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## 1. Basic Textile Terms of Spinning:

**Fiber:** The fundamental component used in making textile yarns and fabrics. Fibers are fine substances with a high ratio of length to thickness. They can be either natural (e.g. cotton, wool, silk etc.) or synthetic (e.g. polyester, nylon, acrylic etc.).

**Blow room Lap:** The Loose strand, roughly parallel, untwisted fiber sheet produced in blow room.

**Chute feed system:** It is a system of feeding small tufts of fibers directly from blow room to a series of cards, arranged in a circuit through pneumatic pipe.

**Sliver:** The strand of loose, roughly parallel, untwisted fibers produced in Carding.

**Roving:** The soft strand of carded/combed fibres that has been twisted, attenuated, and freed of foreign matter, which is a feed material to spinning.

**Yarn:** A continuous strand of textile fibers that may be composed of endless filaments or shorter fibers twisted or otherwise held together.

**Spinning:** The process of making yarns from the textile fiber is called spinning. Spinning is the twisting together of drawn out strands of fibers to form yarn.

### Yarn Count/Sliver Hank

Yarn count is the numerical expression of yarn, which defines its fineness or coarseness. (Linear density).

### Yarn count systems

Indirect system: English count (Ne), Worsted Count etc.

i.e. Higher the yarn number, finer the yarn.

Direct System: Tex, Denier

i.e. Higher the yarn number, Coarser the yarn.

Similarly numerical expression of fineness or coarseness of Lap, sliver & roving are called Hank.

Note: English (Ne) count system is commonly followed in India.

English Count: No. of Hanks of length 840 yds weighing in 1 pound

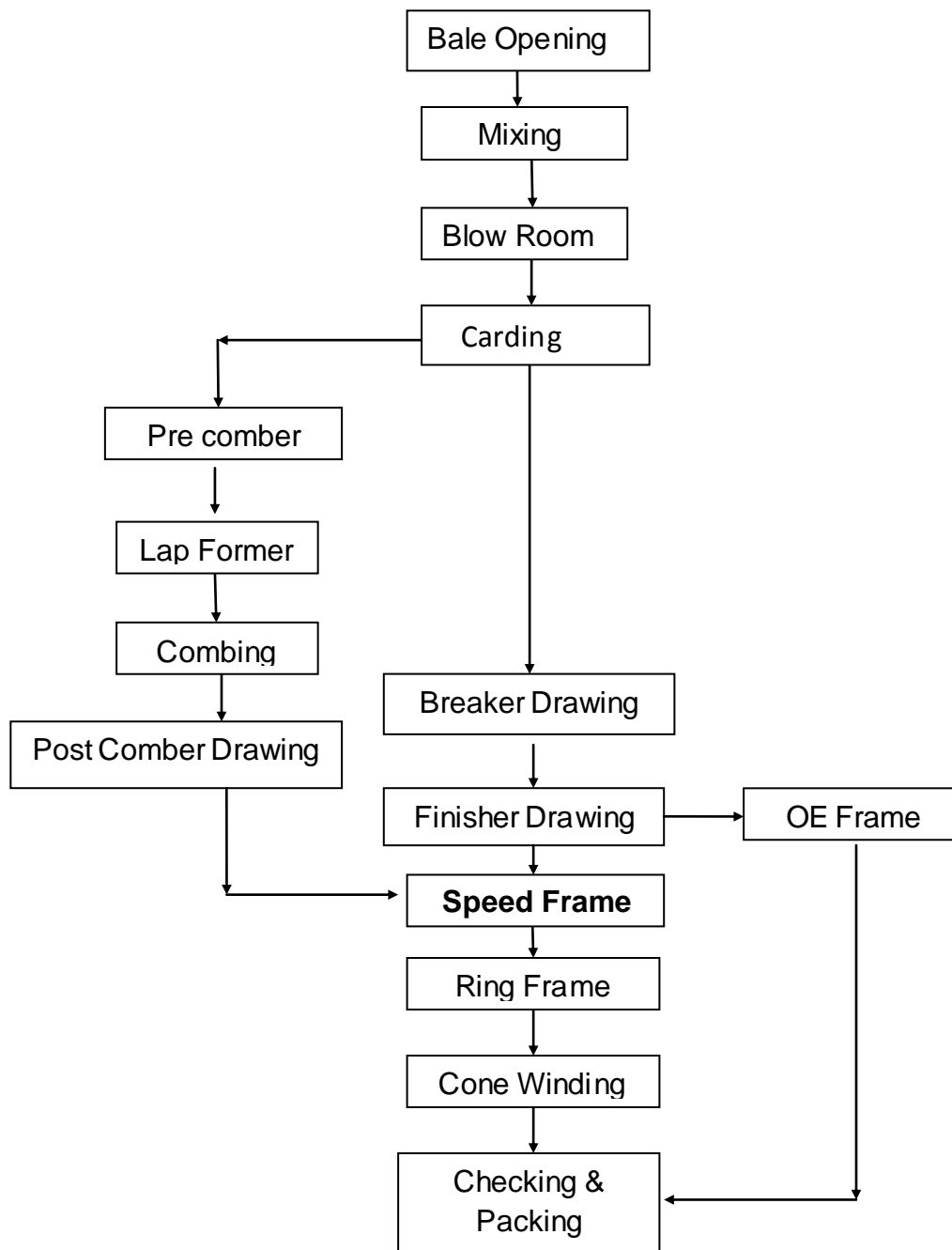
1yds: 0.9144mtrs

1lbs: 0.453 Kgs.

e.g.  $40^s$  Ne = 40 hanks of 840 yds weighs 1 lbs.

$20^s$  Ne = 20 hanks of 840 yds weighs 1 lbs.

## 2. Sequence of Spinning Process:



**3. Material Flow in Spinning:**  
**Carded Yarn Manufacturing:**

**TABLE-1**

<b>STAGE</b>	<b>MACHINE</b>	<b>INPUT MATERIAL</b>	<b>OUT PUT MATERIAL</b>	<b>PACKAGE FORM</b>
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Card	Lap or chute feed	Card sliver	Slivers in Can
1 <sup>st</sup> drawing	Breaker Draw frame	Card sliver	Drawn sliver	Sliver can
2 <sup>nd</sup> drawing	Finisher Draw frame	Drawn sliver	Drawn sliver	Sliver in can for Roving
<b>Roving</b>	<b>Speed Frame</b>	<b>Drawn sliver</b>	<b>Roving</b>	<b>Roving bobbin</b>
Spinning	Ring spinning frame	Roving	Ring-spun yarn	Spinning Cops
Post-Spinning processes	Winding & Reeling	Yarn in spinning cops	Yarn	Cone, Cheese & Hank

**Combed Yarn Manufacturing**

**TABLE-2**

<b>STAGE</b>	<b>MACHINE</b>	<b>INPUT MATERIAL</b>	<b>OUT PUT MATERIAL</b>	<b>PACKAGE FORM</b>
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Carding machine	Lap or chute feed	Card sliver	Carded Slivers in Cans
Pre comber Drawing	Breaker Draw Frame	Carded Sliver	Drawn Sliver	Drawn slivers in cans
Lap Formation	Super Lap or Lap Former	Drawn Slivers	Lap	Laps in spools
Combing	Comber	Lap	Combed Sliver	Combed sliver in Cans
Post comber Drawing	Finisher Draw Frame	Combed sliver	Drawn sliver	Post comber Draw frame slivers in cans
<b>Roving</b>	<b>Speed Frame</b>	<b>Post comber Draw frame sliver</b>	<b>Roving</b>	<b>Roving bobbin</b>
Spinning	Ring spinning frame	Roving	Ring-spun yarn	Spinning Cops
Post-Spinning processes	Winding & Reeling	Yarn in spinning cops	Yarn	Cone, Cheese & Hank

**Open End Yarn Manufacturing:**

**TABLE-3**

STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Card	Lap or chute feed	Card sliver	Slivers in Can
Drawing	Draw frame	Card sliver	Drawn sliver	Sliver can
OE Spinning	OE Frame	Drawn sliver	OE yarn	Cheese

**Various Package Form:**





**Roving Bobbin**



**Ring Bobbins**



**Cone Packages**

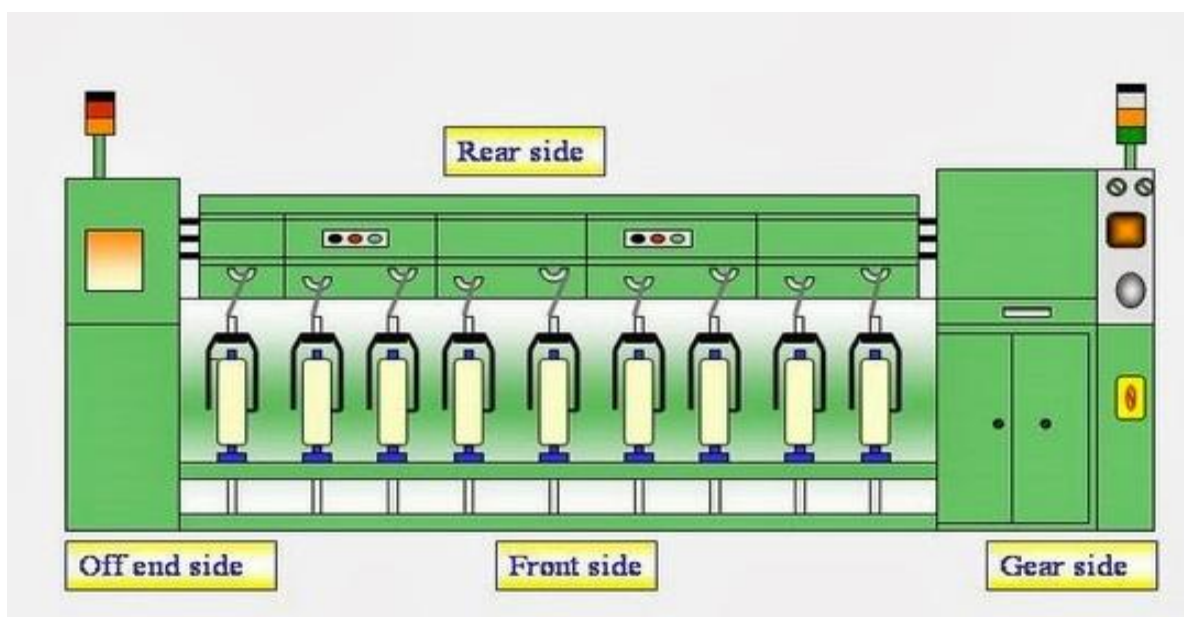


**Cheese Package**

#### 4. Functions of Speed Frame Machine:

- To draft the sliver to reduce weight per unit length
- Conversion of sliver into roving
- To insert small amount of twist
- To wind twisted strand on the bobbin.
- To make conical or taper shape of the bobbin.

#### 5. Details of Speed Frame Machine:





## Different Zones of Speed Frame Machine:

### Creeling:

Draw frame slivers are fed to the roving frame in large cans. The slivers are guided through separators and then over the guide rollers and tension rollers. The slivers then pass through the drafting rollers.

### Drafting:

To draft the sliver to reduce weight per unit length. In the drafting zone pneumatic pressure is applied over the drafting rollers and the speed difference between the drafting rollers, drafts the sliver to desired hank.



Drafting Zone



**Twisting:** The drafted slivers delivered are too thin to hold themselves together and slight twist is needed to strengthen the roving to prevent breakage during next processing. The drafted strands of fibres are passed from Drafting zone to flyers for twisting.



**Winding:** The flyers impart twist to the fibre strands and make the roving strong enough to be wound on the bobbin and to be processed in Ring Frame



**Building:** The up & down traversing of bobbin rail builds up the bobbin to make conical or taper shape of the bobbin

**Doffing:** When the roving bobbins become full the machine is stopped and doffing takes place to remove full bobbins and to fix empty bobbins with required length of roving manually wound on the empty bobbins through Flyers for continues working.



**Signal Lamps:**

Signal lamps are provided on the machine to indicate the reason for stoppage of machine. Understand each signal lamp and their purpose in the machine.



**Display Panel:**

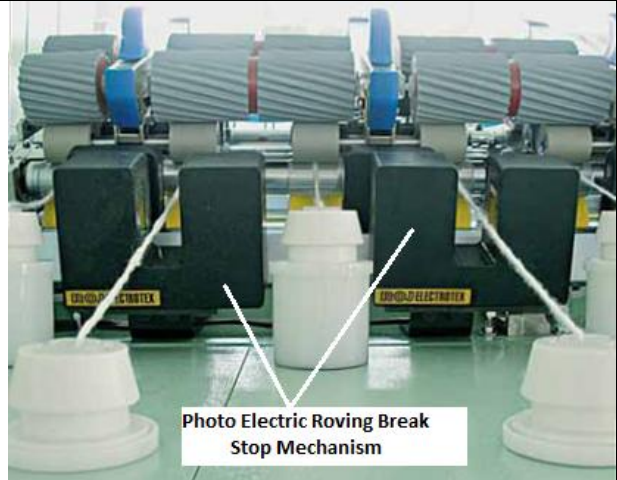
It displays various operating machine parameters like speed, production etc. Understand the details in the display panel and work accordingly



**Roving Break Stop mechanism & Sliver Break Stop mechanism:**

Photo electrical sliver and roving break stop mechanism.

Whenever sliver or roving breaks due to any reason machine stops.



## 6. Operating Speed Frame Machine:

- Creel the required number of sliver cans and draw the slivers forward.
- Take the slivers through guide rollers and feed to drafting zone.
- Operate the control switches for inching, starting and stopping the Speed frame.
- By inching feed the material and start running.
- Follow the different signal lamps & stop motions used in machines.
- Piece the sliver during breakage
- Piece the roving during breakage
- Support the doffing team and doff the full Roving bobbins.
- View the display panel and identify the reasons for machine stoppages if any.
- Inform the supervisor and maintenance in charge in case of any break-downs
- Support for carrying out maintenance activities.
- Carryout cleaning activities in creeling, drafting, and in Flyer.
- Remove the waste while attending breakage/creeling and put them in appropriate waste collection bins.
- Always keep Speed frame area clean.

### Importance of Colour coding:

The details related to colour coding like Sliver Can colour, Bobbin colour and other relevant information like Hank of sliver etc, are normally displayed in respective machine's display board. It is the responsibility of the machine operator to understand them & work accordingly.

### Identifying Defects:

- Defects in feed sliver like uneven sliver, neps in slivers, slivers with high variation etc. are to be identified and informed to supervisor for necessary action.
- Defects in roving like irregular roving, slubby roving, excessive roving breaks etc, are to be identified and informed to supervisor for necessary action.
- Defects in roving bobbins like soft bobbins, unequal tapering, sloughing off roving bobbins etc are to be identified and informed to supervisor for necessary action.

### Attending Sliver Break at Creel:

- Identify whether the machine stoppage is due to a sliver breakage or roving breakage by seeing the signal lamp
- Move in the creel side and identify which sliver is broken, identify the reasons for sliver breakage by viewing the breakage spot i.e., whether sliver is broken at creel or sliver is exhausted in the sliver can.
- Check proper length of sliver is available for piecing, piece the broken sliver together. Use standard piecing method, avoid soiling, loose or tighter piecing of slivers.
- Take minimum time for piecing the sliver.
- Keep the sliver waste in the waste collection hip bag/ apron pocket and then put in the waste in waste collection box.



### Attending Roving Break:

- Identify the reason for machine stoppage by seeing the signal lamps. Patrol and identify in which spindle the roving is broken.
- Check and identify the reasons for roving breakage by viewing at the breakage spot i.e., whether the roving is broken at spindle or flyer or drafting zone.
- Take minimum time for identifying and attending the roving breakage.
- Unwind or remove the broken roving from the bobbin, (by using suitable equipment) unwind extra length of roving from the bobbin.



- Fix the bobbin in a proper manner in the spindle and take out the roving through the flyer making it ready for piecing.
- Piece the roving between flyer and drafting zone.
- Use standard piecing method, avoid soiling, loose or tighter piecing of roving.
- Take minimum time for piecing the roving
- Check the bobbin is perfectly fitted in the spindle after piecing
- Verify proper material passage from drafting zone till the roving is wound on bobbin
- Remove the waste and deposit in the respective waste collection bags
- Check proper functioning of the machine
- Attend to the sliver or roving breakage as and when they occur
- Inform the supervisor and maintenance in charge in case any frequent lapping in the machine.
- In case of any break-downs, report to the supervisor and support for carrying out maintenance activities.



## **Doffing:**

### **Preparing for doffing**

- Identify the speed frame machine ready for carrying out doffing activity
- Collect the correct sized, right colour coded empty bobbins from storage area, check the bobbins are clean & are in good condition, remove the damaged bobbins and store in a separate place.
- Load the required number of empty bobbins as per requirement in different bobbin trolleys, move and arrange the bobbin trolleys in an organised manner near the speed frame machine,
- Check the machine is completely stopped
- Remove the fully bobbin from spindle and store in the bobbin trolley
- Fix the empty bobbin in the spindle
- Repeat the doffing activity for specified number of spindles as instructed by the superior
- Gait the roving end with the empty bobbin
- Take minimum time to carry out doffing
- Check all full bobbins are replaced with empty bobbins, also check all empty bobbins are mounted in the spindle rail properly
- Ensure gaiting is done properly for all the spindles
- Check all full bobbins are placed in the bobbin trolley.
- Ensure the machine is ready to start in all aspects after doffing and start the machine

### **After Doffing (when the operator is in doffing team)**

- Ensure that the doffing is carried out properly, check the delivery zone is clean
- support the tenter by bringing draw frame can for creeling, creeling activities and piecing in the event of a count change
- Ensuring the machine is ready to start, ensure proper functioning of machine

- Verify the proper build of the roving bobbin
- Report to the supervisor / maintenance team if the machine is not functioning properly.
- Support the maintenance team while machine is under maintenance. Clean the gear end, off end, spindle rails, spindles, bobbin rail, clearer rollers and other parts of machine as instructed by supervisor using proper cleaning tools
- Check for proper transportation of filled bobbin trolley to designated storage area, store them at designated place properly
- Cover the stored full bobbins with polythene sheets as instructed by superiors to avoid fluff accumulation on roving bobbins
- Keep the empty bobbins in a neat & clean condition in the bins with identification provided
- Segregate the sliver waste and roving waste count wise and store in the respective waste bins
- Transport the collected wastes to the waste room
- Weigh the different types of waste collected in the speed frame departments
- Take part doffs wherever necessary as instructed by the supervisor





Roving Doffing Signal



Replacing full roving bobbin with empty bobbin during Doffing



On trolley putting the roving bobbins



After doff keep the Roving Bobbin trolley at trolley storage region



After doff start the machine

## **Cleaning the speed frame & Waste disposal**

- Carry out cleaning of Speed frame periodicity as follows as or as instructed
- ensure safety while carrying out cleaning
- Carryout cleaning activities in creeling zone, drafting zone, and Flyer.
- Remove the dust from creeling area and remove any excess sliver lying in this area.
- Remove the soft waste piled up if any from drafting zone.
- Clean the flyer and bobbin rail.
- Check the wastes collected from different parts of machine are deposited in the respective bins
- Keep the speed frame department clean.

## **7. Instructions for Shift Change:**

### **Take Charge of the Shift**

- Come at least 10 - 15 minutes earlier to the work spot.
- Meet the previous shift operator and discuss regarding the issues faced by them with respect to the quality or production or spare or safety or any other specific instruction etc.
- Understand the count produced, colour coding followed in the Speed Frame for the allocated number of machines.
- Check and understand the technical details mentioned in the display board.
- Check for the availability of the feeding sliver cans for creeling.
- Check the sliver passage and proper formation of roving.
- Check the condition of all the spindles
- Check the cleanliness of the machines & other work areas.
- Check the waste collection boxes are empty while taking charge of shift.

### **Handing over the Shift:**

- Properly hand over the shift to the incoming shift operator.
- Provide the details regarding count produced, colour coding followed in the Speed frame for the allocated number of machines.

- Provide all relevant information regarding the idle spindles, damaged machine parts etc.,
- Collect the wastes from waste collection bags weigh them and transport to storage place.
- Check for the cleanliness of the work place.
- Get clearance from the incoming counterpart before leaving the work spot, in case if the next shift operators do not come report to shift supervisor.
- Report to the shift supervisor about the quality / production / safety issues/ any other issue faced in the shift and leave the department only after getting concurrence for the same from supervisors.

### **8. Importance of Health & Safety**

- Follow the safety work instructions or practices like not opening the doors of the machine, not cleaning the interior parts & not taking any choked material when the machine is in running condition.
- Always use head cap and face mask in the work spot.
- Do not carry any metallic parts during machine running as there are chances of fire and damage to machine parts.
- Take action based on instructions in the event of fire, emergencies or accidents, participate in mock drills/ evacuation procedures organized at the workplace as per organization procedures.