to 200 as per the different specifications.

ii) Dyes: For fly shuttle durries usually the weavers use direct dyes, as they are cheaper. Dry cleaning is recommended for these durries as they are not colorfast.

Direct dyes: These dyes are also known as hot water dyes. Direct dyes can be used with hot water and require no binding or exhausting agents. They are convenient but lack in color fastness and wash fastness. They are used on cotton, wool, silk and nylon.

5. Tools Used for Making Fly Shuttle Durries

5.1 Taana Machine



[Photograph 2: Taana Machine]

The taana or warping machine is made of two basic parts: a big octagonal horizontal cylinder that rotates on its axis and a vertical frame on which a number of thread rolls can be attached.

The preparation of the warp requires a lot of space so it is usually done in the open.

5.2 Charkha



[Photograph 3: A charkha is used for making rolls or bundles of yarn]

5.3 Shuttles



[Photograph 4: Shuttle being used]

These are boat shaped wooden blocks that are pointed on both sides. They are scooped out within to contain the bobbin that is used for the weft or *baana*. The shuttle travels between the threads of the warp with the pull of the strings attached to the frame of the loom. This provides a catapulting effect, which makes it shuttle across the warp on the sill of the frame. It gets its name from this process. The weaver uses a number of shuttles in making one durrie: one shuttle for each different color.



[Photograph 5: Shuttle box]

5.4 Shuttle Box (Shuttle Runner)

This hollow part of the moving frame (*hattha*) is located at the ends of the frame. It is where the oscillating shuttle is kept Shuttle box is actually a part of Flu shuttle loom which makes it different from other available looms.

5.5 Gittas

These are plastic reels that contain the untangled yarn from the *charkha*. These reels are sent to the *taana* machine for making the *rula* log.



[Photograph 4: Shuttle being used]

5.7 The Fly Shuttle Loom



[Photograph 7: A fly shuttle loom]

The fly shuttle loom is a superior pit loom, which is locally called '*Japani* loom' (Japanese loom) by the weavers in Delhi. It is identified by the heavy wooden frames on which the *hattha* or beater is mounted.



[Photograph 8: Working with a pit loom]

One of the important features of this type of loom is that it has foot pedals and multiple harnesses as per the design requirement.



[Photograph 9: Working with a pit loom]

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Harnesses refer to the combination of pulleys and heddles, which raise and lower the warp threads. In the fly shuttle pit loom two pedals are used for plain weave and a maximum of four pedals can be installed for fabrics/durries with design as otherwise it becomes very difficult for the weaver to handle it.

The fly shuttle loom makes the weaving process much faster than the local pit looms, but the disadvantage of this loom is that it cannot make very intricate patterns.



[Photograph 10: Sleigh on a pit loom]

The whole loom rests on a frame of four vertical posts. In this loom, the sleigh carries a race board and 2 shuttle boxes, one on either side. The weft yarn is wound on to a bobbin, which is put in a shuttle. This is placed in one of the shuttle boxes either side.



[Photograph 11: Weaver pulling rope to move shuttle]

The momentum created by the pull of the rope (called *muttha* in local language) by the weaver is transferred through the knotted system of *doris* to the picker. This causes the shuttle to catapult across the sleigh. This is the major difference between the fly shuttle pit loom and the throw shuttle pit loom. The fly shuttle oscillating sleigh works at a higher speed than the throw shuttle sleigh, resulting in an increase in the rate of production. On this loom a weaver can weave an average 5-6 durries of 3 x 5 ft. size in a day.

The fly shuttle enables the weaver to propel the shuttle through a wider strip of cloth than would be possible without it. The width can go to a maximum of 6 feet for plain fabrics but for durries with designs it should ideally be not more than 3.5 feet or a maximum of 4 feet. Any wider would be difficult for a weaver to manage. The weaver uses one hand to move the

shuttle across the warp and the other to perform the combing to compact the cloth. This mechanism speeds the whole weaving process, leading to an increase in production.

6. Weaving Process for Fly Shuttle Durries

The process of making a fly shuttle durrie has the following steps:

6.1 Design

Buyers and design houses usually provide the designs to weavers. Designs are normally received as scaled down computer printouts (graphs) detailing pattern and color. The master weaver refers to the required design to prepare the warp and the *raach* (the vertical comb-like wires through which the warp yarn passes).

6.2 Dyeing

Color selection for dyeing the unbleached cotton threads depends on the colors present on the design. The dyeing process is usually given out to specialists called '*rangrej*'. Two basic types of dyes are commonly used for durries: direct dyes and vat dyes. Direct dyes are cheaper and are not colorfast. Mostly direct dyes are used for making fly shuttle durries. As they bleed on washing, retail houses recommend dry cleaning for these durries.

For dyeing, the yarn is stocked in the form of loose bundles knotted at the center. These are put in a tank (usually a rectangular container of size 5 x 4 x 4 ft) that contains boiling water to which the desired color of dye is added. The yarn is kept dipped for about 10 minutes and then taken out and dried. This process is repeated again to give the yarn lot a uniform color.

6.3 Yarn Opening for Weft

The dyed cotton threads come to the weaver in the form of bundles. This form of yarn needs to be stretched and reeled to make it free from tangles. This is done on the *charkha*. The loose bundle of yarn is put over the larger wheel of the *charkha* and the other end of the thread is tied to a small reel called *gitta*, which effectively works as the smaller wheel of the *charkha*. The *gitta* is then wheeled so the yarn is pulled from the larger wheel to the *gitta*. This form of the yarn is tighter, uniform and tangle free.



[Photograph 12: Lady operating charkha to make reels]

6.4 Warping

The master weaver now prepares the *rula* (log) with the warp, to be used by the weaver to make the durrie. For this purpose he uses a *taana* or warping machine. A *taana* machine is a much larger version of the *charkha* principle.

The thread rolls or *gittas* are put on the vertical frame of the warping machine. This is a movable frame that resembles an abacus. The ends of the thread are taken from the rolls, passed through another, smaller, grid-like frame with vertical metal wires that guides the thread, and are wound on the big wooden cylinder of the machine. This process starts from one end of the big octagonal cylinder and goes on till the entire cylinder is covered with yarn.

The craftsman uses a special visual measurement scale that consists of a spring with a small weight hung over it. The small weight slides over the spring, covering one coil of the spring with every revolution that the wooden cylinder takes. Normally the entire length of the spring scale can take 50 revolutions of the wooden cylinder. Once the desired length of yarn is wound around the cylinder, the log upon which the *taana* is to be wound is fitted into the blocks between the cylinder and the frame.

Then the craftsman puts a heavy weight across the cylinder. This is tied to the end of a rubber tube at one end of the wooden cylinder. The tube rests over the circumference of the wheel. This is done so that when the thread is pulled over the *rula* log it comes over the *rula* in a very tight fashion. The tightly wound yarn on this log is then provided to the weaver who uses it for the warp on the loom frame.

6.5 Weaving

As mentioned, fly shuttle durries are commonly woven on the pit loom. The weaver sits at ground level and his legs rest inside a pit that contains the pedals.



[Photograph 13: These pedals move the frames in an up and down movement]

For weaving, the warp from the *rula* (log) is bound on the two beams of the loom. It loops over another log called *kharag*. The warp is then guided in two layers by a flat vertical metallic reed till it reaches the *hattha* (the moveable frame used to beat the weft, which also carries the fly shuttle reel).



[Photograph 14: These pedals move the frames in an up and down movement]

The reed is a comb-like structure of metal wires. It maintains the distance between the individual warp threads. The design of the reed (*raach*) frame varies with each design and is made by an outside specialist; making the correct *raach* is very important to get the weave as desired. For plain durries the loom has two frames, but the number of frames can go up to a maximum of four depending on the complexity of the design.

Normally the weaver takes about an hour to make a 2 x 3 ft. durrie on a fly shuttle loom and makes about 10 duries a day. The maximum width that can be woven on the fly shuttle loom is 3.5-4 feet for duries with designs and 6 feet for plain duries.

The weaver uses the beater (*hattha*) to push back the loose thread that tails the shuttle into the system of weft threads. As the weaving progresses, he adjusts the tension of the warp using the tightening screws on the two loom beams.

7. Market

Usually these weavers sell their products through exhibitions (direct selling) or through exporters and retail stores (indirect selling). The domestic market for fly shuttle duries is growing day by day as they are cheaper, offer contemporary colors and designs and are also easy to maintain.

8. Development changes over the years

Over the years, iron reeds have replaced the wooden reeds used formerly. The iron reeds are stronger and last longer, thus being more economical in the long run. Colors and designs have changed over a period of time, to suit changing customer preferences.

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