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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:** finished product of blow room in the form of a sheet of fibers.

**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, Draw frame.

**Roving:** A product of speed frame in the form of a soft strand of fiber that has been twisted, attenuated, and free from foreign matter preparatory 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 system:

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 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

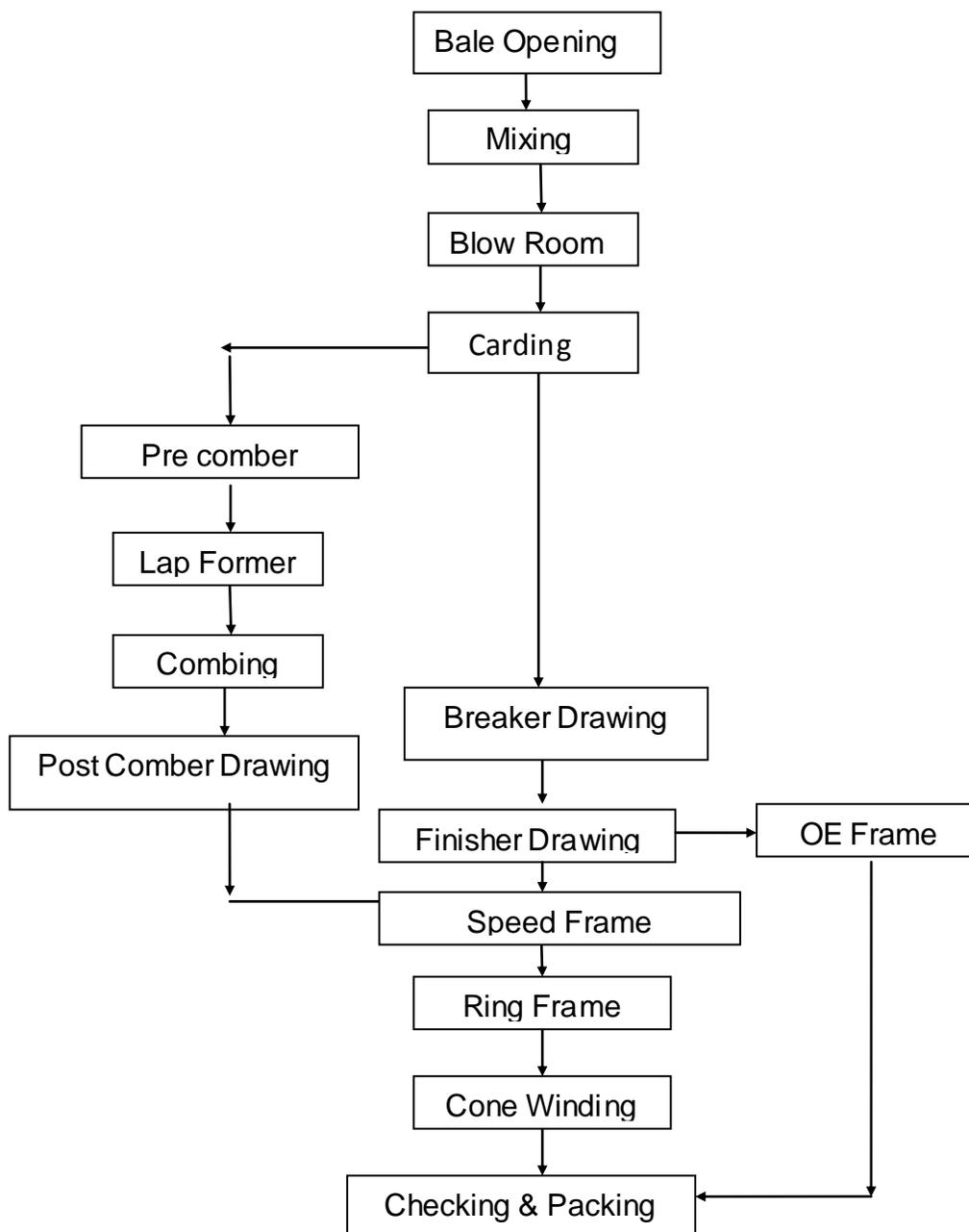
1yds: 0.9144 mtrs.

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

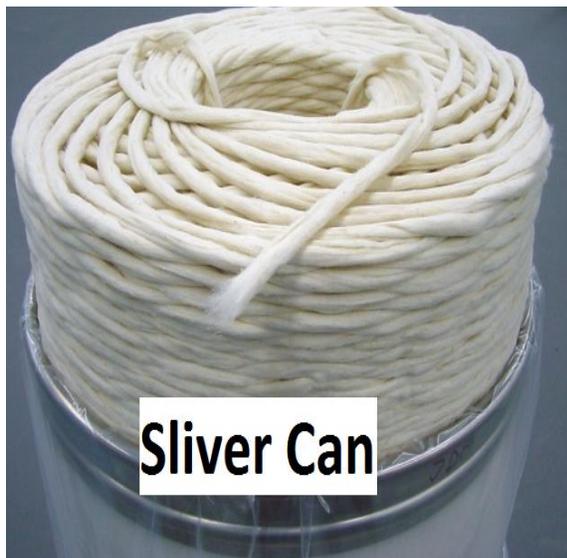
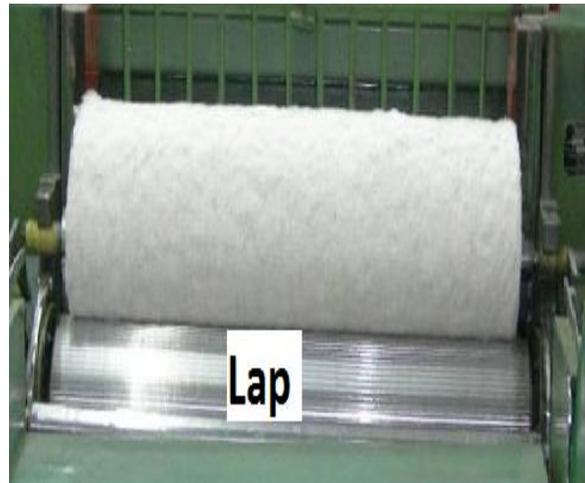
STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
Opening & cleaning	Blow Room machines	Raw cotton	Lap or chute feed	-
Carding	Card	Lap or chute feed	Card sliver	Slivers in Can
1 <sup>st</sup> drawing	Breaker Draw frame	Card sliver	Drawn sliver	Sliver can
2 <sup>nd</sup> drawing	Finisher Draw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

#### Combed Yarn Manufacturing

TABLE-2

STAGE	MACHINE	INPUT MATERIAL	OUT PUT MATERIAL	PACKAGE FORM
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
Roving	Speed Frame	Post comber Draw frame sliver	Roving	Roving bobbin
<b>Spinning</b>	<b>Ring spinning frame</b>	<b>Roving</b>	<b>Ring-spun yarn</b>	<b>Spinning Cops</b>
Post-Spinning processes	Winding	Yarn in spinning cops	Yarn	Cone, Cheese & Hank as required

**Various Package Form:**

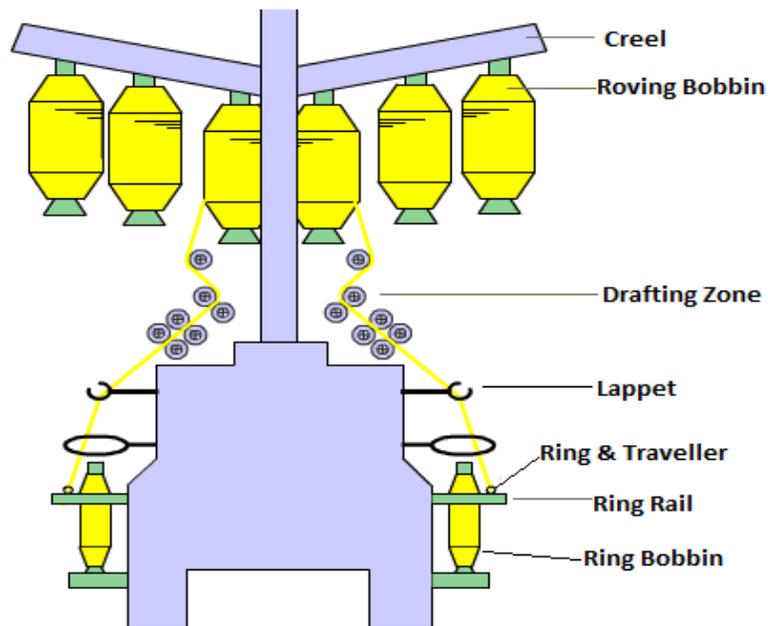
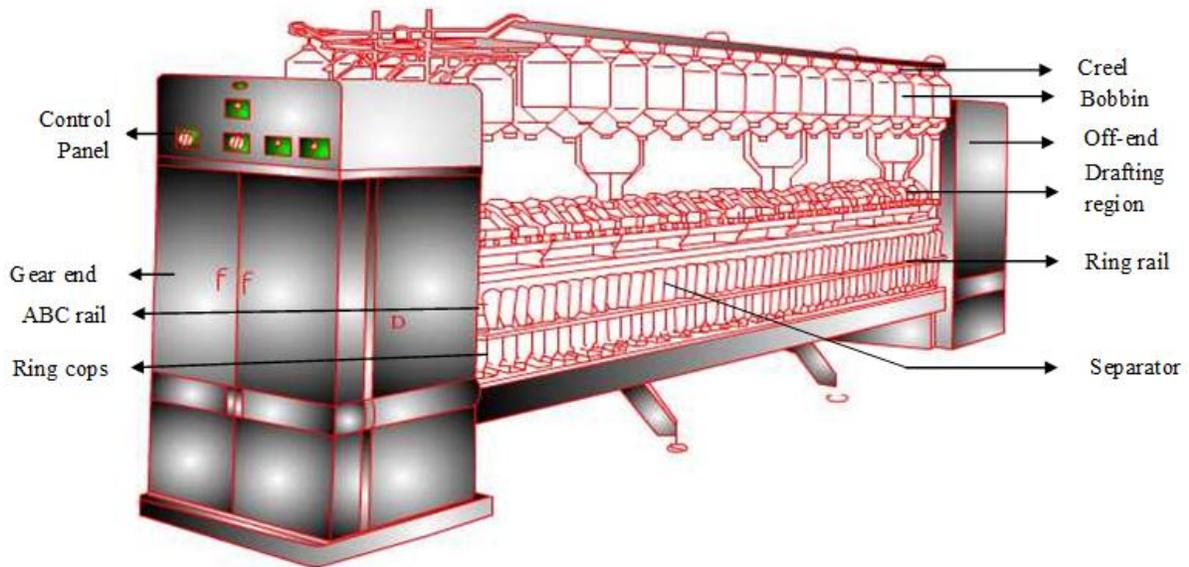




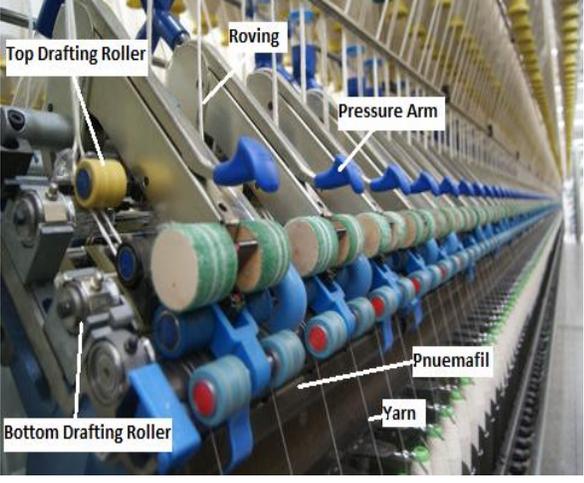
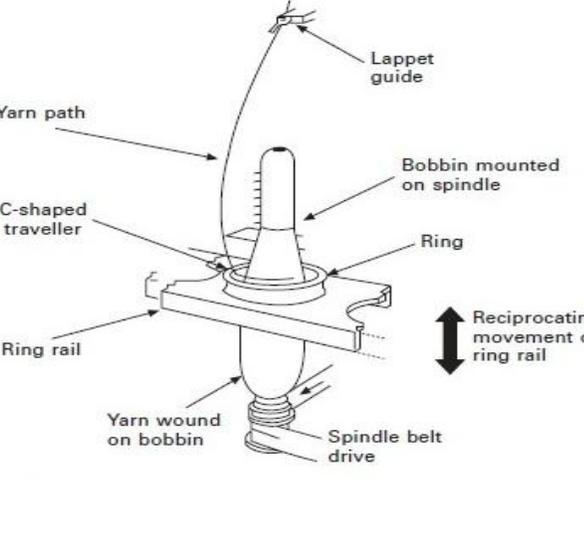
#### **4. Functions of Ring Frame Machine:**

- To produce required count of yarn from the supplied roving by drafting.
- To insert sufficient amount of twist to the yarn to impart strength.
- To wind the yarn onto the bobbin.
- To build the yarn package properly.

## 5. Details of Ring Frame Machine:



## Different Zones in Ring Frame Machine:

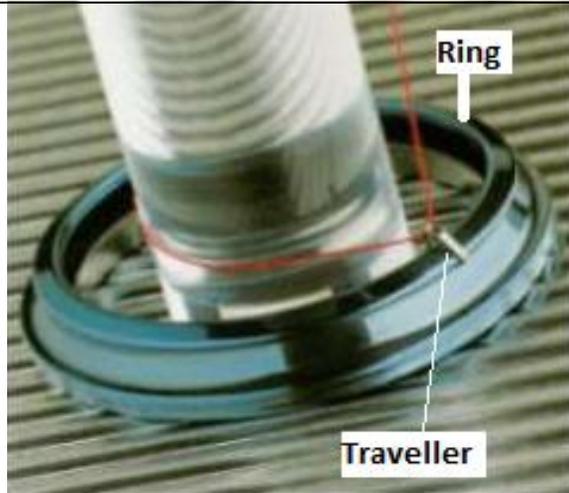
<p><b>Creeling:</b></p> <p>Roving is fed to the Ring frame from roving bobbin held by creels. For all the spindles roving bobbin are creeled on the machine. The roving is guided and passed through trumpet. The roving then passes through the drafting rollers.</p>	 <p>A photograph showing several large, white, conical bobbins mounted on a machine. A label 'Creeled Roving Bobbin' points to one of the bobbins.</p>
<p><b>Drafting:</b></p> <p>To draft the roving to reduce weight per unit length. The Drafting zone in Ring Frame attenuates the roving to desired fineness by imparting required draft to the roving by top arm pressure and the speed variations in the Bottom rollers of drafting zone.</p>	 <p>A photograph of the drafting zone of a ring frame machine. Labels include: 'Top Drafting Roller', 'Roving', 'Pressure Arm', 'Pneumafil', 'Bottom Drafting Roller', and 'Yarn'.</p>
<p><b>Twisting:</b> The drafted strand of the material is finer than rove and twist is inserted to strengthen the material i.e. yarn.</p> <p><b>Winding:</b> Winding of the yarn on to the bobbin is done by raising and lowering the ring rail. The traverse movement of the ring rail is less than that of the bobbin height. The ring rail must therefore be raised by small amount after each layer of coils.</p> <p><b>Building:</b> To make conical or taper shape of the ring bobbin.</p>	 <p>A schematic diagram of the winding mechanism. Labels include: 'Lappet guide', 'Bobbin mounted on spindle', 'Ring', 'Ring rail', 'Spindle belt drive', 'Yarn wound on bobbin', 'C-shaped traveller', and 'Yarn path'. A vertical double-headed arrow indicates 'Reciprocating movement of ring rail'.</p>

**Pneumafil :** When an end breaks the fibre strand coming out from front roller are collected through suction system fixed just below the front roller with suitable holes for effecting suction



**Ring & Traveller:**

The ring guides the circular run off the traveller. The drafted strands of fibres as they are delivered by the front rollers are given twist to produce a yarn. The Ring and travellers enable to Wind the yarn onto the bobbin & maintain winding tension of the yarn. It acts as a second guide for the yarn on the way to be wound on the bobbin.



**Doffing:** To replace with empty bobbins when the Ring Bobbins become full.



<p><b>Signal Lamps:</b> 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.</p>	
<p><b>Display Panel:</b> It displays various operating machine parameters like speed, production, Count of yarn etc. Understand the details in the display panel and work accordingly</p>	

### 6. Operating Ring Frame for Doffing:

- To bring correct colour coded empty spinning cops in the trolleys .
- To keep the trolleys near the Ring frame machine ready for doffing.
- Identify the machine ready for doffing
- Reach the doffing spot(machine ready for doffing) as per the instructions of jobber
- ensure the machine is completely stopped
- remove the full yarn cop from spindle and replace it with an empty cop from the cop trolley
- ensure the empty cop is properly mounted in the spindle
- repeat the doffing activity for specified number of spindles as instructed by your superior
- Gait the empty cop with the same running yarn for continues working.
- Do the doffing at good speed and keep the full cops in the trolleys.
- Handle and transport the full cops properly to the storage area.
- cover the doffed ring cops if needed
- ensure cleanliness at work place

- Apart from these above doffing activities, as per the instructions of supervisor the doffer has to attend to Ring frame machine for creeling of Roving bobbins, piecing broken rovings, piecing the yarn in case of yarn breakage, traveller changing and cleaning of machine etc
- Ring frame doffer must also know the ring frame operations



**Importance of Colour coding:**

The details related to colour coding like Roving bobbins colour, Ring Cops colour and other relevant information like Hank of roving, Count of yarn produced 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 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, stained bobbins, unequal tapering, uneven and fluff accumulated bobbins etc are to be identified and informed to supervisor for necessary action.
- Defects in spinning cops like, uneven cops, stained bunch of yarn wound etc., are to be identified and informed to supervisor for necessary action.

### **Operating Ring Frame Machine:**

- Creel the required number of roving bobbins and draw the roving forward.
- Take the roving over the creel rod and then through trumpet and feed to drafting zone.
- Operate the control switches for starting and stopping of ring frame.
- Follow the different signal lamps & stop motions used in machines.
- Piece the roving during breakages.
- Piece the yarn during yarn breakage while winding on the cops.
- Ensure passage of material after piecing.
- Support the doffing team while doffing the ring 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 spindle assembly.
- Remove the waste while attending breakage/creeling, roller lapping etc and put them in appropriate waste collection bins.
- Remove the pneumafil waste and yarn waste and deposit in the respective waste collection bags.
- Always keep Ring frame area clean.

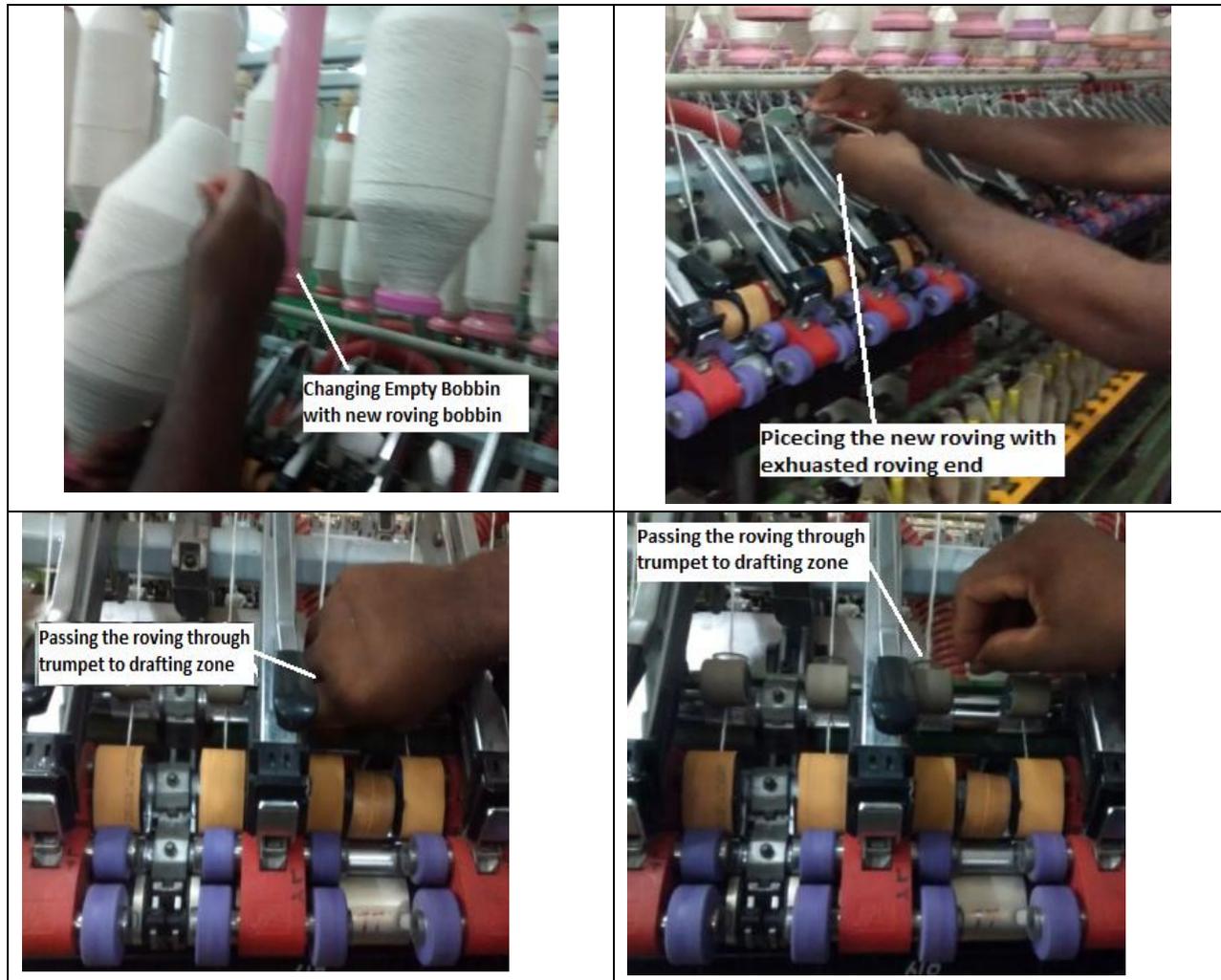
## Creeling

- Bring the correct colour coded bobbins (like colour of Bobbin, tinted colour of roving etc.) from roving bobbin storage using bobbin trolley.
- Identify exhausted roving bobbins in the creel and replace exhausted roving bobbin with correct colour coded bobbins on the creel from the reserve holder / trolley.



## Attending the roving break at the Creel:

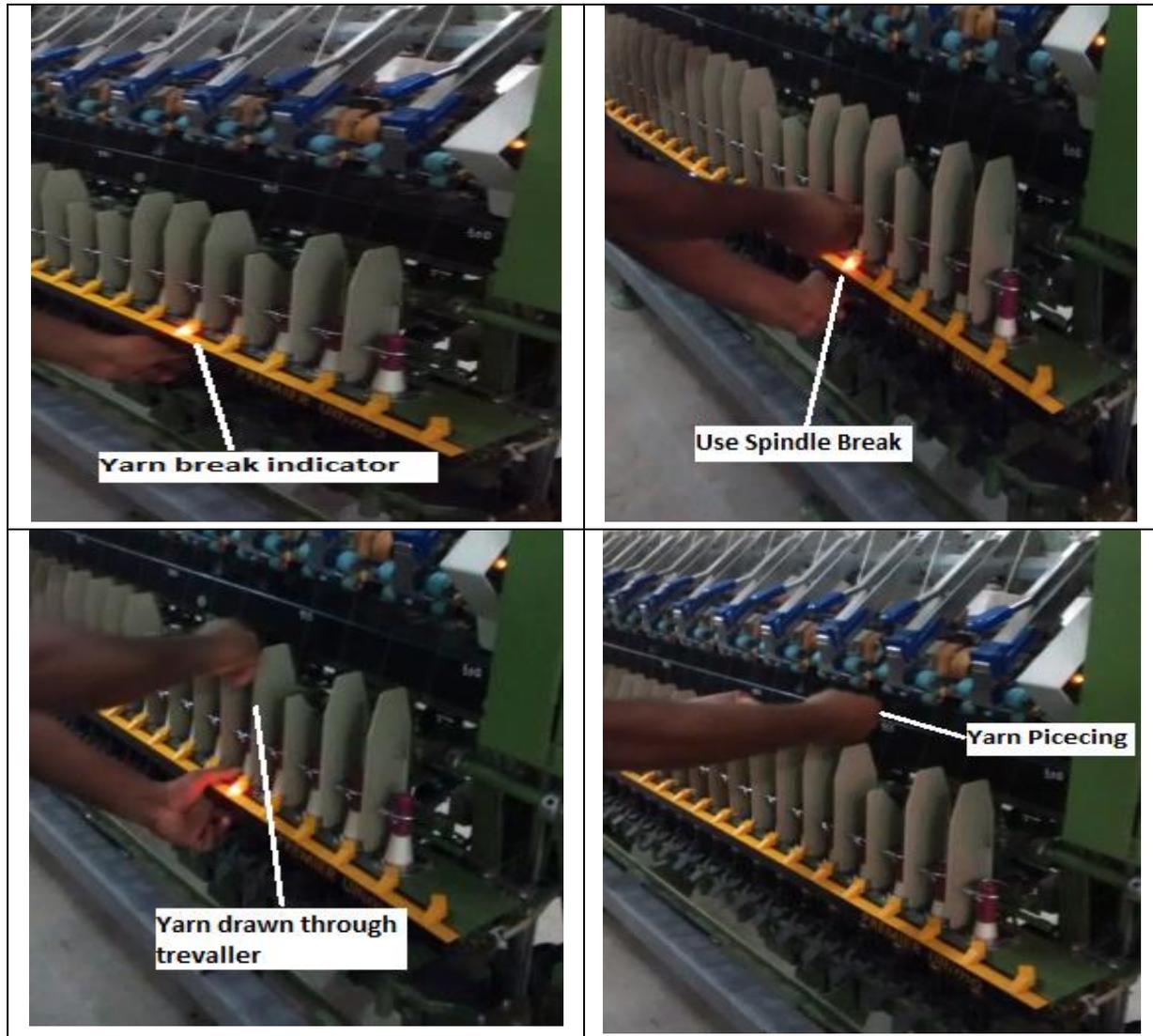
- Check the creels and identify which roving is broken, identify the reasons for roving breakage i.e. whether roving is broken at creel or roving is exhausted in the Roving bobbin.
- Take proper passage of roving from creel to drafting zone through creel rod and trumpet.
- Take minimum time for piecing the roving.
- Keep the roving waste in the waste collection hip bag/ apron pocket and then put the waste in waste collection box.



### Attending yarn breakage

- If there is any yarn breakage, apply the knee break to stop the spindle.
- Take yarn from cop to feed through Ring traveller & lappet hook.
- Cut the yarn (10mm) and start piecing, while piecing avoid staining the yarn.
- Piecing should be fast and qualitative to ensure the thickness of pieced portion is not thick or thin.
- Take minimum time for piecing the yarn.
- Ensure proper seating of cops in the spindle after yarn piecing and release the knee break.
- Check proper traveller running.
- Ensure proper material handling of ring cops.

- Ensure proper tension of the pieced yarn.
- Verify proper material passage from drafting zone till the yarn wound in cop.
- Remove the pneumafil waste and yarn waste and deposit in the respective waste collection bags.
- Ensure safety while carrying out piecing activities.
- Attend the end breakage as and when they occur



### **Cleaning of Ring frame & Waste disposal:**

- Carry out cleaning of machine at periodic intervals as instructed.
- Clean the creeling area at periodical intervals & keep the creeling zone free from fluff & dust accumulation.
- Use the cleaning equipment given to clean the drafting Zone. Periodically arrange to clean the top roll clearer roller (Scavenger Roller). Ensure that the clearer roller is always kept clean
- If there is any over lapping noticed, remove the roller lapping manually or with tools provided, without damaging the cots. Clean pneumafil pipes and ensure that the suction orifices are free from fluff accumulation.
- Collect the roving wastes and yarn waste in the hip bag provided and deposit them category wise in the designated bags at specified places.
- Clean around the Ring frame machine using proper cleaning equipments.
- Keep the Ring 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 jobber and understand which are the machines ready for doffing 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 ring frame for his allocated number of Spindles/ machines for doffing.
- Check and understand the technical details mentioned in the display board.
- Check for the availability of the roving bobbins.
- Check the availability for empty ring cops for doffing.

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

- Properly hand over the shift to the incoming shift Ring frame Doffing team head.
- Provide the details regarding count produced, colour coding for roving bobbins and empty ring bobbins for allocated spindles/machines.
- Check the cleanliness of the work place.

- Get clearance from the incoming Doffing team before leaving the work spot, in case if the next shift doffing team member/s do not come, report it to shift supervisor.
- Report the stages of Ring frames for doffing to the supervisor and leave the department only after getting concurrence for the same from supervisors.

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

- Follow the work & safety instructions and adopt safe working 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.
- Follow the safe working practices at the time of doffing.
- Always use head cap, face mask and ear plug 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.