



Faculty of Engineering  
Department of Textile Engineering

## **Study on Quality Issues in Denim Production**

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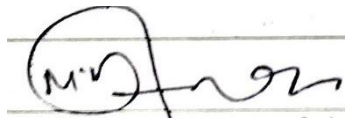
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A thesis submitted in partial fulfillment of the requirements for the degree of  
**Bachelor of Science in Textile Engineering**

Advance in Fabric Manufacturing Technology  
Fall-2019

## LETTER OF APPROVAL

This thesis report on ‘**Quality Issues in Denim Production**’ is prepared by Munemul Haque ID: 161-23-4633 , Md. Shofiqul Islam Rana ID: 133-23-3718 .This report is submitted in Partial Fulfillment of the Requirement for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The whole report of thesis has completed under my supervision. During the research period I have found them sincere, hardworking, punctual and enthusiastic.



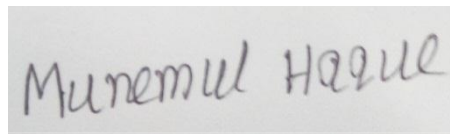
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## DECLARATION

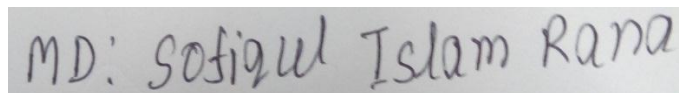
We hereby declare that, this project has been done by us under the supervision of **Prof. Dr. Md. Mahbubul Haque**, Professor & Head, Department of Textile Engineering, Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any B.Sc in Textile Engineering degree or diploma.



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First we express our heartiest thanks and appreciation to Almighty Allah for His favors makes us conceivable to finish this project successfully.

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At long last, we should recognize with due regard the consistent help and patients of our parents.

## DEDICATION

``This thesis work is dignified to our parents and teacher may  
they live long``

## ABSTRACT

The project is on the "Quality Issues<sup>1</sup> in Denim Production ". At recent time quality has turned into an important issue in every perspective. Each and everybody are currently progressively worried about the quality. Everyone re willing to pay more for the desire quality product. Because of quality issues producers are must be progressively worried about the quality. As our country is normally popular provider to make readymade woven products of clothing so the makers have keep up the quality through the process. Our Denim industry is an incorporated industry so it is must be necessary to check the process from the earliest starting point. It moves toward becoming from the yarn to the completed item. We are here tried to represent the quality parameter in the Denim sector.

This thesis paper contains lots of information about important issues occur during Denim production, their improvements and the remedies. Here we endeavored to establish each and everyone to know the parameters occupied to define the quality matters in an industry. Usually in Denim the quality is tested in three different unique steps. Firstly protective assessment this incorporate; yarn quality checking, machine quality, the tension inspection finding the defects and modifying them. After that point the process control is done. Here the method is checked and confirmed on-line and off-line. This unites are checking of GSM, the attach length of the texture, the speed of the machine. At lastly comes the item control. Here the texture is tested through 4-point system, 10-point system and others. So we can say that a quality needs to permit such a large number of levels to be on the following process.

In the market as long as the challenge is developing step by step. A self-contained and pointless mix-up in quality controlling can be valid justification for the removal of the item. So it ends up important to keep up all the quality fundamentals of the customer.

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# **CHAPTER-1: INTRODUCTION**

## 1.1 Denim Fabrics:

First time denim was produced and developed by the city Nimes in France. In the Rhone Valley region of France heavy cotton fabrics were produced in nineteenth century. These fabrics were known as tissue de Nimes and Blue de Genes. The term denim and jeans originate from these titles. Denim is a twill weave woven and 100% cotton fabric which contain of various color of twist and weft yarn. In denim texture, one shading is established on the fabric surface. Denim is a typical crude material for pieces of clothing producing.

100% cotton and woven fabric is heavy and classical denim which warp thread are indigo dyed and weft yarn are undyed. The traditional denim is hard-wearing, high density fabrics with a high mass per unit area and a 3/1 or 2/1- twill weave construction.

Denim outlook is more colorful and attractive in indigo blue shades and it is made for a variety of applications and in a wide range of qualities and shades. Classical denim is made from 100% cotton dyed with Indigo blue shades. Denim is comfortable to wear, fashionable, affordable and durable and popular in different age peoples. Denim is available in different weight ranges.

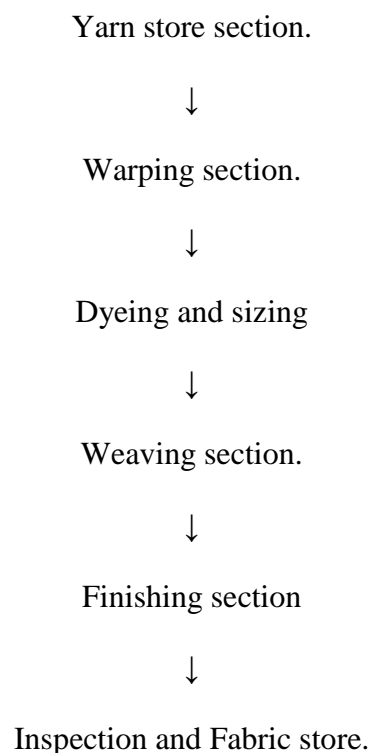
## 1.2 Quality issues:

In the cutting authority period of exchange and business, competition is getting to be inflexible constantly. About 15-20 years earlier, slight texture defects like the beginning imprint and little length of missing ends and so on were ignored by the clients. Yet, at once, when the WTO understanding is large at our entrance and globalization of the market has been presented in national and all-inclusive preparations, a textile producer will definitely diverge his item and his Bangladeshi associates as well as delivered in all over the world. In the event that one negligence to organize the quality with the universal measures, one will need to whichever sell his surface with the end goal of floor cleaning and so on or easily stop manufacture or make withdrawal from the market. The procedure and the human factor you can't separate, in that way I accept that Quality, when integrated with an item, products approaches and ideas inside the beings who have contributed in it's creation. When you have prepared something that you are pleased, when you have delivered an item that brings smirks to your clients, at that point you have

accomplished Quality. You and they'll know about it, and every one of you will succeed from it.

Quality is the most important things which are exhaustively depend on the customers demand. Similar properties in a material could be the most smooth quality for a consumer however it not for the other consumer. It has an absurd construction with the style of time. For illustration the obscuring influence in the pants jeans is the most attractive quality for young age individuals and as well it is approved as a most in trend consistency however then again it isn't the quality for the older individuals. In the feeling of texture qualities it is a insufficiency because of loss of the quality.

### 1.3 Denim fabric production sections:



## I) Warping section:

Cone from winding



Creeling.



Control system



Reed



Sensor



Winding on beam.

## II) Preparatory section:

Scouring.



Bleaching.



Dyeing (indigo, black, bottoming, topping etc.)



LCB (Only for rope denim)



Sizing



Weavers beam

### III) Weaving section

Weavers beam



Drawing/ knotting



Denting



Shedding



Picking



Beat up



Take up and let off



Rolling

#### **IV) Finishing section**

Loading and J box



Singeing



Skewing.



Weft stretching.



Calendaring.



Moisture guider .



Mercerization



Inspection and folding

## **CHAPTER-2: LITERATURE SURVEY**



## 2.1 Quality:

The total features and properties of a product or service that its ability to satisfy convinced or obscure needs . The degree of excellence kept by a product .The term quality refers the properties of a product or service that defines its ability to full fill the customer demand . Ex the quality of a product is like the blood of a human body .There are some aspects of quality like performance ,conformance, durability, reliability of a product. The quality factors affecting by customers ,process, employee, materials etc .Quality control (QC) is a process that a manufacturer pursues that ensure product quality is maintained or improved with lower number of error it near about zero percent. Quality methods required to fulfilled manufacturer demand a sufficient quality .It may helps, keeping up a satisfactory of quality otherwise costs increasing.

There are some various kind of matters where quality aspect of clothing industry is based .For example, - execution, unwavering quality, sturdiness, visual and saw quality of the piece of clothing. Quality should be defined as far as a specific process of expense.

## 2.2 Quality Control:

Quality is the most important part of any part of business .Quality control (QC) is a process that a manufacturer try to ensure that product quality is maintained or improved. The no of error is likely zero percent. "The process required for programming and planning the endeavors of the different gatherings in an association to keep up the imperative quality". Quality Control is part of Quality Assurance or Total Quality Control.

Quality control are mainly two types:

- 1)Online quality control.
- 2Off-line quality control.

## 2.3 Total Quality Control:

"The essential quality of item is accomplished to confirm .". Its depends on consumer loyalty, however it leaves quality control as an essential yet costly factors. By quality control it required to develop, design, produce and service a product, which is most economical, most useful and always satisfactory to the consumer.

The essential quality is being accomplished that every steps of assembling from crude materials boxed standard ,to confirm at least lower cost.

## 2.4 Quality Assurance:

The goal of quality assurance that requirements for an item or management that will be satisfied by designing exercises that executed in a quality work. It is the deliberate valuation, connection with a standard, checking of making process and a related criticism circle that gives mix-up remedial action. Quality control relation can be appeared differently, which is centered on procedure points.

## 2.5 Quality assurance steps:

Quality assurance system can be defined into following steps:

1. On line Quality assurance system and
2. Off line Quality assurance system.

Again on line Quality assurance framework can be separated into the following advances:

1. Raw material control.
2. Process control.

## 2.6 Preventive Measures:

Preventive measures is the pre-quality controlling. At this stage the crude components and the stuffs which are identified with weaving is checked and the errors are fixed. This stage incorporates the yarn quality necessity and support of the machine. There are some limitation with this issues emerge during sewing. In the event that the issues are redressed before generation the measure of the deficiencies will decrease in the creation.

Preventive measure incorporates:

- Yarn quality Requirements
- Well maintained knitting machine.

## 2.7 What is denim:

Denim is a cotton or polyester blend fabric which is heavy weight twill weave and yarn dyed fabric. In denim fabric normally warp is white and weft is colored.

## 2.8 Different Types of Denim Fabric:

- Dry denim
- Selvedge denim
- Stretch denim
- Color denim
- Reverse denim
- Vintage denim
- Marble denim etc.

## 2.9 Yarn for denim:

In denim fabrics there yarns are used as short-staple spun yarns, because they are formed from fibers that having a staple length which is less than 2.5 inches. The cotton fiber normally over an inch long. One of important information yarn that they are development and manufacture of denim by yarn size. Yarn number, yarn count, and yarn size are used to refer to interchange the linear density of a given yarn. Yarns are produced by most two common spinning system they are ring spinning end and rotor spinning end.

## 2.10 Winding:

Winding is the process of transfer yarns from ring ,bobbin ,hanks etc. into a convenient form of package containing considerably long length of yarn .This simple transfer of yarn from one package to another is called winding.

Objects of winding:

- 1.To improve the quality of yarn .
- 2.To get a suitable package.
- 3.To get quality fabric.
- 4.To clean the yarn.
- 5.to store the yarn.
- 6.To improve efficiency of yarn for next process.

Types of package winding:

- 1.Parallel winding .
- 2.Near parallel winding.
- 3.cross winding.

## **2.11: warping.**

In fabric manufacturing warping is first process. After completing winding and warping process it is done for produces a weavers beam .weavers beam is produced form a seed of yarn of same yarn count or different count.

objects of warping :

- To wound up fixed length of yarn on to a warp beam.
- It is increasing the weave ability of yarn.
- It helps to increase the quality of yarn and make reuseable small package.
- It helps to grow the weave-capacity of twist yarn during texture producing.
- To make convenient yarn sheet for next sizing process.
- It increase the production and make dynamic for next process.

## **Important requirements of Warping:**

- The tension of all wound ends must be uniform and possibly constant during all the time of withdrawal from supply package.
- Warping should not impair the physical and mechanical properties of yarn.
- The production rate of warping should be high.
- The surface of warping package surely cylindrical.
- Warping length should be observed.
- The outside of warping bundle must be barrel shaped.

## **2.12Types of Warping:**

1. Sectional warping or ball warping

.2. High speed or direct warping.

### **High speed or direct Warping:**

High speed warping also called Beam warping/direct warping. In high speed warping the yarn is wound parallel on the warping beam. All the yarns are wound at once and simple flanged beam is used. It is a very high speed process and is used for making fabric of single colour.

### **Features of high speed warping –**

- It used in most of the fabric in large production.
- Weavers beam produce from single yarn.
- The rate of production is very high and sizing is also done.
- Simple flange of beam is used and not used drums.

### **Packing fault-**

- Count mixing and knotting is not done properly
- Slough off
- Extra yarn
- Cut yarn
- Lot mixing

## **2.13 Dyeing and sizing procedure of denim yarn:**

The process by which a textile material is to be changed physically or chemically. So that it looks mono uniform colored is called dyeing. Dyeing is mainly depends on the type of the fabric, structure of fabric and properties of dyes.

Objectives of dyeing:,

1. The textile goods are dyed uniformly with single color.
2. To increase the attractiveness of textile materials.

3. To make the fabric suitable for various usage and decorative purposes.

Dyes use for denim:

- 1) Vat dyes,
- 2) sulfur dyes.

### 2.13.1. Vat dyes

Vat dyes are normally different from reactive dyes, disperse dyes, basic dyes etc but its application process is near similar as sulfur dye .It is widely used for run the dyeing process of cotton yarn which is used for jeans or denim product. Vat dyes are natural coloring materials which are solubilized in a vat by the fermentation process called vatting .Vat dyes are insoluble in water but becomes in soluble from vatting .The process of convert insoluble vat dyes into soluble from is known as vatting .It is natural coloring dyes. Final color is developed by oxidation process and it is done at alkaline condition. Its rubbing properties is not good but its fastness properties excellent.

### 2.13.2. Sulfur dye:

Sulfur dyes are highly colored, water insoluble compounds and have to converted into water soluble substance from before application of textile materials .This conversion carried out by a treatment with a reducing agent like dilute aqueous  $\text{Na}_2\text{S}$ .Then these are converted into original water insoluble from by oxidation .The oxidation carried out by oxidation. It have sulfur linkage within their molecules .It is highly color insoluble dye ,no direct affinity towards cellulosic fibers .Its light an wash fastness is excellent ,easy to apply in wide range of shade.

#### **Some reducing and oxidation agents:**

- 1) Na sulfide,
- 2) Na Hydro sulfide,
- 3)Thioglycolic acid,

- 4) potassium dichromate,
- 5) Na perborate ,
- 6)Na peroxide.

## 2.14 Sizing:

Sizing is the process of applying the size material on the yarn. It is the process of giving a protective surface coating on the warp yarn to minimize yarn breakage during weaving.

### 2.14.1. Objective of sizing:

- To protect the yarn from abrasion
- To improve the breaking strength of the yarn
- To increase smoothness of yarn
- To increase yarn elasticity
- To decrease hairiness
- To decrease the generation of static electricity

### Some size material:

- 1)Orchid,
- 2) Siza bond,
- 3) PCB,
- 4) Wax,
- 5) Water.

### 2.14.2.Types of Sizing:

- **Pure sizing:** size pick up % is 3 – 10 % is called pure sizing.
- **Light sizing:** size pick up % is 11 -16% is called light sizing.
- **Medium sizing:** size pick up % is 17 – 40 % is called medium sizing.



- **Heavy sizing:** size pick up % is above 40 % then it is called heavy sizing.

## 2.15 Weaving process of denim fabric:

The *weaving process is a combined process* of five basic operations like shedding, picking, beating-up, left off and take up. The process of producing a fabric by interlacing warp and weft threads is known as weaving. Weaving is finished by interlacement of warp and weft threads, where warp yarns are white and weft yarn are colored. The machine used for weaving is known as weaving machine or loom.. Different fabrics are produced in Weaving Industry. These fabrics are weaved by using various looms and related machines. Loom is a machine or device which is used to produce woven fabric. It is the central point of whole process of cloth production. In this framework warp thread is as sheet.

Loom are two type: between two layers of warp sheet by methods for an appropriate bearer,

1) Manual/ hand loom :

- vertical loom,
- pit loom,
- frame loom etc.

2) Modern loom :

- air jet loom,
- rapier loom ,
- projectile loom,
- water jet and so on.

## FLOW CHART OF WEAVING

Weavers beam



Drawing/ knotting



Denting



Shedding



Picking



Beat up



Take up and let off



Rolling

### **2.15.1. Fabric structure:**

Fabric structure will also affect the clarity and color richness of a digitally printed image. Wicking can also be enhanced or subdued depending on the fabric structure. Weaves with long floats like satin tend towards higher levels of wicking, plain weave fabrics or knit minimize wicking. If the fabric structure is very bulky or uses a great deal of yarn, as is the case with knitted fabric, it will be more absorptive and require greater amounts of ink/dye to be printed. The denser the weave or surface structure, the greater the likelihood of increased surface tension. The fabric structure will also impact the clarity and color richness of a digitally printed image. Wicking can also be enhanced or subdued, based on the fabric structure. We can weave with stretch or inflexible as much as required. We can utilize coarser tally to make coats or shorts. Utilizing cotton is progressively agreeable in this style.

The form of interlacing of warp and weft yarns can be divided basically into three categories- plain, twill and satin/sateen weave. These three kinds of forms are called basic weaves

### **2.16 Finishing process of denim fabrics:**

After final woven fabrics, the yarn is twisted on a material roll that we get from weaving machine at specific interims and kept an eye on review machine. So any weaving issue can be recognized. After weaving process finishing is done. Normally finishing is experiences different procedure. For example: loading, brushing, singeing, skewing, washing, drying, moisture controlling, calendaring, ironing, cooling and folding polluting influences and furriness of the denim fabric. In this process neps , dust, projecting and hairy fiber removed. At this stage also controlling the moisture, bowing, curve the fabrics. Washing is also done at this stage and dry and iron and fold the fabrics. After complete all step then it is sent to for clothing producing.

### **2.17 Denim washing process:**

The wash out effect is achieved by removing dyestuff from fabric to get popular abraded, worn out look during washing process.

Wash can be divided into two types. Such as-

- Mechanical wash
- Chemical wash

#### **2.17.1. Mechanical wash:**

Mechanical wash contains garment wash, stone wash, sandblasting etc.

#### **2.17.2 Chemical wash:**

Chemical wash contains acid wash, enzyme wash, bleaching wash etc.

## 2.18 Fabric Inspection Method:

Fabric is inspected to determine its acceptability from a quality view point.

There are various fabric inspection system such as-

- 4- point system
- 10- point system
- 2.5- point system etc.

### 2.18.1. Four Point system

4 Point system for fabric inspection is widely used in apparel industry for fabric quality inspection. To use this system you have to know following things.

Fabric inspection method or preparation

Criteria of giving penalty points based on defects and defect length.

Calculation method of total penalty points for total defects found in a fabric roll or than

A Check sheet or format for recording data

Knowledge of different types of defects .Fabric inspection method or preparation.

### 2.18.2. Criteria for giving penalty points of 4 point system:

In the following table the penalty evaluation points has been given for different length of fabric :

Size of defects	penalty point
Defects up to 3 inches	1
Defects > 3 inches < 6 inches	2
Defects > 6 inches < 9 inches	3
Defects > 9 inches	4
holes and openings (largest and dimension)	
1 inch or less	2
Over 1 inch	4

Calculation of total points per yards

In 4 point system fabric quality is evaluated by unit points/100 sq. yds.

Points / 100 sq. yd. = (Total points in roll \* 36 \* 100)/ (Fabric length in yards \* Fabric width in inches)

Normally fabric roll containing 40 points per 100 square yard are acceptable.

### 2.18.3. Ten Point System:

For production of high quality garments, need high quality piece goods. It is an universal truth. When a sewing factory receives fabric from the mill, it is difficult to conduct a full 100% inspection of the fabric. So then minimum 10% inspection of all piece goods prior to spreading the fabric. There are several methods of fabric inspection in garments industry. Ten Points system is one of them.

The 10 point method is a point per fault system, which gives a measurable guide to quality grading per roll. In 1955s “Ten Points” piece goods evaluation was adapted by the Textile Distributors and National Federation of Textiles. The system assigns penalty points to each defect as per following guideline.

#### Warp and weft defect:

##### Warp Defects

Size of defects →→→→→→→→→→→→→→→→→Penalty

Up to 1 inch →→→→→→→→→→→→→→→→→1 Point

1 to 5 inches →→→→→→→→→→→→→→→→→3 Points

5 to 10 inches →→→→→→→→→→→→→→→→→5 Points

10 to 36 inches →→→→→→→→→→→→→→→→→10 Points

##### Filling/Weft Defects

Size of defects →→→→→→→→→→→→→→→→→Penalty

Up to 1 inch →→→→→→→→→→→→→→→→→1 Point

1 to 5 inches →→→→→→→→→→→→→→→→→3 Points

5 inches to half the width →→→→→→→→→→→→→→→→→5 Points

Half to Full width →→→→→→→→→→→→→→→→→10 Points

A maximum 10 Points is charged for one linear yard of fabric.

Working Procedures:

Under the 10 Points system, a piece is graded as “First”, if the total penalty points do not exceed the total yardage of the piece.

In case of a fabric wider than 50 inches; “First” quality is considered if the total defect points do not exceed the total yardage of the fabric.

A piece is graded as “Second” if the total penalty points exceed the total yardage of the piece.

## **2.19 Major Defects:**

There are some major defect in woven fabric they are not like to slubs, holes, missing yarns, yarn variety, end out, dirtied yarns, and wrong yarn.

Major defect of color or printing carried out of register, color spots, machine stop, shading out, shading smear, or concealing.

### **2.19.1. Inspection Procedure:**

1 for Assessing color, construction, finish and visual appearance are should required to approved bulk of dye lot must be available before starting inspection

2.A roll by checking shade variation between Centre and selvage and the beginning is done by shade continuity, middle and end of each roll must be evaluated and documented.

3. There are some textiles products like knits must be evaluated for weight against standard approved weight.

- 4 .Fabric width must be checked from selvage to selvage against standard.
- 5.All defects must be required to marking during inspection and fabric inspection speed must be not more then 15yds per minute.
- 6.Without suitable and safe environment with enough ventilation and proper lighting fabric inspection is not done properly.

### **2.19.2. Defects Rules:**

- A constant of imperfection will be relegated four points for each direct meter or yard in which it done.
- Any piece having a running inspection defects are more then three consistent direct meters or yards then it will be rejected. All process of point system.
- Any piece with a full width defect bigger than six” then it must be rejected.
- Any piece that contains in bigger then three full width defects for every single defect one hundred direct meters or yards must be rejected.
- No piece will be acknowledged that contains a full width imperfection in the first and last three meters or yards no piece will be accept that it contain full width.
- A gap or tear is considered as a major problem and it will be punished four
- Fabric construction and weight, there are 0% tolerance no tolerance is accepted.
- The distance between two major defects should required not less than 20meters.
- All major and full width defects are considered as a polyester string at thread as selvedge.



### **2.19.3. Following defects are cut table and will be rejected:**

- Wrinkles, hitches, slub, pollution, spots and so forth are done continuously.
- Any frequent issues.
- Broken end, twofold end, wrong draw reed mark is more than one meter.
- Holes torn and drift above ¼ inches.
- Unsuitable selvedge, light weft bar, count variety, Lecco, conceal variety
- The length of heavy weft bar more than 6inch long.
- The maximum number of time most regular process is the American 4 point system.
- The usual output contains of two numbers.
- The usual number of points (on a 100) of all check rolls.
- The extent of moves above acceptance limit.

### **2.19.4. Major problems/faults/defects of yarn, dyeing & sizing weaving and finishing:**

- Weak yarn
- Neps
- Hairness
- Slub effect
- Twist
- Thick and thin
- Uneven yarn count
- Unlevel dyeing

- Listing
- Ball formation
- Wrong dyeing & padder tension
- Off shade
- Loose , tight , miss warp
- Double warp
- Line mark
- Tample mark
- Stop mark
- White and black mark
- Knot
- Wrong denting, reed, twill
- Hole
- Smach
- Loom bar
- Line mark
- Snarl
- Miss , broken, short pick
- Reed mark
- Cresh mark
- Wrinkle
- Shrinkage
- Skew
- Bowing
- Weavy
- Float
- Burning
- Water sport

## **CHAPTER-3: EXPERIMENTAL DETAILS**

### 3.1 High speed warping quality parameters:

#### 3.1.2. Yarn used (warp) in denim production:

1. **RS (Ring Slub):**, 10, 12, 14, 16, 18, 20 Count.
2. **RS (Ring Slub):** 7, 9, 10, 12, 14 , 16 Count.
3. **RC (Ring Carded):** 8, 9, 10, 12, 14, 16, 20, 30Count.
4. **RC (Ring Carded) :** 10Count.
5. **Siro:** 10, 14, 20Count.
6. **RC (Ring Carded) Compact Siro:** 20Count.
7. **MC (Multi-count):** 7, 9, 10, 11, 12Count.
8. **RMC (Ring Multi-count):** 10Count.

#### 3.1.1. Table no 1: Details information about tension and speed(RPM) in warping machine:

counts	Total ends	Tension (G/E)	Speed (RPM)
8	5300	75-80	480-520
10	5328	65-70	480-520
12	4900	50-55	450-480
14	6912	45-50	420-450
16	4150	35-40	420-450
18	6400	20-30	380-400

\*Source ONE Denim Mill Ltd

This Table indicates different kinds of yarn counts, their types and tension and speed .Tension is normally 20-80, lower tension is 20 and highest tension is 80. For Higher no of count the tension is 20-30 comparatively lower no. of count tension is 75-80. Here we used 5 types of yarn such as OE (open ends) ,MS (Medium slub) , RS (Ring slub) ,RC( Rotor card) , R. combed (Rotor combed).As a example for 8,10 count in the table OE/MS/RS/RC Yarns are using and tension is applied in 65-80 and speed is 480-520. Its done for reducing yarn breakage. If the same tension is applied in different count then it is highly possibility to increase yarn breakage.

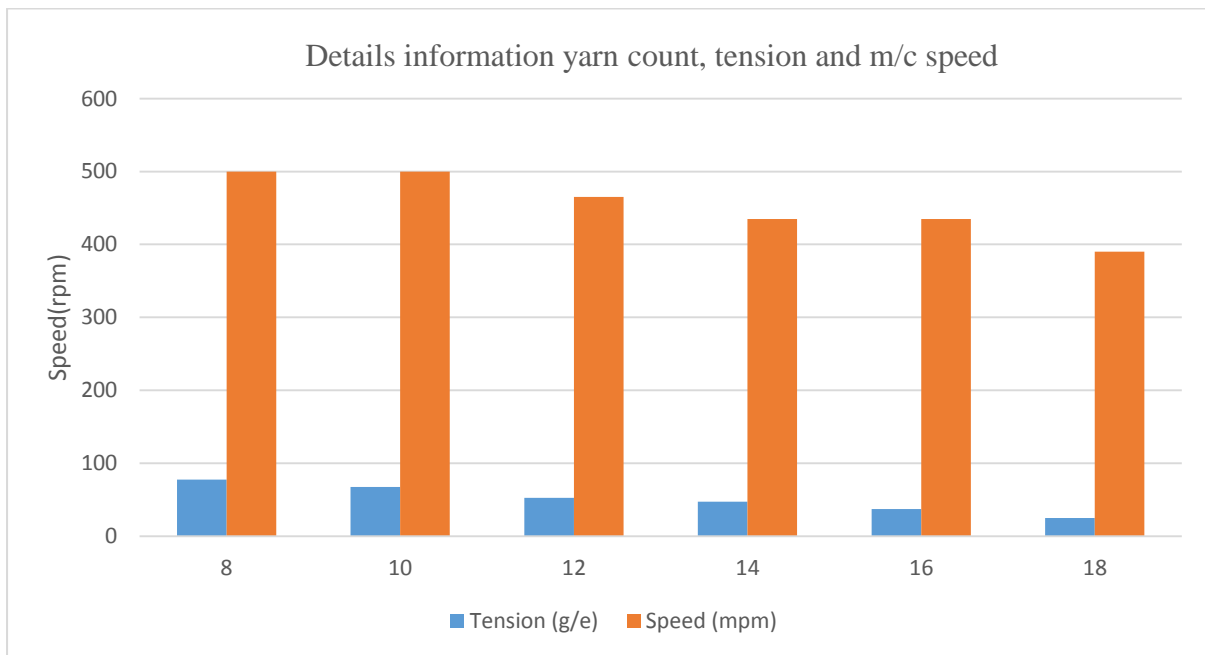


Fig:1 Details information about tension and speed(RPM) in warping machine

### 3.1.2. Table no 2: Information about machine speed and breakage of yarn purchased from different spinning mill:

Sl. No.	Yarn Supplier	Types of yarn	Yarn Count (Ne)	Machine Speed (RPM)	Breakage (Per hour)
01	For the sack	OE, RS	16	450-480	12-14
02	Of confidentiality name are not used.	OE, RS, Combed	8, 10	450-480	12-14
03		OE, RC, RS	18, 20	480-500	8-10
04		OE, RS	10, 12	480-500	18-20
05		OE, RC, RS	14, 16	480-520	7-8
06		MS, RC	20, 22	450-460	16-18
07		OE, RS	20, 22	420-450	17-20
08		OE, RS	8, 9, 10	480-520	6-7

\*Source ONE Denim Mill Ltd

From this table, we know some information about different types of yarn supplier, breakage and machine speed for denim production. We also know about different types of yarn and yarn count. Here, we can get some information about machine efficiency depending on yarn supplier, yarn types and yarn counts. We know that, machine efficiency also depends on machine speed and yarn breakage. Yarn breakage is the fundamental problem of warping. So if the warping quality is good then the other step will be more easier. This table provides us the relation between yarn count, Yarn breakage, machine speed and also machine quality. By this table we get that the yarn is coarser then we can easily run machine at high speed and the number of yarn breakage is lower. On the other hand if we use for the finer yarn then we cannot run machine as high speed as like coarser yarn. We see in the table yarn open ends and ring slub yarn from count 8,9,10 it show high speed ball warping where defect per hour only 6-7 times. It give finer count, by using this speed is more and lower yarn breakage Another company provide open ends and ring card and combed yarn which count is 8-10 but

the machine speed decrease and also yarn breakage increase. From this we learn that if the count is almost same and type of yarn is also same but depending on the quality of yarn and yarn supplier machine speed and also yarn breakage can varied. All the data of this table showed those things.

### 3.2Dyeing quality parameters:

#### 3.2.1 Table no 3: Various colors and shades of denim fabrics:

Shade	Shade grade	Shade%
Indigo	Dark	4.8%
	Medium	3.5%
	Light	2.7%
Black	Dark	5.4%
	Medium	4.8%
	Light	3.5%
Bottoming	Dark	5%
	Medium	3.5%
	Light	2.5%
Topping	Dark	4.2%
	Medium	2.8%
	Light	1.90%

\*Source ONE Denim Mill Ltd

This table is giving us the information about Dyeing shade, shade grading, shade %. In this table 4 types of shade is used by us. They are Indigo, Bottoming, Topping, Black. Every shade is grading by dark, medium and light.

In Indigo the shade % is vary between 2.7 to 4.8% (Light to Dark).

In Bottoming shade % is vary between 2.5 to 5% also (Light to Dark).

In Topping shade % is vary between 1.9 to 4.2% (Light to Dark).

In Black shade % is vary between 3.50 to 5.40% (Light to Dark).

### 3.2.2 Table no 4: Information about Squeeze roller pressures, Deeping time, M/C speed (RPM) used in dyeing and sizing machine:

Dye Box No	Squeeze roller Pressure (PSI)	Deeping Time (SEC)	M/C Speed (RPM)
01	70	15-18	26-28
02	65-70	15-18	26-28
03,04	65	15-18	26-28
05,06	70	15-18	26-28
07	70-75	15-18	26-28

\*Source ONE Denim Mill Ltd

By this table we see rope dyeing machine's different parameter. In Slasher dyeing machine there are different dyes and chemical boxes are present. In this table we showed 5 dye box and there squeeze roller pressure, deeping time and machine speed. From these four parameters we showed the condition of dye bath. As slasher dyeing is a continuous process so these parameters should be maintained very carefully. Here we see different dye boxes pressure, depping time and machine speed. Such as for first dye box has 70psi squeeze roller pressure, to maintain proper tension of the rope it should follow 26-28 tension and for matching proper color shed deeping time should be 15-18 sec. Here whole machine output 23-27. As like other dye boxes are followed this parameters accordingly.



### 3.2.3.:Table no 5: Some parameter of sizing and details about sizing sample recipe:

#### Some parameter of sizing:

- 1) Orchid= 50 kg
- 2) Siza bond= 10kg
- 3) PCB= 05 kg
- 4) Wax= 03 kg
- 5) Water= 775 ltr

<b>Sizing Sample Recipe:</b>		
Name	Actual Parameters	Calculated Parameters
Cooking time	(40+30) Min 775 ltr	(40+30) Min 850 ltr
Water Temperature	(60+90)°C	(60+90)°C

\*Source ONE Denim Mill Ltd

This table is given us the information about different parameters of sizing, sizing recipe.

In sizing machine one Scouring box is present where the temperature is vary between 60-90<sup>0</sup> C and cooking 40+30 min ,in this recipe using 775 ltr water.

In this table we know some sizing parameter like orchid, siza bond , size PCB , wax and water. These are some sizing material which are normally used in sizing after dyeing. Sizing material is used to give a surface coating to reduces yarn breakage.

\*Source ONE Denim Mill Ltd

### 3.3LCB Quality Parameters:

#### 3.3.1. Table no 6: Daily Knotting & Gaiting Program

SL	Lo om No	Custome r	Grey Construction	Design	Reed	M/C Pick	Total Ends	Progra m	Warp Count	Warp Tens	Selved ge
1	58	Al-Noor	95X58/14oex(300+40D)+(12+40D)	3/1 Desi	931/4	57	6672	Knottin g After Beam Finish	14oe	3.1	14/4.
2	18	"	"	"	"	"	"	"	"	"	"
3	28	"	"	"	"	"	"	"	"	"	"
4	37	"	"	"	"	"	"	"	"	"	"
5	39	"	"	"	"	"	"	Pattern +Knotti ng+Ca m Change	"	"	"
6	12	Amrin Trader	99X64/14rx(300+40D)+(12+40D)	4/1 Desi	22/4- 5	64	7290	Knottin g After Beam Finish	14k	3.1	14/5.
7	33	"	"	"	"	"	"	"	"	"	"

8	44	"	"	"	"	"	"	"	"	"	"
9	19	"	99X58/14rx (12+40D)	"	"	58	"	"	"	"	"
10	7	Revolin Denim	92X58/14oex( 300+40D)+(12 +40D)	3/1 Desi	1085/3 3.4	58	6534	Knottin g After Beam Finish	14oe	3.1	14/4
11	8	"	"	"	"	"	"	"	"	"	"
12	10	Salek Textile	72X53/(10oe+ 12rs)x(150+40 D)	3/1RHT	931/3	52	4920	Knottin g After Beam Finish	10oe+ 12rs	3.1	12/4
13	13	"	64X40/7oex9o e	"	16/4	39	4360	"	7oe	"	8/4

\*Source ONE Denim Mill Ltd

By this table we know daily knotting & gaiting program. In this table we see loom no, customer, grey construction. We also know the weaving design, reed count, machine pick. Other this information also find total ends, weft yarn, warp count, warp color, warp tension and selvedge. By this table we know the hole knotting and gaiting process.

### 3.4 Weaving Quality Parameters:

Table no 7: Grey fabric test report:

Customer	Weave	Color	EPI X PPI		Weight (Oz/yd <sup>2</sup> )		Shrinkage%		Bow %	Movement %	
			B/W	A/W	B/W	A/W	Warp	Weft		A/W	
Shasha Denim	3/RHT	IBST	79X59.5	80.5X59.5	11.38	10.85	0.00%	1.50%	0.50%	7.10%	0.60%
Shasha Denim	3/RHT	IBST	73X49	74X50	12.26	12	2.00%	2.00%	0.50%	8.70%	0.40%
Shasha Denim	3/RHT	SBIT	73.5X48	75.5X49	12.26	12.12	2.00%	2.20%	0.50%	6.80%	0.20%
Shasha Denim	3/RHT	INDIGO	83.5X49.5	101X50.5	11.47	13.03	1.50%	17.50%	0.50%	9.20%	3.30%
Shasha Denim	3/RHT	BLACK	76.5X54	95X55.5	11.02	13.38	2.50%	19.50%	0.50%	9.70%	2.60%
Shasha Denim	3/RHT	SBIT	85.5X58	102.5X59	11.14	12.82	2%	17%	0.50%	8.30%	1.70%

\*Source ONE Denim Mill Ltd

From these table we can know the grey fabric test report. Here we know the buyer name, weaving design, color. We also know the information about EPI & PPI before wash and after wash, weight before wash and after wash. Other this we also know shrinkage ,bow , skew and movement .By this we know the difference data before after wash.

### 3.5.2.: Table no 8: Quality Wise Daily QC Report

Buyer : Argon Denim  
 Order No : 14/3430  
 Code No : 17130-1  
 Construction :67 X 53/ 10 Rx 150+40D Black  
 Weft Yarn : 150+40D Black- 1 Pick  
 Pick/Inch : 52  
 Weave : 3/ RHT  
 Color : IBST  
 Shift : A

Loom No.	Reed Count	Grey Width "	By Pass Yarn	RPM	Warp Breakage	Weft Breakage	Warp CMPX	Weft CMPX	Eff%	Fabric Fault
01	610/4	66.5"	10	550	2	2	0.8	0.8	98.7%	Tample Mark
02	"	67.5"	12	"	2	0	0.8	0.0	99.9%	
03	"	"	10	"	5	1	2.0	0.4	96.8%	
04	"	"	14	475	6	1	2.7	0.5	96.4%	Miss Pick
05	"	"	18	"	2	0	0.9	0.0	98.3%	
41	"	67.2"	14	"	4	0	1.8	0.0	98.8%	Tample Mark
43	"	67.8"	12	"	3	5	1.4	2.3	96.8%	
44	"	67.4"	10	525	2	3	0.47	1.2	98.2%	
53	"	66.8"	11	475	16	0	10.0	0.0	70.2%	
52	"	67.2"	10	500	1	1	0.4	0.4	97.7%	
51	"	67.5	15	"	3	0	13	0.0	99.0%	
<b>Average</b>							<b>2.0%</b>	<b>0.5%</b>	<b>95.4%</b>	

\*Source ONE Denim Mill Ltd

From these table we can know the quality wise daily qc report. Here we firstly get some information like buyer name, order no, code no, grey fabric construction, pick , weave and color. Then we know about loom no, reed count, grey width. We also find the speed of the machine, warp & weft breakage , effi% , fabric fault. All this data we find by these table.

### 3.5.3. Some Usual fabric construction of one denim:

#### Some Usual fabric construction of one denim:

- 95X58/14oex(300+40D)+(12+40D)
- 99X64/14rx(300+40D)+(12+40D)
- 99X58/14rx (12+40D)
- 92X58/14oex(300+40D)+(12+40D)
- 72X53/(10oe+12rs)x(150+40D)
- 64X40/7oex9oe
- 80X48/(16rs+16r) x 20cc
- 95x621 140e (300+40D)+(12+40D)
- 68 x50/9rs x12+40D

\*Source ONE Denim Mill Ltd.

### 3.5 Table no 9: weaving production:

#### Weaving Production

Loom Type	100% Production	P/A-R/A		P/B-R/B		P/C-R/C	
		Actual Production	EFF%	Actual Production	EFF%	Actual Production	EFF%
Arijet 35/22	10,083 yds	2,139 yds	63.6%	2,193 yds	65.2%	2,222 yds	66.1%
Rapier 35/34	14,450 yds	3,755 yds	77.9%	4,219 yds	87.5%	4,100 yds	85.1%
Somet 30/20	3,859 yds	867 yds	67.3%	1,040 yds	80.8%	1,027 yds	79.8%
<b>Total</b>	28.392	6,761 yds	75.1%	7,452 yds	82.8 %	7,349 yds	81.6 %
<b>Both Production= 21,562 yds, EFF%= 80%</b>							

\*Source ONE Denim Mill Ltd

From these table we saw weaving production . Which type of loom and no of loom is used ,daily actual production calculated production all we know. By air jet, rapier, somet machine are running daily in every shift. We get calculated production, actual production and efficiency of the machine.

## **CHAPTER-4: RESULT AND DISCUSSION**



## **4.0 Result and Discussion:**

From these experiment we have exposed a part of the outcomes which were shown in our task paper. We have learnt different steps of denim production. From table-1 we see that if count number increasing then speed of machine and tension is decreasing. From table-2 we know that if number of count is same from different supplier but quality is not same, number of breakage is different. In table-3 we see the different color shades. From table 4&5 we see squeeze roller pressure, deeping time and sizing parameters. Then we also know about lcb quality parameters and weaving quality parameters and weaving production.

### **4.1. Analysis Sectional warping Section:**

Yarns are one of the main materials for denim weaving. So the nature of the yarn must be perfect to get a decent quality product. From the table-1, 2 we can discover the variables that speak to the nature of the yarn. It must be to utilize best quality yarn to have the best quality fabric.

### **4.2 Analysis dyeing Section:**

Slasher dyeing is viewed as the most ideal dyeing approach for yarn as short dyeing time that doesn't enable indigo to infiltrate fully the filaments, along these lines making ring-dyed yarn that shapes preferred and quicker over completely dyed yarn.

Shade variety is similarly lower in the slasher dyeing process than the most utilized shared dyeing, a denim industrial facility authority clarified. Less water is expended while concoction use is high, individuals associated with the procedure said.

Another part of the procedure is it gives a profound look, the one of a kind look that denim beloveds are searching for.

Despite the fact that slasher dyeing apparatus establishment cost is higher than sliced dyeing, purchasers offer 10 to 15 taka more expensive rate because of its shading and quality, they explained.

### 4.3 Analysis Sizing Section:

**Viscosity of size glue in size box:** All variation in the concentration or temperature modifies the viscosity of the glue which thusly influences both the degree of size get and degree of infiltration. At first as the viscosity expands, the size get additionally increments. However, as the viscosity increments past a point, the size get is decreased.

**Squeezing pressure and condition of squeezing nip:** The pressing weight decides the degree of entrance of the size glue between the strands of the yarn and furthermore of the expulsion of overabundance size glue and henceforth the degree of the size get.

**Speed of the sizing machine:** Other sizing conditions staying unaltered, the size get increments with expanding sizing velocity and the other way around. This is on the grounds that the time accessible to press the surplus size from the yarn is less at high speeds.

**Depth of immersion roller in size paste:** The depth of immersion roller in the paste decides the term for which the yarn remains drenched in the paste. This length thusly impacts both the degree of size get and the degree of size infiltration.

**Level of size glue in the size box:** Variation in the degree of size glue is a significant wellspring of size get varieties both inside and between pillars.

### 4.4 Analysis Weaving Section:

Weaving is an important procedure in fabric production. Weaving procedure known as the way toward framing an inflexible fabric by interlacing the warp and weft yarn. It can create a decent finished results with smoothness, less hairiness and quality features of fabric since it has weaving inclination process. While getting weaving, we should know how the fabric delivered and there are some weave structures that we can make.

## **4.5 Fault analysis:**

Assessing a fabric is another major part of value control of Denim. It is difficult to notice and modifying the outcomes. The outcomes are planned to be expelled from the texture for more arrangements. For studying the shortages we utilized the 4-point and 10-point system. This are the most regularly used system in the endeavors..

## **CHAPTER-5: CONCLUSION**

## 5.1 Conclusion:

From these experiment we have exposed a part of the outcomes which were shown in our task paper. We have learnt different steps of denim production. From table-1 we see that if count number increasing then speed of machine and tension is decreasing. From table-2 we know that if number of count is same from different supplier but quality is not same ,number of breakage is different. In table-3 we see the different color shades. From table 4&5 we see squeeze roller pressure, deeping time and sizing parameters. Then we also know about lcb quality parameters and weaving quality parameters and weaving production from table 6,7,8,9.

At present quality turns into an unexpected issue for producing products. Individuals are absorbed to pay more to get the quality items. Today buyer are gradually concerned about the quality of the products. In the market of competition, every one of the suppliers of the material are trying to keep maintain quality products in their item. So to be in the market it is important to keep up quality for delivering products.

In our country majority of the businesses keep up quality parameters however till now we are still behind applying the cutting edge revolution. A percentage of the projects actualized the technique but most of the majority of them don't. The technique generally covers the region of the on-line quality control. Which decreases the time misfortune during the creation.

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