INTRODUCTION

[Here, * = Reference of Moshiour Rahman]

Q. Write down the process sequence of carded yarn production.*
Dhaka Textile – `04; Noakhali Textile - `09

Ans :

Input	Process/machine	Output
Bale	Blow room	Lap
Lap	Carding m/c	Carded Sliver
Carded Sliver	Drawing	Drawn Sliver
Drawn Sliver	Roving Frame/Speed Frame/Simplex	Roving
Roving	Ring frame	Yarn
Yarn	winding	cone/package

Q. Write down the process sequence of combed yarn production.*
Dhaka Textile – `05,`07,`03. Noakhali Textile - `08

Ans :

Input	Process/machine	Output
	Bale Management	
	↓	
Fibre	Blow room	Lap
Lap	Carding m/c	Carded Sliver
Carded Sliver	Pre comb Drawing	Drawn Sliver
Drawn Sliver	Lap former	Mini Lap
Mini Lap	Combing	Combed Sliver
Combed Sliver	Post comb drawing	Drawn Sliver
Drawn Sliver	Simplex	Roving
Roving	Ring frame	Yarn
Yarn	winding	cone

Q. What are the properties of cotton frbre considered by cotton spinners?*
Dhaka Textile – `04,`05,`06. Noakhali Textile - `09

Ans :

The following properties of cotton fibres are considered for cotton spg^{n} :-

1. Fibre length : The average length of spinnable fibre is called staple length. Staple length is one of the most important fibre characteristics. The quality, count, strength etc. depend on the staple length of fibre.

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Staple length ↑→ Yarn quality↑

Fibre length influence :

- Spg^{n} limit,
- Yarn strength,
- Yarn evenness,
- Handle of the product,
- Luster of the product,
- Yarn hairiness,
- Productivity.

The following length groupings are currently used in stating the trade staple:

Average :(25-35)mm

Short length : 1010″ or less.

Medium length : $1\frac{1}{32}''$ to$1\frac{1}{8}''$

Long length : $1\frac{5}{32}''$ to$1\frac{3}{5}''$

Extra long length : $1\frac{17}{32}''$ to above

2. Fibre fineness : Fineness is one of the most important parameter determining the yarn quality characteristics. Fibre fineness influences the number of fibres in the cross section of yarn.

Thirty fibres are needed at the min^{m} in the yarn cross section but there are usually over 100. One hundred is approximately the lower limit for almost all new spg^{n} process. This indicates that fineness will become more important. Fibre influence primarily :

- Spg^{n} limit,
- Yarn strength,
- Yarn evenness,
- Drape of the fabric product,
- Handle,
- Luster,
- Yarn fullness,
- Productivity.

Evenness is measured in Micronaire value (MIC).

Rating of MIC value -

MIC value	**Fineness**
Up to 3.1	very fine
3.1 to 3.9	fine
4.0 to 4.9	medium
5.0 to 5.9	slightly coarse
5.9 to above	coarse.

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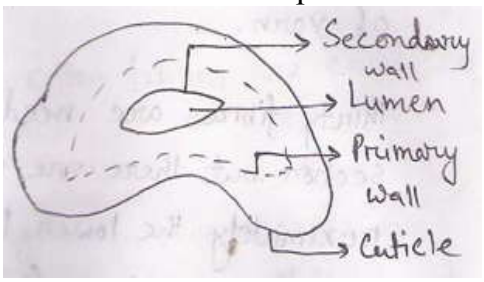
3. Maturity : The maturity of cotton is defined in terms of the development of cell wall. A fully mature fibre has a well developed thick cell wall. On the other hand, an immature fibre has a very thin cell. The fibre is to be considered as mature fibre when the cell wall of the moisture-swollen fibre represents 50-80% of the round cross section, as immature when it represents 30-45% and as dead when it represents less than 25%.



Immature fibre leads to :

- Nepping,
- loss of yarn strength,
- Varying dye ability,
- High proportion of short fibres,
- Processing difficulties mainly at the card

Mature fibre → Dye absorb ↑

Immature fibre → Dye absorb ↓.

4. Fibre Strength : Toughness of fibre has a direct effect on yarn & fabric strength.

Fibre strength ↑ → Yarn & Fabric strength. ↑

Very weak cottons tend to rupture during processing both in blow room & carding, creating short fibres & consequently deteriorate yarn strength & uniformity.

The following scale of value is used :

Below to 70%	→ weak,
70% to 74%	→ fairly strong,
75% to 80%	→ medium strong,
81% to 86%	→ strong,
87% to 92%	→ very strong,
93% & above	→ excellent.

5. Fibre cleanness : In addition to usable fibres, cotton stock contain foreign matter or trash or foreign material of various kinds :-

- **Vegetable matter :**
  Husk portions
  Seed fragments
  Stem fragments
  Wood fragments.
- **Mineral material :**
  Earth
  Sand, dust, coal.
- **Others :**

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Metal fragments
Cloth fragments
Packing materials.

Foreign matter causes :

i) Drafting disturbance, ii) Yarn breakage,
iii) Filling up of card clothing, iv) Contaminated yarn.

Accepted the range of foreign matters to the Bale –

Up to 1.2%	→ very clean
1.2% to 2.0%	→ clean
2.0% to 4.0%	→ medium
4.0% to 7.0%	→ dirty
7.0% & above	→ very dirty.

6. Colour : Colour is particularly important as a measure on how well a yarn or fabric will dye or bleach. Instrumental techniques for determining the colour of the sample have only now reached the Industry, HVI measurement of colour provides reasonably accurate results of average reflectance & yellowness in a sample.

Q. Write short note on Mixing & Blending.*

Dhaka Textile – `07,`05,`03,`02.

Ans :

Mixing : If different grade of same fibres are kept together, then it is called mixing.

e.g. 50% of $1\frac{1}{8}''$ staple length of cotton + 50% of $1\frac{1}{4}''$ staple length of cotton.

Blending : When different fibres of same or different grades are kept together, then it is called blending.

Q. Mention various types of mixing.

Ans :

Types of mixing :

i) Volume mixing,
ii) Weight mixing,
iii) Hand stock mixing,
iv) Bin mixing,
v) Mixing by hopper,
vi) Lap mixing,
vii) Card mixing,
viii) Sliver mixing,
ix) Automatic mixing.

Q. Why blending is important? [B&J]

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Ans :
Importance of blending –
(a) Important of processing performance.
(b) Development for newer usages.
(c) Minimization of cost.
(d) To give the req^{d} characteristics to the end product.
(e) Availability of stock.

Q. Mention different types of Blending operation. [B&J]

Ans :
Process stage of blending type : Types of Blending operation

Blending type		**Process stage**
Bale mixing	→	Before the blow room
Flock mixing	→	Within the blow room
Lap mixing	→	Using doubling scutchers.
Web mixing	→	At the ribbon lap m/c, or the blending draw frame.
Sliver mixing	→	At the draw frame & sliver, Lap or the comber.
Fibre mixing	→	At the card or Rotor spg^{n} m/c.
Roving mixing	→	At the ring spg^{n} m/c.

Q. Why mixing is important?

Ans :
(a) processing importance (speed, setting & productivity).
(b) End uses.
(c) Costing.

Q. Describe various types of mixing.

Ans :
(a) **Volume mixing** : Here, volumetric mixing is performed. Cotton fibres of different quality falls into the mixing bin & the bins are filled in different volume by pneumatic air. Thus mixing is done.

(b) **Weight mixing** : In weight mixing, different quality cotton fibres are weighted at first & then they are mixed in different weight(gm).

(c) **Hand stack mixing :** This method is a old type of mixing. Normally used to produce higher count yarn. This mixing is done entirely with the help of hand.

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(d) Bin mixing : In bin mixing, cotton flocks are transferred from the bale opener into pipe line. The pipe dia is 10" & it passes over the bins, Fibre flocks are delivered into the bins from the delivery boxes of the pipe placed in the pipe.

(e)Lap mixing : In lap mixing, double scutcher is used. One is breaker scutcher & another one is finisher scutcher. Different grade & different quality laps are

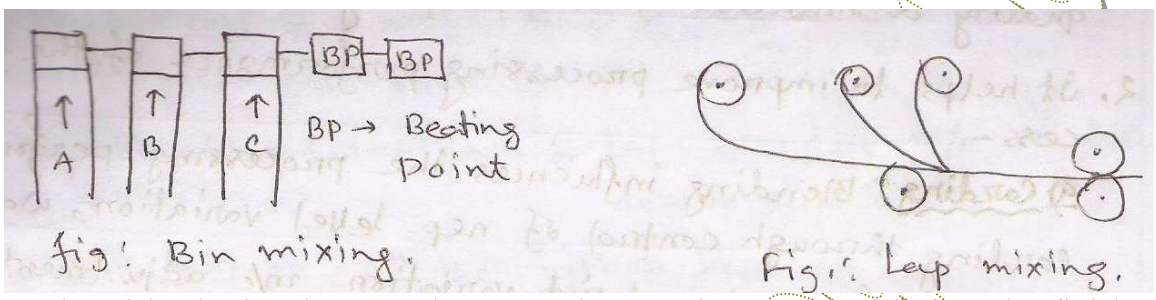
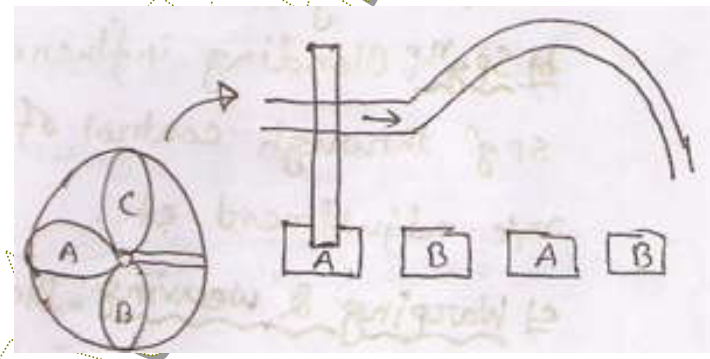


fig: Bin mixing.

fig: Lap mixing.

produced in the breaker scutcher. Four lap stands are placed before the finisher scutcher. For feeding four laps. Therefore, mixing can be done different ratio, like, 1/3; 1/1; 3/1; $1/_{1/2}$; $2/_{1/1}$ or 1/1/1/1 etc. This method is still used successfully.

(e) Automatic mixing : In this method, cotton fibres are mixed automatically by different automated m/cs without breaking bales manually. Here, the number of bales are placed both side of the m/c longitudinally. The m/c moves in traversing motion & extract the fibres from the bales into the duct for mixing. For example, unimix of Reiter.



(f) Card mixing : This mixing is sometime used in the high production carding, where two laps are fed & mixed together.

(g) Sliver mixing : In this method, different carded slivers are used in a particular ration by doubling to mix the fibres in draw frame.

(h) Mixing by hopper : In this method, at first cotton fibres are passed into the bale breaker from where the fibres falls on a lattice. A series of lattice take the cotton fibres of different quality into the mixing bins through a cross lattice. As a result mixing of different quality cotton fibres are performed.

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Q. What is the objects of blending?

Ans :

(a) Blending influences the reduction of the cost of the final product through blend composition, availability of fibres quality & inherent fibre property variations.

(b) It helps to improve processing performance of the following process –

(i) Carding : Blending influences the processing performance of carding through control of nep level variation, waste level variation, fly, roving twist variation, m/c adjustment, static electricity formation.

(ii) Spg^n : Blending influences the processing performance of spg^n through control of yarn twist variation, end breakage, m/c adjustment etc.

(iii) Warping & weaving : Blending influences the processing performance of warping & weaving through control of end break m/c adjustment etc.

(iv) Dyeing & finishing : Blending influences the behaviour of dyeing & finishing through control of shrinkage variation, dyeing defects etc.

(c) Blending influences –

(i) Physical properties : It influences to increases tensile & tear strength, elasticity, abrasion resistance, stretch etc.

(ii) Aesthetic properties : It influences to increase luster. Appearance, cover, color etc.

(iii) Subjective properties : It increases comfort & the properties like handlings, touch, softness etc.

(d) It helps to meet function & end used requirements.

(e) It helps to achieve effect by carrying color, fibre characteristics & so on.

Q. Write down the points should be considered during mixing and blending.

Ans :

(a) Similarity in fibre length.
(b) Strength of fibre.
(c) Similarity in colour of fibre.
(d) Maturity of fibre.
(e) Similarly of fibre.
(f) Atmosphere in fineness of fibre.
(g) Skilled labour.
(h) Well equipped m/c to be used.

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Q. Differeniate between mixing & blending.

Ans :

Sl. no.	Blending	Mixing
1.	Mixing of different fibres. e.g. p.c. blend; t.c. blend etc.	Mixing of same fibres. e.g. Mixing of American & Indian cotton.
2.	Same properties of fibre are used in blending.	Different properties of fibre are used in mixing.
3.	In blending, quality are not considered.	In mixing, quality of fibre are considered.
4.	In blending, fibres are blended in definite proportion.	In mixing, quality of fibre are considered.
5.	All the characteristics of fibre are known in this process.	All the characteristics of fibres are not correctly known in this process.

Q. Define spinning.

Ans :

Spg^n may be defined as the art or techniques to produce yarn by twisting of fibrous mtls or any other method from the fibre forming agents. Spg^n is the first step in the textile manufacturing process for staple artices.

There are several spg^n process (rotor spg^n, air jet spg^n, friction spg^n, dref spg^n etc) depending upon the fibre used. However, the principle of spg^n is the same.

Q. What is Yarn?

Ans :

Yarn is an assembly of fibres that are twisted together to form a continuous strand. Yarns may be made from either staple fibres or filament fibres. Staple fibres are twisted into yarns; filament fibres need little or no twist to hold them together into yarns. The type & length of fibre, the type, ply & size of yarns & the amount of twist given to yarns determine many of the characteristics of fabrics made from the yarns. All fabrics except plastics & non-wovens depend upon the use of yarns. For example, fabrics constructed of spun yarns are less smooth than fabrics constructed of filament yarns. They also have a lower lusture cord or rib fabrics contain ply or larger yarns in the rib direction.

Q. Describe the chronological development of spg^n system.

Ans :

(From 1780- 1830)

On the basis of spg^n elements –

- Mule spg^n.

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- Flyer spg^{n}.
- Cap spg^{n}.
- Centrifugal spg^{n}.
- Pot spg^{n}.
- Ring spg^{n}(pioneer).
- New spg^{n} system (mid of 1960).

Q. Mention different stages of spinning process.

Ans :

The spinning process basically consists of three stages :-

(a) Reduction of strand thickness from the supply roving or sliver to the required yarn count.

(b) The prevention of the further fibre slippage usually by twist insertion.

(c) Winding on to a package which is convenient for handling and which protects the yarn.

Q. Classify spinning m/cs.

Ans :

Spinning m/cs may be broadly divided into two main groups :-

(a) Intermittent : These m/cs can only carry out the stage (3) of the spinning process i.e. winding on while stage (1) & (2) are interrupted.

(b) continuous : These m/cs can carry out the three stages of the spinning process simultaneously on consecutive length of the material.

Q. Differentiate between carded & combed Yarn.

Ans :

Sl. no.	Carded yarn	Combed yarn
1.	The yarn that is obtained without combing is called carded yarn.	The yarn that is obtained by combing is called combed yarn.
2.	Quality of carded yarn not better than combed yarn.	Quality of combed yarn better than carded yarn.
3.	Short fibre % is high	Short fibre % is low.
4.	Combing action is not done here.	Combing action is done here.
5.	Less strength.	Higher strength.
6.	Irregular.	Regular.

Q. Write a note on "Ginning".*

Ans :

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Ginning : The freshly picked cotton has seeds in it, it is called seed cotton. The treading is done in this condition also, but normally the trading is done after separation of the fibres from their seed. So, the process involves to separate the cotton fibres from their seeds is called Ginning.

Objects :

1. To separate fibres fully from its seeds.
2. To collect seeds & waste together.
3. To collect fibre without any faults.
4. To separate whole fibre.

Types of ginning :

1. Roller ginning,
2. Saw ginning,
3. Macarthy ginning.

Faults in ginning :

1. Gin-cut fibre,
2. Crushed seeds,
3. Nep formation,
4. Too much wastage.

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YARN MANUFACTURING - I

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