CHAPTER : 21

WEAVING

With the development of human civilization, man progressed in textile manufacturing. Man's attraction for nature's admirable creation led to the discovery of soft, flexible, strong fibers from which textiles are manufactured.

Table 21.1: Textile Manufacturing

Textile manufacturing without fibers	Textile manufacturing using fibers	Textile manufacturing from yarn	
— Paper (napkins)	— Numdah (woolen clothes made from action of heat and pressure)	— Twisting (shoe lace)	
— Plastic film and sheet (for support to the lower layer of textiles)	— Needle punch method (clothing with net)	— knitting	
— Polyurethane foam (insulator of sound and heat)	— Branded clothes without weaving (on heat ---clothes using heat and pressure)	— Warp knitting	— Weft knitting
— Island clothing (people living on islands wear layered clothes)	— Mechanically branded clothing, double weaved (blankets, carpets, etc)		— Ex- raschel, tricot
	— Laminated clothing (quilt, foam on clothes, clothes pasted on clothes)		

Textile manufacturing is done in 3 ways— (Table 21.1)

1. Textile manufacturing without fibers– The textile prepared in this method is less lasting and less useful. Paper napkins, plastic films, plastic sheets, polyurethane foam is prepared under this method.
2. Textile manufacturing using fibers– From this method numdah, needle punched clothes, branded clothes without weaving, laminated clothes, and mechanically prepared branded clothes are made.
3. Textile manufacturing from yarn or thread– Laces are prepared by twisting two or more

threads together, clothes from knotting is prepared under this method.

Different methods of textile manufacturing using the above 3 ways are—

1. **Numdah formation**— This is a fiber using textile manufacturing method. Numdah is generally prepared from woolen fibers because wool has the quality of setting under the effect of temperature and pressure. Therefore, numdah formation is a technique in which loosened and moistened short fibers are twisted together and then they are subjected to pressure and heat into forming of cloth. Today automatic machines are available for numdah formation. The length and breadth of numdah is according to requirements but its thickness is not more than 3" and not less than 0.01". Blankets, shawls, coats, caps are are also using this technique.
2. **Knitting–** This is a thread using textile manufacturing technique. Knitted fabric consists of a number of consecutive rows of interlocking loops. As each row progresses, a newly created loop is pulled through one or more loops from the prior row, placed on the gaining needle, and the loops from the prior row are then pulled off the other needle. Woolen apparels from cotton, sweater, socks and shawls from artificial fibers are knitted. Knitted apparels take the shape of body.
3. **Braiding or lace–** Braid means interlocked lace. Two or three laces are interlocked together to form flattened, thin or round strips. These strips are stitched on the corners of Kashmiri shawls. Lace can be prepared by both hands and machines. For making laces, special needles like Croatia, tatting. To make apparels beautiful and attractive braids or laces are used.
4. **Weaving–** This is an ancient and popular technique of textile manufacturing. A longitudinal and a transverse thread is used which are called warp and weft respectively. These two threads are interlaced at right angles to form a fabric.

Process of weaving—

The weaving process consists of five basic operations, shedding, picking, beating-up, left off and take up.

1. **Shedding:** Separating the warp yarns into two layers by lifting and lowering the shafts, to form a tunnel known as the 'shed'.
2. **Picking or Filling:** As the harnesses raise the heddles which raise the warp yarns, the shed is created. The filling yarn is inserted through the shed by a small carrier device called a shuttle. A single crossing of the shuttle from one side of the loom to the other is known as a pick.
3. **Battening or Beating-up:** The portion of the fabric that has already been formed but not yet rolled up on the take-up roll is called the fell. After the shuttle moves across the loom laying down the fill yarn, the weaver uses the reed to press (or batten) each filling yarn against the fell.
4. **Let off and Take up:** The warp yarns are unwound from the warp beam during the above three processes. The woven fabric is wound on the cloth beam in the above three processes.

The above operations must be synchronized to occur in the correct sequence and not interfere with one another.

Types of weaving– Weaving of clothes is done

using a loom. Before the invention of loom, the process of weaving took lot of time and labor. With the help of loom the process has become simple and easy. Initially a handloom was used and now a mechanical loom is used for weaving. Mechanical loom takes less time, effort and produces more quantity of textile than a handloom.

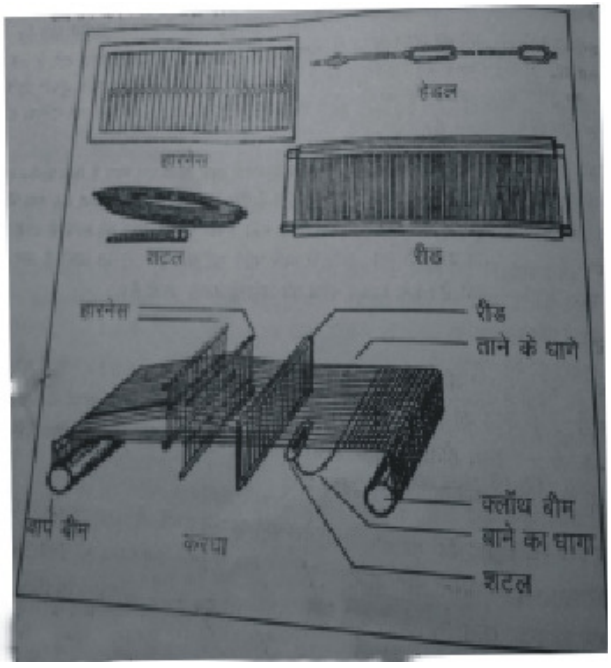

Figure : 21.1 (Different Part of Loom)

Loom:

A loom is a device used to weave cloth and tapestry. The precise shape of the loom and its mechanics may vary, but the basic function is the same. Following are the parts of a loom:

1. **Warp beam**– It is cylindrical in shape and is at the back side of the loom. The warp sheet is wound on this beam. The end of warp sheet is tied to the cloth beam. This warp beam continuously moves, as the weft thread fills up it slows down the speed and loosens the thread so that the warp thread can now be filled and weaving continues.
2. **Cloth beam–** It is fixed on the front side of loom. The end of warp sheet is tied to it. As the weaving starts, the fabric or cloth gets wound on it. That is why it is known as cloth beam.
3. **Harness–** It controls the warp thread and helps in weaving. It is a frame with thousands of wires known as heddle. There is a small hole in the heddle from which the thread reaches the warp beam. One thread from one heddle comes out. Harness controls the up and down motion of thread.

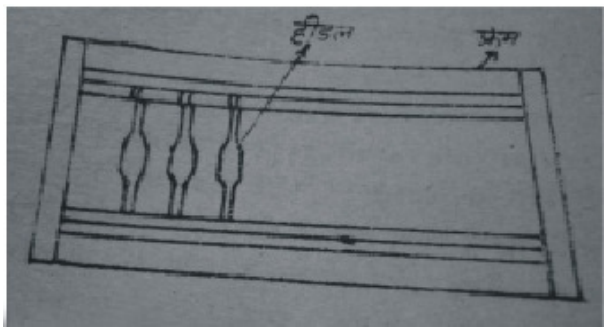

Figure : 21.2 (Harness its Hiddle and Fram shown)

4. **Shuttle–** It is basically a weft carrier and helps in interlacement of the weft with the warp threads to form cloth. The shuttle passes from one end of the loom to the other.

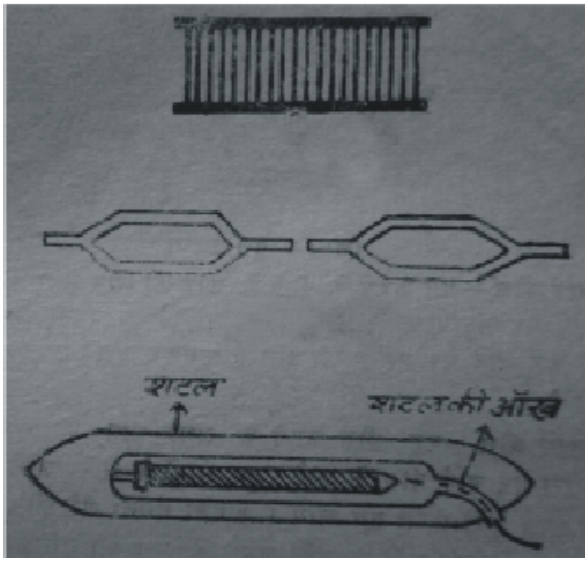

Figure : 21.3 (Shuttle)

moves across the loom, the reed is used to press or batten the yarn to make the fabric.

The type of weaving depends on the technique of braiding. There are two types of weaving– (1) Simple weaving, (2) Fancy weaving. Here we will discuss three types of weaving.

1. **Plain Weave:** It is the most simple and most common type of weaving. In plain weave, the warp and weft are aligned so they form a simple criss-cross pattern. Each weft thread crosses the warp threads by going over one, then under the next, and so on. The next weft thread goes under the warp threads that its neighbor went over, and vice versa. To bring a difference in plain weaving, wrap and weft threads of different thickness are used. It is strong and hard-wearing, used for fashion and furnishing fabrics. Canvas, muslin, chiffon, organza are made using a plain weave.

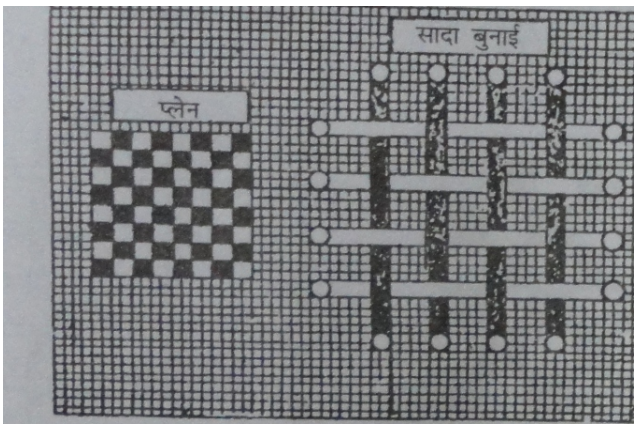

Figure : 21.4 Plain Weave

2. **Twill weaving–** A twill weave can be identified by its diagonal lines. This is done by passing the weft thread over one or more warp threads then under two or more warp threads and so on, with a "step," or offset, between rows to create the characteristic diagonal pattern. Soiling and stains are less noticeable on the uneven surface of twills than on a smooth surface, such as plain weaves, and as a result twills are often used for sturdy work clothing and for durable upholstery. Denim, for example, is a twill.

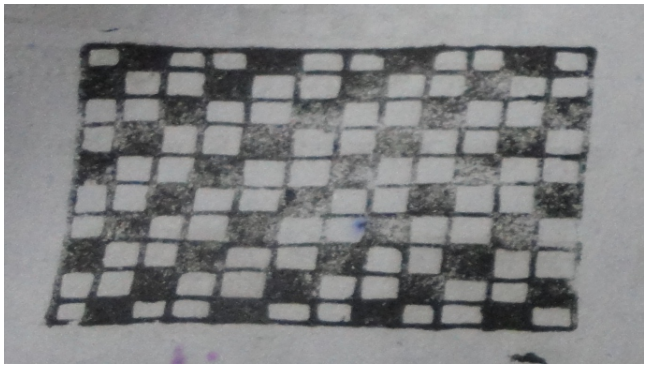

Figure : 21.5 Twill weaving

3. **Satin weaving–** Satin is a weave that typically has a glossy surface. Satin is usually a warp-faced weaving technique in which warp yarns are "floated" over weft yarns, although there are also weft-faced satins. This makes the surface glossy. The satin weave is characterized by four warp yarns floating over a single weft yarn, which makes only warp thread visible and hides weft. Fabrics made form silk, rayon and chemical fibers are prepared in the mems. These fabrics are beautiful and are especially worn on special occasions. This weaving is not very durable and strong.

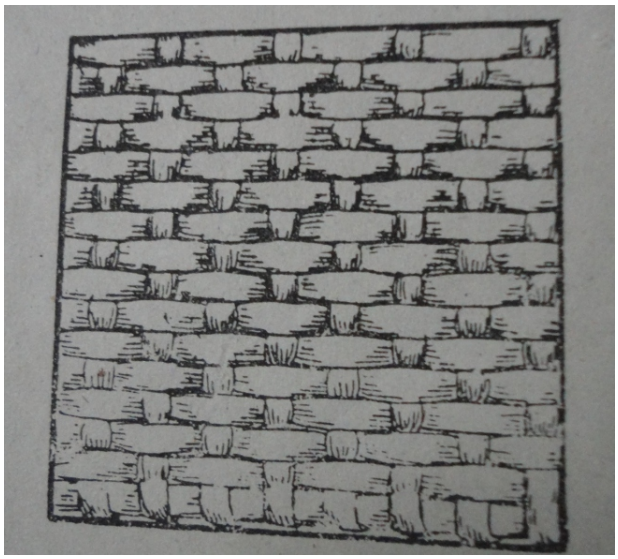

Figure : 21.6 Satin weaving

Table 21.2: Stitches of weaving

Back stitch	Straight stitch	Tuck	Misc

Table 21.2: Classification of weaving

Simple	Fancy
Plain	Pile
Rib	Dobby
Satin	Double cloth
Selin	Crepe
Basket	Corduroy
Twill	Velvet
Honeycomb	Leno
Huckback	Paracord
	Swivel

Table 21.3: Lace and net

Croatia	Novelty lace	Needle made lace	Shuttle	Pillow lace

Selvage:

A selvage or selvedge is a self-finished edge of fabric. The selvages keep the fabric from unraveling or fraying. In woven fabric, selvages are the edges that run parallel to the warp and are created by the weft thread looping back at the end of each row.

Table 21.4: Selvage

Plain selvage	Cut selvage (small fabrics like towel, handkerchief, napkin, etc)	Tape like selvage	Fused selvage (fusing the end fibers by melting)

Coefficient of fabric:

The quality, durability, working depends on the density and compactness of weaving. This dense weaving depends on the number of warp and weft threads. The More the number of warp and weft, the more durable, strong, smooth and dense the fabric is.

The number of warp and weft present in one square inch of fabric is known as coefficient of fabric. Number of warp + number of weft = fabric coefficient

Balance of fabric:

The proportion of warp and weft in fabric is known as balance of fabric. If the wrap and weft are equal then the balance of cloth is good. one imbalance can deteriorate the quality of fabrie.

IMPORTANT POINTS:

1. Textile manufacturing is done using fibers and threads by felting, knitting, braiding, weaving, etc.
2. Numdah, mechanical branded clothes, laminated clothes are made using fibers.
3. Using thread fabric is made by knitting,

braiding, weaving, etc.

4. Knitted fabric consists of a number of consecutive rows of interlocking loops.
5. Warp and weft are interlaced at right angles to form a weaved fabric
6. The main parts of a loom are warp beam, cloth beam, harness, shuttle and reed.
7. The process of weaving involves shedding, picking, battening, let off and take up.

EXERCISE:

1. Choose the correct option:

(i) The fabric is prepared from
(a) Fibers (b) Thread
(c) Fiber and thread (d) None of these

(ii) The parts of loom are
(a) Carding (b) Spinning
(c) Warp beam and cloth beam
(d) Weaving

(iii) The quality of fabric depends on
(a) Number of warp and weft
(b) Process of knitting
(c) Strength of cloth and warp beam
(d) Selvage

(iv) The strongest fabric is made using
(a) Plain weave (b) Twill weave
(c) Satin weave (d) Fancy weave

2. Fill in the blanks:

(i) Clothes made from woolen fibers are called ———-

(ii) ——— is used for weaving clothes by the process of shedding, picking, etc.

(iii) Clothes made from ——— technique takes the shape of body.

(iv) ——— performs the function of battening during weaving.

3. Explain the different ways of textile manufacturing.
4. How is numdah prepared?
5. What is a cloth beam?
6. Write names of five fancy weaves?
7. Write a paragraph on twill weaving.
8. What is a loom? Explain the different parts of a loom.
9. Explain the process of weaving and types of weaving.
10. Explain plain and satin weave with diagrams.
11. What do you understand by selvage, fabric coefficient and fabric balance?

ANSWERS:

1. (i) c (ii) c (iii) a (iv) b
2. (i) numdah (ii) loom (iii) knitting (iv) reed