MODULE 38 - COTTON YARN

OBJECTIVES

After going through this documentary students will be able to understand the following: -

1. Process of conversion of raw cotton into cotton thread through spinning process.
2. Effect on environment by cotton factory.
3. Health hazards involved to the workers in the production of cotton threads due to cotton dust.
4. Precautions that can be taken to prevent air population in the environment.

SUMMARY

Cotton is picked from cotton plants in the field and compressed into large bales. The bales often contain dirt, broken pieces of cotton boll, seeds, and other impurities, so cleaning is the first step at the yarn mill which is done in the blow room. The bale is broken; the fibers are opened by comb like device, mixed together and cleaned. The cleaned cotton fibers are termed laps. The laps are fed into a carding machine that separates' the fibers. This is done through the carding process which involves cleaning, combing, and sorting the fibers thereby producing slivers used for processing the thread. Then comes a draw frame responsible for drawing the fiber into narrow bands for carded and combed yarn. Then comes the speed frame stage in which the roving's made. Then is the ring frame in which ring travels on the small plastic tubes known as bobbins which are wounded with the processed thread. It is also responsible for reducing the thickness of the thread. This is followed by autoconer process in which the thread wounded on several small plastic bobbins is wounded on a bigger cone either automatically or manually. The last step is the conditioning step in which thread is conditioned under vacuum, particular temperature and steam for improvising the quality and strength of the thread which is then packaged for manufacturing textile.

TRANSCRIPTION

Introduction

Cotton, a soft, staple fiber was first cultivated 7,000 years ago, by the inhabitants of the Indus Valley Civilization and today, India is one of the largest cotton producing country and M.P. is known as the cotton bowl of India.

Cultivation

Cotton is grown with long, hot dry summers with plenty of sunshine and low humidity in the form of bolls around the seeds of the cotton plant, a shrub native to tropical and subtropical regions around the world.

Harvesting

Cotton is harvested or picked, either manually or mechanically. Manual picking is very labour intensive, time consuming and thus expensive. Mechanically, cotton is harvested by cotton pickers or cotton strippers, which is much faster than manual picking.

Cotton Ginning

After harvesting, the cotton fiber is collected and transported to a cotton gin, where the cotton fibers, also known as lint, are separated from cotton seeds and is then compacted in bales and stored and further transported to the cotton yarn mills.

Cotton Yarn

At the cotton yarn mill, raw cotton is processed and converted into thread used for manufacturing cotton textile. For this conversion, a series of detailed mechanical procedure is followed.

- **Blow Room**
  Cotton picked from cotton plants, often contains dirt, broken pieces of cotton boll, seeds and other impurities, so opening and scrutinizing is the first step carried out in blow room. As cotton bales come from various regions, therefore these are mixed and fed into bale- plucker, which is used to pluck the cotton heaps using high- pressure air suction.
- **Carding**
  Carding process combines the different fibers into a homogeneous mix. This machine consists mainly of one big roller with smaller ones surrounding it. The cotton leaves the carding the carding machine in the form of a sliver, a large rope of fibers.

- **Drawing**
  In this, as many as 8 slivers are combined. Each sliver will have thick and thin spots, thus by combining several slivers together a more consistent size can be obtained. This process is known as Draw frame.
  Draw Frame produces 2 types of yarns-:
    - A normal yarn by carded process, and
    - A super fine yarn by combed process.

  In Carded, the yarn is further drawn and woven on bobbins, and is a bit non-uniform. Whereas, in Combed, the fiber yarn shorter than half inch are removed and then is further drawn and slightly twisted into a more thinner and uniform strand. Which is more fine and improvised in strength, is wound on bobbins.

- **Speed Frame**
  After the yarn is combed or carded, the yarn is reduced to a finer thread in this process by giving more twist, thereby, turning the yarn into a more regular and even thread, which is then winded on to a tube. This is also known as Roving Frames.
- **Ring Frame**
  Ring spinning is a continuous process, in which the thread is passes around the ring, and is woven on small plastic tubes or bobbins through a ring traveler.
- **Auto Coner**
  In this, the thread wounded on several small bobbins is collectively wounded on a bigger cone- like shape. This is also known as auto- winding.
- **Conditioning**
  The final thread is sent into a conditioning machine where it is treated in vacuum with steam and kept for a particular time period. This process strengthens the thread and gives it a lustrous finish.
- **Packing**
  The conditioned thread spools are then packed as per the customers' requirements.

Health Hazards

Cotton being a natural fiber, is non- injurious to those who use it, but for those who manufacture it, it might turn into a threat, as the, working conditions in cotton mills are usually not healthy.

Hot and humid air required to prevent the thread from breaking and a temperature of 65 to 80 F and 85% humidity, air thick with the cotton dust leads to

BYSSINOSIS, which is a lung disease. The cotton dust air leads to skin infections, eye infections, bronchitis and tuberculosis.

Conclusion

Thus, cotton fiber when converted into textile, it proves out to be soft and breathable and therefore is the most widely used natural fiber in the world. It is also used to make basting thread and fabrics like linen, rayon, etc. which have plant origins.

GLOSSARY

Bale: A bale is a bundle of raw cotton.

Boll: The boll is the rounded mature seed pod of the cotton plant. It is made up of separate compartments which are called locks, in which cotton seeds and lint grow.

Break Spinning: This is an alternative name for open-end spinning.

Carding: This is a process by which cotton fibers are cleaned and strengthened.

Combed: This is an industrial yarn preparation. During the combing process, fibers are combed to make them parallel in the sliver and short fibers are removed.

Continuous spinning: A system of spinning in which the fiber moves through the process without interruption, eg ring-spinning.

Cotton: Cotton is a tropical and subtropical herbaceous plant of the genus Gosspium of the mallow family Malvaceae. There are two major species of the genus Gosspium in current production - G. hirsutum, commonly known as upland cotton and G.barbadense or pima cotton.

Cotton spinning system: This refers to the process originally developed for spinning cotton but now also used for other fibers.

Count of Yarn: This is the number indicating the mass per unit length or the length per unit mass of yarn.

Drawing: This is a process by which cotton fibers are further strengthened after carding. The drawing forms the fibers into a loose rope called a drawn sliver.

Fiber: A cotton fiber is classified in four ways; by its length, micronaire, strength and uniformity. The fiber typically accounts for approximately 35% of the weight of a seed cotton, though this proportion varies.

Ginning: This is the process of separating the cotton fibers from the seeds.

Ginning Outturn: This is the ratio of lint to seed cotton produced by the ginning process.

Length: This is the average length of cotton fiber after the ginning process.

Lint: This is raw ginned cotton which is ready for baling. It is obtained by the ginning process once the cotton seed, leaves and casing have been removed.

Linters: These are the short fibers which remain on the cotton seed after ginning.

Mercerization: This refers to the application of an alkaline solution to cotton cloth or thread to strengthen the cotton and to make it hold the dye better.

Open-end spinning: This is a process by which yarn is spun from a broken-up sliver or roving.

Opening: This describes the process of separating fibers from the pressed bale.

Organic Cotton: This refers to organically grown cotton using crop rotation, beneficial insects, compost and other farming methods in place of chemical fertilizers and intensive farming techniques.

Picker: This is a machine which separates and cleans the fibers of cotton.

Ring-Spinning: This refers to a system of continuous spinning of staple fiber.

Roving: This refers to a thin strand of cotton fibers ready for spinning.

Seed Cotton: This refers to unginned picked cotton.

Sliver: This is a loose rope of cotton fibers. A card sliver is thicker and has more tangled fibers than a drawn sliver.

Spun Yarn: This refers to yarn spun from staple fiber held together by twist.

Trash: Trash refers to the leaves, stems and other unwanted plant material in harvested cotton.

Universal Cotton Standards: This refers to American Upland Cotton Established in 1924 as an aid to promoting domestic and foreign trade and is Recognized by 18 countries in Europe, South America and Asia.

Weave: The manufacturing of cloth by the interlacing of yarns

Yarn Number: Cotton yarn is measured by yarn number, based on how many hanks (840 yards) there are in 1 lb of yarn. Higher numbers have finer thread.

FAQs

1. How is cotton yarn made?
Ans. At the textile mill, bales are opened by machines, and the lint is mixed and cleaned further by blowing and beating. Lint that is too short for this use is separated and sold for use in other industries. Usable lint consists of fibers about 1 inch to 1 ¾ inches long. The mixed and fluffed cotton goes into a carding machine which further cleans the fibers and orients them lengthwise, side by side. The combing action of the carding machine finishes the job of cleaning and straightening the fibers, and makes them into a soft, untwisted rope called a sliver (pronounced sly-ver). The spinning devices take fibers from the sliver and rotate them up to 2,500 revolutions in a second twist that makes yarn for weaving or knitting into fabrics.

2. What products are produced by yarn spinning mills?
Ans. Products include acetate and acrylic yarn, made from purchased staple; carded, carpet, combed, and cordage yarn (all of cotton); crochet yarn; and cotton, silk, wood, and manmade staple.

3. What do yarn spinning mills specialize in?
Ans. Yarn Mills primarily engaged in spinning yarn wholly or chiefly by weight of cotton, manmade fibers, silk, wool, mohair, or similar animal fibers.

4. How does cotton get made into yarn then used to make fabrics?
Ans. You get your cotton put it in water then as it is soggy pull it really hard then cut it into thin pieces using a special machine.

5. What is Mercerized Cotton?

Ans. Mercerized cotton is a special kind of cotton yarn that is more lustrous than conventional cotton. It is also stronger, takes dye a little more readily, makes the yarn more resistant to mildew and reduces lint. It also may not shrink or lose its shape as much as "regular" cotton.

6. Why are yarns twisted?
Ans. Yarns are twisted to give them strength and smoothness; a clockwise twist is known as the Z twist and a counterclockwise twist is known as the S twist.

7. Where does cotton come from?
Ans. Cotton is a soft, staple fiber that grows around the seeds of the cotton plant (Gossypium) ChaCha.

8. What is a Cotton scope?
Ans. Cotton scope is a new, rapid accurate way to measure cotton maturity.

9. Does cotton come from sheep?
Ans. Cotton comes from cotton plants, harvested on cotton farms. Wool comes from sheep.

10. Does alcohol come up on a cotton swab?
Ans. Oral alcohol swab testing only detects the most recent use, generally with in 24 hours.

11. Does cotton come off of trees or a bush?
Ans. Cotton is a soft, staple fiber that grows around the seeds of the cotton plant, a shrub. The shape of cotton is known as a boll.

12. What does cotton boll mean?
Ans. Cotton boll is the name of the rounded seed pod of the cotton plant. The fibre harvested for cotton develop within the boll and are part of it. See the Web Link to the left for more information.