

SILK WEAVING

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Weaving is the interlacing of the two systems of yarns, which interlace at right angles to each other.

The lengthwise thread are called **warp**. Individually they are known as **ends**.

The crosswise threads are called **filling** or **weft** or **woof**. Individually they are called as **picks**.

Weaving is done on a loom which makes it possible to interlace the warp and filling threads according to design. The lengthwise edges of the fabric are called **selvage** or **raw edge** or **self edge**.

After throwing process the actual weaving starts. Weaving consists of preparatory and actual weaving on handloom or power loom.

Preparatory Waving: The object of preparatory process is to prepare warp and weft yarns for weaving. In silk weaving normally sectional warping is followed.

Warping consists of two parts. *viz.*, 1. Warping Creel and 2. Warping Machine

Creel: Creeling machine depends upon the system of weaving, investment and space *etc.*, *eg.*, for power looms high capacity creel may be used. Say creel with a capacity of 400 bobbins is quite ideal. The creel is horizontal type. There is a big platform either side of it there is a bobbin creel having spindles to hold bobbins. In the center there is a passage so that the worker can move about inspecting and arranging threads from bobbins. Thread from all bobbins are passed through various thread guides and single thread stop motion device *etc.*, Afterwards threads are collected and passed through a reed before making a section to be wound on the warping drum. After making certain length of section, number of each sections are prepared on the drum depending upon the total number of ends or width of the fabric required. For wider fabric, number of threads will be more and number of sections to be prepared on warping machine is also more. *eg.*, if creel capacity is 400 bobbins so each section will have 400 threads. If fabric width is 60", number of ends per inch is 100. Total number of ends required for the fabric will be $60 \times 100 = 6000$ ends that means 15 sections are prepared on the warping machine. In case of

handlooms small warping device is used. Sometimes warp prepared by hand process combining the number of threads making into sections or ball and finally warping sheet is prepared for handloom weaving.

Beaming: The winding of sectional warp from warp drum to the weavers warp beam is called beaming. It is done by passing the ends over a whip role, over and under the lease rods and then through the current of heddle eyes of the respective heddles, it is then drawn through the reeds.

Pirn winding: Pirn winding is necessary to prepare weft yarn. Small pirns are prepared so that it is mounted in the shuttle. Generally pirns are bigger in power looms and the content of yarn in it will be more. So pirn winding machine is used for power loom weaving. Pirn winding machine may be automatic or non automatic. Whereas for handloom pirn is smaller, preparation is ordinary and hand operated charaka is used for the preparation. The automatic pirn winding machine has all the features of controlling tension, distribution of coils and also has instantaneous stop motion device in the event of thread breakage. So package of pirn is more perfect and content of yarn is more, so that replacement of pirn in the shuttle during weaving will be less thereby efficiency of weaving is more.

Drawing: It is done from warp beam. The ends pass over a whip roll, over and under the lease rods and then through the correct heddle eye of the respective heddles, it is then drawn through the dents of reeds. The drawing of threads from reed is called reeding.

Gating: It means fixing of the warp beam, heddle shaft and reed on the loom are at right height and angle is called gating.

Weaving Mechanism: The actual mechanism of weaving is involved in primary and secondary motions. The chief motions of the loom are

1. Primary motions:
 - a. Shedding
 - b. Picking
 - c. Beating up
2. Secondary Motions:
 - a. Let off
 - b. Take up

3. Auxiliary Motions:
- a. Warp stop motion
 - b. Weft stop motion
 - c. Shuttle trap motion
 - d. Shuttle change motion
 - e. Weft replenish

Primary Motions:

Shedding Motion:- The division (separating) of warp ends into upper and lower system of thread to permit the shuttle to pass through the space that has been formed. The warp ends are drawn through heddle eyes. It has incorrect manner and turning ones the crank shaft of loom. A shed is formed with each turn. Sheds should not be too large but sufficient for shuttle motion. Shuttle is generally smallest turn. Sheds should not be too large but sufficient for shuttle motion. Shuttles are generally smaller in hand loom. In case of hand loom it is done by manually in power loom by power.

Picking Motion:- This is the actual passing of the shuttle through the shed of the loom. The shuttle passes over the lowered ends of the shed and under its raised ends. The shed allows the shuttle to pass through it and thereby make it possible for the shuttle to deposit the pick or filling yarn. The shuttle contains a pirn of filling yarn, which emerges through a hole in the side as the shuttle moves across the loom. A single crossing of the shuttle from one side of the loom to the other is known as pick.

Beating Up:- It consists in beating up the last pick of the weft to the fell of the cloth with the help of reed in the slay. A slay swing forward to beat the last pick of weft and goes backward to allow a shuttle to pass through shed.

Secondary Motions:

Let Off Motion:- The Let-off motion is an arrangement to let the warp from the weaver's beam at uniform rate thus maintaining the appropriate warp tension throughout the weaving process.

Take Up Motion:- The take up motion is to draw a fabric to the cloth roller regularly and withdraws the cloth from the weaving area at a regular or constant rate so as to

give the required pick-spacing (in picks/inch or picks/cm) and then winds it on to a cloth roller. Take up motion determines the number of ends and picks per centimeter or inch.

In India, handloom weaving is dominating and 95% of our silk goods are produced on handlooms. Handloom silk industry is at large in Tamilnadu, Karnataka, Andrapradesh, Uttarpradesh, West Bengal, Assam and Kashmir. At present about present 5% of the silk goods are produced on power looms. Since handloom weaving sector needs cheaper silk irrespective of quality, charaka silk reeling is still predominant in India. Out of the total silk fabrics produced about 70% production is of sarees in India.

Handloom: Handloom is very simple device in weaving and it is manufactured locally. There are two types of handlooms

One is pit loom and another is frame loom. Pit loom is traditional one and frame loom is slightly modern one. Space required will be less in case of frame loom as compared to pit loom. But pit loom has some advantages.

1. It can be installed in any ordinary house where height is limited. So dobby and jacquard mechanism can easily be assembled on the pit loom, where as frame loom needs more height.

2. Pit loom is sturdier so less vibration occurs during weaving.

In pit loom warp is prepared in the ball form, about 5 sarees can be woven with one warp preparation. At a time one saree length of warp is taken for weaving, weft is introduced by means of throw shuttle or fly shuttle. Production rate is very much limited. About 3 meters cloth (plain) may be woven per day with efficient worker. Preparatory work (warp and weft preparation) will be done by family members and actual weaving on loom will be done by the head of the family. Normally weaver can earn in the range of Rs. 15 to 20 per day (1984 data). There are about 1, 90, 000 silk hand looms in India.

Power Loom: There are 14,000 power looms are engaging in the silk weaving. Most of the big units are in government sector. However, small unit of about 10 power looms are in private sector. In power loom there are two types of looms. One is over

pick type and another is under pick type. Under pick type is more suitable for silk weaving. The weavers warp beam (containing longer length of warp) can be prepared elsewhere on warping machine and with that weaving can be continued for even months together. In power looms pirn is also bigger, so that quantity of yarn available in each pirn will be more so that replacement of pirn in the shuttle will be minimized to run the loom more effectively, and one weaver attends one loom. Production is about 10-15 meters per day (8 hours). Power loom requires superior quality yarn to withstand the higher speed and tension during weaving. Normally charaka silk is used for weft and cottage basin or filature silk is used for warp since warp ends undergo tension during weaving.

Automatic Loom: Automatic loom is not used for silk weaving in our country, but in some advanced countries automatic looms are used for silk as in case of cotton and synthetic weaving. In automatic looms certain operations are done automatically that is automatic stoppage of loom in the event of any warp end breaks, automatic let off, automatic pirn changing and even automatic stoppage of loom on account of weft breakages are all essential features of an automatic loom mechanism. So when all these operations are automatically controlled, weaver can attend 6-10 looms. The production is also more.

The major types of fabrics are plain cloth, check fabrics and sarees.

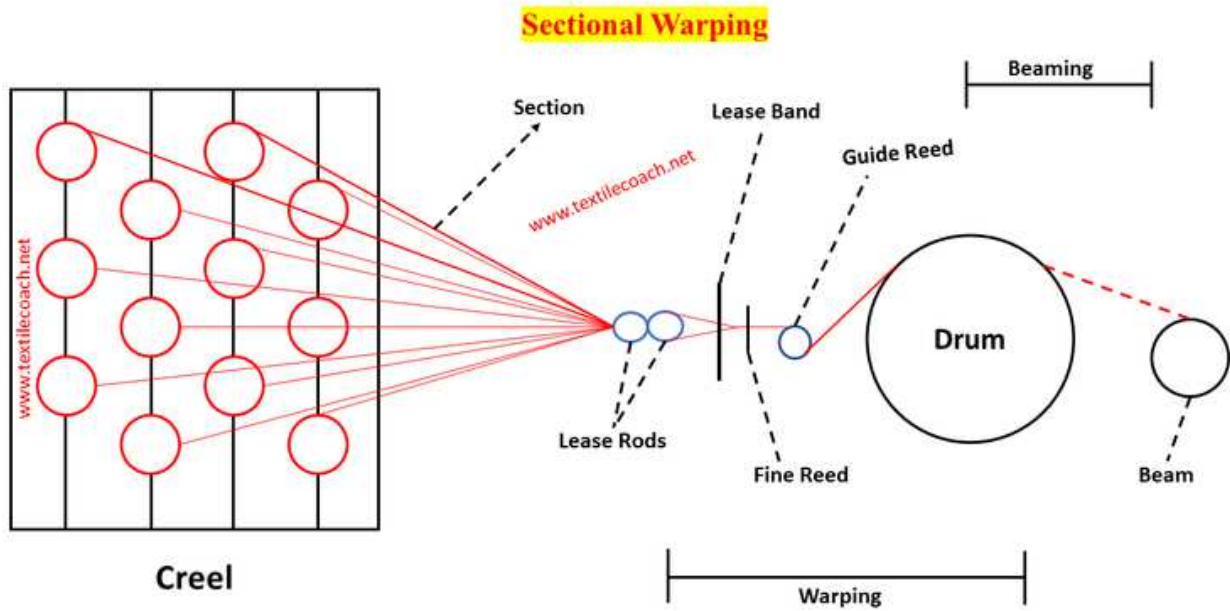


DIAGRAM SHOWING OVERALL WEAVING PROCESS

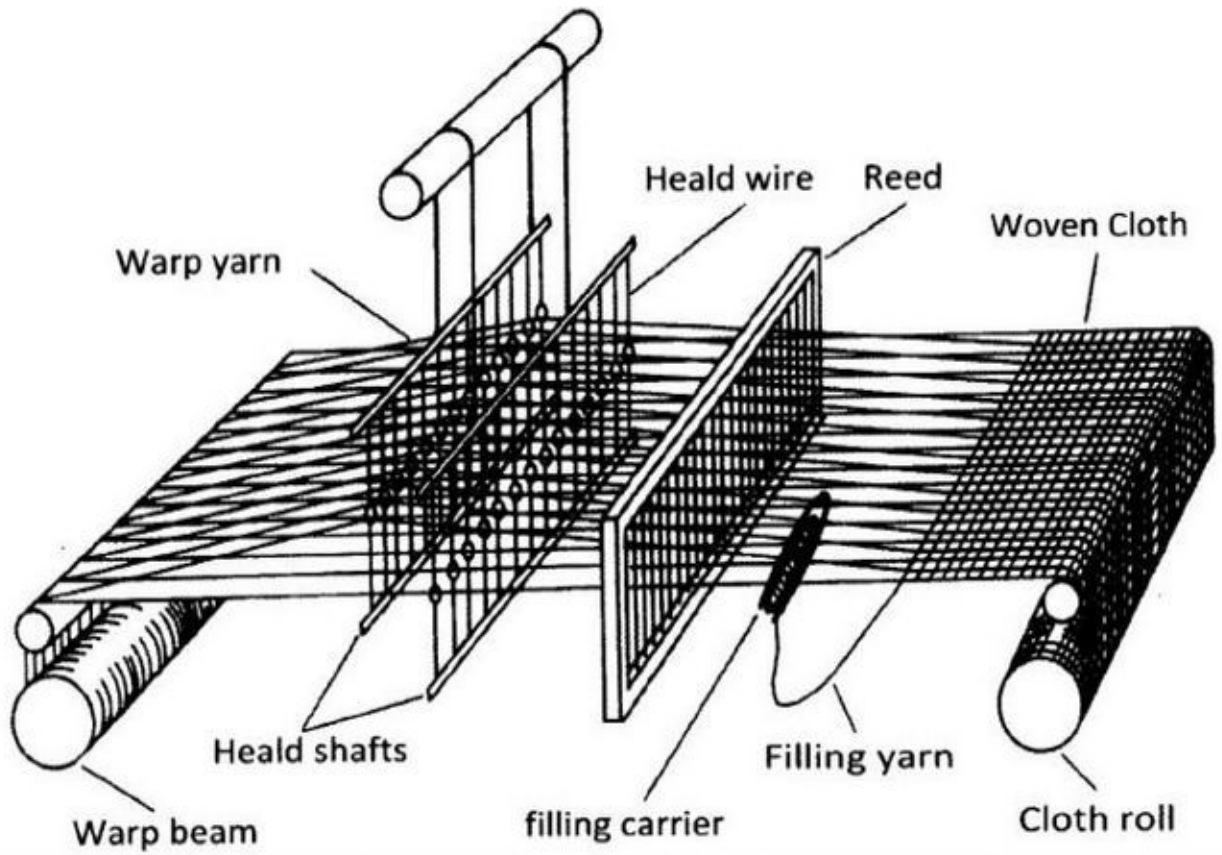


DIAGRAM SHOWING WEAVING PROCESS

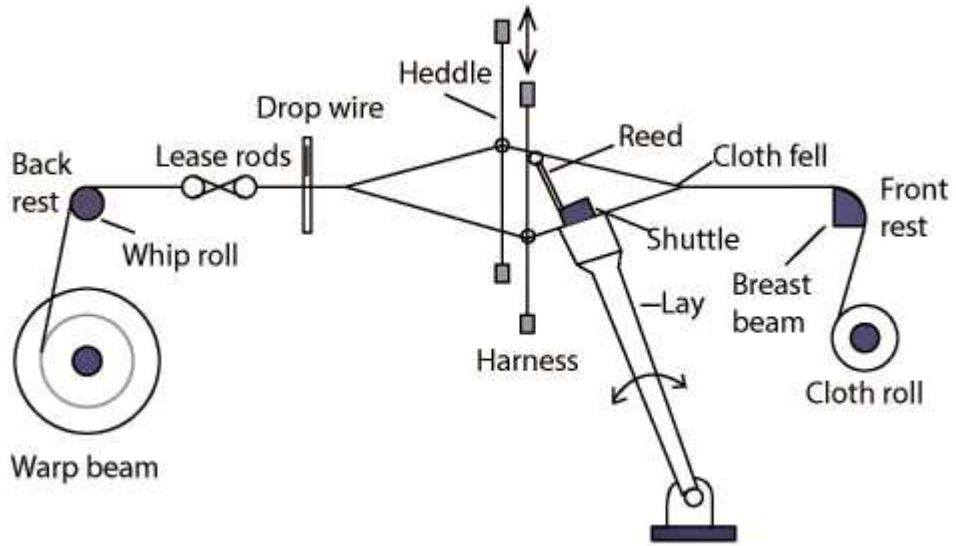


DIAGRAM SHOWING DIFFERENT PARTS OF WEAVING MACHINE



EMPTY SHUTTLE



PIRNS



PIRN FILLED IN SHUTTLE
