Project

On

"Study on Denim Productivity of Slasher Dying & Weaving"

Course Title: Project (Thesis)
Course Code: TE-4214

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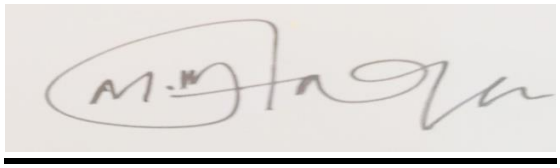
This Project given in partial fulfillment of the need for The Degree of Bachelor of Science in Textile Engineering

DECLARATION

We hereby declare that, this project constrained "Study on Denim Productivity of Slasher Dying & Weaving”**.** The work is done by us under the supervision of Professor Dr. Md. Mahbubul Haque. We also declare that it has not been submitted for a degree of other university. All the materials use for this work has been properly avowed.

We hereby declare that the above mentioned statements are true to the best of our knowledge.

Supervised By



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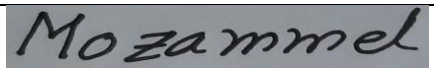
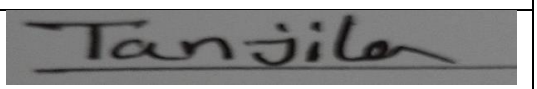
Mozammel Hossain	181-23-5349	
Tanjila Islam	181-23-5365	

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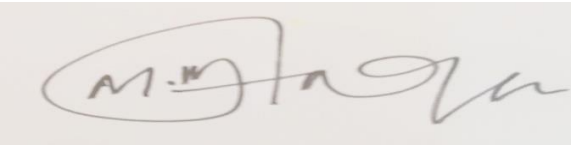
LETTER OF APPROVAL

The project is made by Mozammel Hossain carrying ID: 181-23-5349 and Tanjila Islam carrying ID: 181-23-5365 is approved in Partial Fulfillment of the necessity for the Degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING. The same students have completed their project work below my supervision. throughout the analysis amount I found them sincere, diligent and keen.



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ACKNOWLEDGEMENT

First of all, we would like to express our sincere gratitude and appreciation to Almighty God for his divine blessings that enabled us to complete this project successfully.

We would like to express our gratitude and best wishes to our supervising teacher Prof. Dr. Md. Mahbubul Haque, Professor and Coordinator Department of Textile Engineering, Faculty of Engineering, Daffodil International University, Dhanmondi, Dhaka. Our supervisor's deep knowledge and deep interest in field development has influenced us to run this project. His immense patience, scholarly direction, unwavering enthusiasm, constant and energetic supervision, constructive criticism, valuable advice, reading a lot of inferior drafts and revising them at all stages have made this project possible. We would like to express our sincere gratitude to the other faculty members of the Department of Textile Engineering at Daffodil International University. Special thanks to NZ Tex Group's Senior Textile Engineers and Officers from whom we have collected valuable information and samples. We would like to thank our full course partner at Daffodil International University. Those who took part in this discussion to finish the course work.

Finally, we must acknowledge our parents with due respect.

DEDICATION

This thesis report is devoted to our beloved parents and honorable teachers

ABSTRACT

The project is on “Productivity of Denim Slasher Dyeing & Weaving”. To know about Denim productivity, we have to go NZ Denim Limited sister concern of NZ Tex Group. We need to start working on the project with effective analysis. We go through every steps of production and collect the data on the basis of project. We tried our best with our keen hospitality to expand knowledge on Denim production, Warping, Dyeing, Weaving, Finishing, Inspection. We also try our best to know about R&D as well as washing department. Here we see the direct warping system and Slasher dyeing. We see the production process and also the causes of faults, production losses and wastage. We also collect the data and important information from every process.

The study also showed which parameter can affect the denim production with denim production process and how to increase the productivity of denim with better quality.

At the end of this project we came in a result that we have to focused in these factor which affected the production in weaving and dyeing and the best factor is yarn quality. We have to overcome this factor to increase the production. Monthly production of warping in NZ denim is 2785400 meter, Dyeing is 2727200 meter when Maximum Speed of the dyeing machine is 25m/min and maximum creel capacity is 12, monthly production in Weaving is 2734930 yds., production in Finishing is 3342510 yds. grade A &B, monthly production in inspection is 3083685 yds. Special thanks to our honorable teacher and industry authority.

CONTENTS

Page No

LIST OF FIGURES

LIST OF TABLES

CHAPTER-1
INTRODUCTION

Introduction:

The first inventors of Denim Fabric are Jacob W. Davis and Levi Strauss. Denim comes from serge de Nimes. Denim is more Multipurpose or Versatile Fabric. Denim is considered one of the most popular and Oldest, Finest fabric now-a-days. It is a warp face fabric where the warp yarn is dyed and weft yarn remain undyed generally. Denim is more fashionable and acceptable by this global people. Denim fabric is produced by twill design. Indigo dye and Sulphur dyes are used in production of Denim Fabric. Bromo-Indigo, yellow this types of color are also used as the requirement. Since the workers and cow-boy used this raw denim because of their high durability. At the beginning it also used as sail. But now Denim used to make different types of apparel such as jacket, baby dress, ladies wear etc. It also used to make Jewelry, Furniture and decorative purpose. Bangladesh is the 2nd largest producer of Denim fabric after China. The Denim industry of Bangladesh Increase their productivity day by day. In the production strategy of Denim from Warping to Inspection the yarn and fabric are go through the different stresses and pressure. If the set level is collapse it will affect the yarn or fabric such as shade variation, elongation or different physical or chemical properties. If we overcome this problem, then the production will be higher. In weaving we also see Broken Pick, Knot, Broken End, Miss Pick, Return Pick and also some mechanical problem. If the tension is higher the warp breakage occurred. For all of this reason the machine stoppage time is higher and hamper the production. If we decrease this types of problem the production will higher. Maximum Denim are made by 100% Cotton, also cotton is blend with Polyester, Lycra etc.

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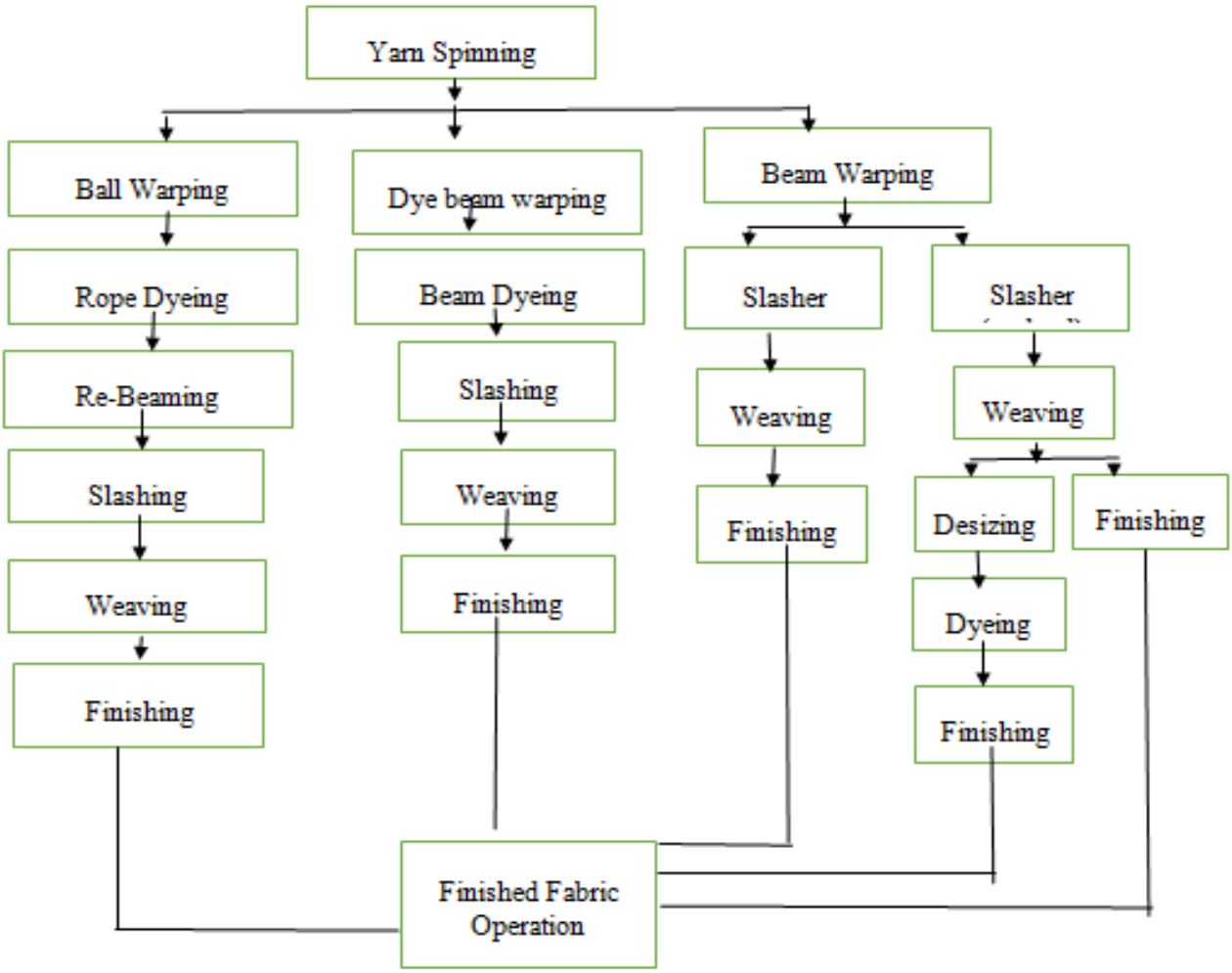
CHAPTER-2
LITERATURE REVIEW

2.1. Denim:

United State used Denim since ere while the middle 19th Century. At first it was used by worker as its durability but now the product become most familiar. By using Denim different types of product are made now. And different industry doing experiment to modified it. It will influence the future of Bangladesh Industry. Denim is produced by S Twill, Z Twill, Dobby, Broken Twill structure and the weight is 4oz to 16oz / sq. yds. Different types of Denim are manufactured by using different types of wash such as hand wash, stone wash, bleach wash, over dyed etc. Denim is preferable for all age consumers because it is not only looks good but also comfortable too. It is long time useable also. **[1]**

Figure-1: Denim

2.2. Flow chart of Denim:



2.3. Warping:

The first process of the Denim production is Warping. Warping the process in which the yarn is transferred from cone or cheese package to a beam where the yarn stays in parallel. Keep the yarn in uniform level is important thing in warping. This process is done to get better performance in weaving section. **[2]**

There are two types of weaving system are used-

a/Direct Warping (Direct Beaming)

b/Indirect Warping (Sectional Warping)

Objective of Warping-

- ✓ Convert Yarn package into Warp beam.
- ✓ To Contain required number of yarn uniformly.

Function of Warping Machine-

- ✓ Measuring the Warp yarn in the beam
- ✓ Speed control
- ✓ Pressing the warp beam by the surface contact of driving drum.

2.3.1. Direct Warping:

The yarn is unwinding from a single end yarn package on the creel and wound in a beam directly. It also known as direct beaming. It is comfortable to making every types of warp beam. In direct beaming the production will be higher. Here the uniform tension is required. This method is mostly used. The method starts with creeling and end with winding on a beam. There are different types of creel such as V-creel, Magazine creel, H creel, Automatic creel but here we saw the H Creel. **[2]**

Figure-2: Direct Warping

2.3.2 Warp Yarn Consumption: [3]

Here,

Warp Length = 10000

Count = 7 OE

Ends = 4500

Warp yarn consumption = Warp length / 1.6933 / 1000 / Count X Ends

= 10000 / 1.6933 / 1000 / 7 X 4500

=3796 kg

Figure-03: Cone Package

2.4. Denim Dyeing:

Dyeing is the acquisition of color with the firmness of the desired color for the application of dyes or pigments to textile materials such as fibers, yarns and fabrics. Pigment molecules are fixed in the fiber by absorption, expansion or bonding with temperature and are the main controlling factors of time. To coloring the yarn dyes is used here. There are various types of dyes but in denim dyeing largely used vat dyes and Sulphur dyes.

Types of Dyeing system-

- Slasher Dyeing
- Rope Dyeing

In case of Sheet Denim Manufacturing Slasher Dyeing is used and in Rope Denim Manufacturing Rope Dyeing is used. **[4]**

2.4.1. Slasher Dyeing:

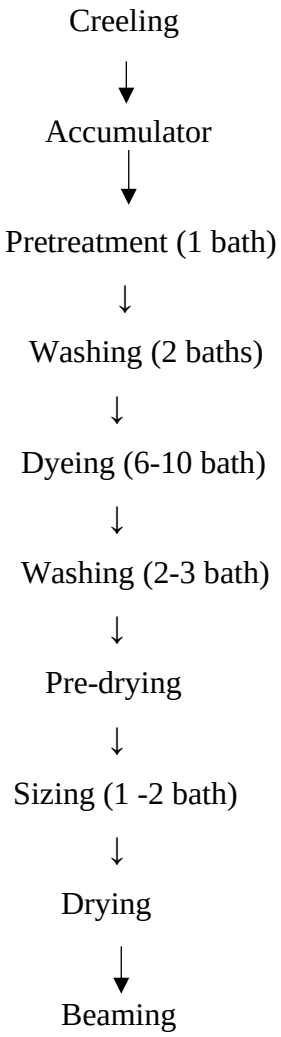
Slasher is a kind of dyeing in which dyeing and sizing process is done in a single method. This dyeing is also known as Sheet Dyeing. Here the warp yarn is passed through different bath of dye and at last the sizing bath and wound in a beam. In this method the yarns are dyed in continuous process that's why it also called continuous dyeing process. It is possible to dye Ne Count (9/s to 30/s) Slub & OE**. [5]**

Purpose of Dyeing:

- ✓ To looking attractive, the goods of Textile.
- ✓ Making fabric suitable for different usage.
- ✓ Used as decorative purpose **[5]**

Figure-04: Slasher Dyeing Method

2.4.2. Flow Chart of Slasher Dyeing: [6]



.2.4.3: Calculation of Dosing: [3]

Dosing = (Yarn weight X M/C Speed X Shade%) / Feed g/l

2.5. Sizing:

The preparatory method of weaving is known as sizing. The method by which size material is applied on the surface of yarn is called Sizing. This protective surface material is given to the warp

yarn. To increasing the weaving efficiency and decreasing the weaving breakage this size material is used. Native starches, slightly modified starches are used as size material. In NZ Denim Ltd. We saw they used TS968, Bensize AD-k, Bensize B-55, EK Size, Bensize P-110 etc. **[7]**

Figure-05: Sizing Method

2.5.1Objects of Sizing: [7]

- To get better efficiency in weaving.
- Breaking strength or tensile strength increasing.
- To get better quality fabric.
- Reducing hairiness and weakness of the textile materials.
- To improve elasticity.
- In blended, synthetic yarn reducing electrolytic formation.
- Smoothness of the yarn increasing.

2.5.2. Method of Sizing:

Here I write down some techniques of sizing-

- Slasher Sizing Method
- Foam Sizing
- Combined Sizing Method
- Emulsion Sizing Method
- Electrostatic Sizing Method

2.5.3. Different types of sizing following to application:

Pure sizing: Pure sizing is a type of sizing where sizing is committed on yarn that produced unbleached fabric. Thus the components are (7 to 10) % based on yarn weight.

Light sizing: In dyeing and printing this is used. And the sizing ingredients is (11 to 15) % based on yarn weight**.**

Medium sizing: The sizing ingredient is used (16 to 40) % based on yarn weight to increase the yarn weight and strength.

Heavy sizing: The amount of size ingredients is used based on the yarn weight is above 40% for increasing the weight. **[7]**

2.5.4. Recipe used at NZ Denim Ltd.

Water	700 Litre
Starch	80 kg
PVA	3 kg
Binder	8 kg
Wax	4 kg

2.6. Weaving:

The process by which interlacing is done by using two set of yarn (warp & weft) and a fabric texture is delivered is called weaving. Weaving machine means loom is utilized to complete this process. Weaving is a craft that has been going on for many years. The fastest use of weaving goes

back to Egyptian human progress. Over the years, both methods have undergone exceptional changes in such machines. From today, weavers have a wide range of opportunities to use, directly from the simplest weaving to the most complex weaving. **[8]**

Figure-06: Weaving Process

2.6.1. Flow Chart of Weaving: [8]

Weavers beam
↓
Drawing/ knotting
↓
Denting
↓
Shedding
↓
Picking
↓
Beat up
↓
Take up and let off
↓
Rolling

2.6.2. Basic Weave Design used for Denim:

- Plain weave
- Twill weave
- Zig-zag twill

- Herringbone twill
- Broken twill **[8]**

2.6.3. Modern Weaving Machines Classification:

According to the filling insertion mechanism weaving machines are classified now. The classification is mentioned here,

- Air-jet Loom
- Rapier Loom
- Water-Jet Loom when
- Projectile Loom **[9]**

2.7. Finishing Method

Generally, denim finishing is started, weaving section send the fabric without de-sizing. At first, brushed the fabric to get contamination free fabric. Then singeing is done with the help of flame to reduce hairiness and to make the fabric surface smoother than before by this process. Padded by a simple recipe, passed over two skew rollers to lower fabric torque which causes skew movement and then dried. **(Rf-6)**

Figure-07: Finishing Process

2.7.1. Flow Chart of Finishing:

Singeing.
↓
Softening.
↓
Skewing.
↓
Sanforizing.
↓
Calendaring.
↓
Stentering.
↓
Desizing
↓
Mercerization.
↓
Inspection and folding

2.7.2. Purpose of Finishing:

- To enhance the luster & beauty of the fabric.
- To get more service from the fabric & make the fabric stronger.
- To enhance the fineness
- To enhance fabric's smoothness.
- To ensure the softness of the fabric.
- To make the fabric more attractive. **[11]**

2.8. Inspection process of denim:

Inspection is the process where fabrics are check to Insure their quality. First inspection is done just after weaving and second inspection is done after finishing process. Finished fabric are Input of Inspection and output is inspected fabrics Inspected fabric meet the best quality for delivery some wastage is found here. Most of the textile industry use 4-point system for inspection. Here, Grading is done as Grade A Grade B grade Generally grade A & B have been approved to deliver. [11]

Figure-08: Fabric Inspection

Objective of Inspection:

- To grade the fabric according to 4-point system.
- To meet the best quality of fabric.

CHAPTER-3

METHODOLOGY

3.1. Methodology:

Methodology is that the Organic, Empirical analysis of the strategies practical to a field of study. It relates to the subject matter of the thesis which means that the relative output of the body of methods and principles related to the field of research and a branch of knowledge can come with theoretical analysis. I involved across fresh idea such as, Organic, Applied with qualitative technic. In thesis paper methodology is a section which allows the reciter to understand the study. It is not like a judgement otherwise a uniform process. Methodology help to relate the topic and understand it more.

3.2. Productivity of Slasher Dyeing Denim:

In production of denim fabric, the required yarn is store into the store section. Then the yarn comes to the warping section. There are different types of warping system and here they use direct warping system. In warping section, they set the creel according their requirement. After warping the warp beam is placed in dyeing section. And the beams are set in the creel zone, and complete the dyeing and sizing process. After that it send to the weaving place.

3.2.1. Denim fabric production sequence:

Yarn Store

⇩

Warping (Direct)

⇩

Dyeing & Sizing (Slasher Dyeing)

⇩

Weaving

⇩

Finishing

⇩

Inspection

⇩

Packaging

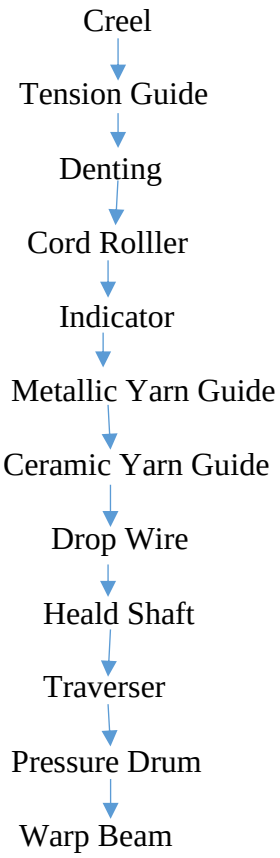
⇩

Delivery

3.3. Productivity of Direct Warping:

The first process of denim production is warping after yarn is store. Warping is a process in which the yarns are transferring from several types of package into a single package. Here the yarns forming a parallel sheet and the yarns are stay in uniform tension. The production of warping depends on different types of parameter. For example, how many number of creel and how many maximum number of creel can we used. Also the production depends on the running time of the machine and the machine efficiency. The production also depends on the skill of the worker, supervisor.

Process sequence of Direct Warping:



We follow up the warping production and collected the data from this section.

Table: 01: Details Information about direct warping:

Sl. No	Cone Length (m)	Count	Total Warp Length (m)
1	54500	12OE	10900
2	33000	7OE	6600
3	42600	10OE	14200
4	9000	10OESL	3000
5	33000	9R	16500
6	44000	10RS	1800

3.3.1. Machine Specification of Direct Warping:

The efficiency and productivity depends on the types of machine. Here in the warping section we saw Panon PLW-84 Machine. Two types of machine we have been see here.

Table: 02: Machine Specification of Direct Warping:

Brand Name	PANON
Model	Panon PLW-84
No.	082
Origin	Taiwan
Working Width	82” & 63’’
Date	2016
Beam Diameter	1275mm
Max Warping Speed	900 RPM
Creel Type	H
Creel Capacity	650
Reed to Reed Distance	0.8cm
Manpower	Twelve
Max Beam Capacity	1150kg (large) & 1020kg (Small)
Stop Motion	Auto
Tension Difference in yarn	(5-7) CN

3.3.2. Machine wise Data of NZ Denim Ltd:

Machine-1

Table:03: Information during production:

Length	RPM	No. Of Yarn	Break	Count
5458	801	527	7	12OE
7000	750	530	9	9R

Machine-2

Table:04: Information during production:

Length	RPM	No. Of Yarn	Break	Count
5160	750	550	6	20R
9627	700	550	7	8OE

Machine-3

Table:05: Information during production:

Length	RPM	No. Of Yarn	Break	Count
13900	550	527	6	16Rs
2653	800	527	2	6OE

3.4 Productivity in Slasher Denim Dyeing & Sizing:

Dyes are generally colored Vital Compound. It is used to color the textile material. Dyeing is the process which is used to modified the textile material chemically or physically. After warping section, the beams are come to the dyeing & sizing section. At first the creeling process is done. After that the unwinding process is started and yarn passes go through Accumulator, presser roller, Pad roller, Dye bath as well as Wash bath. In Slasher dyeing process the dyeing and sizing is done

together in same machine. At first scouring is done. Here they also used bottoming and topping as the requirement of buyer. Usually in denim dyeing Indigo and Sulphur dye are used.

In dyeing section, we follow up the production process and we collect some date about dyeing and sizing. We also disused with the Manager, Production Officer, Operator, Supervisor to know about different process and data. They also told about the wastage. During dyeing process, the data, they observe they write to the note. They also the dyeing process in dyeing book and Sizing process in Sizing book. The productivity depends on the machine types and also skill of worker.

Table: 06: Details Information about Slasher Dyeing & Sizing:

SL. No.	Warp Length (m)	Slasher Dyeing & Sizing Beam Length (m)	Count	Machine Speed
1	16500	16533	9R	25M/Min
2	11000	11040	6OE	25M/Min
3	17000	17120	6OE	25M/Min
4	18500	18680	8OE	25M/Min
5	27500	27405	16RS	25M/Min
6	16500	16420	10RS+10OE	25M/Min

3.4.1 Machine Specification of Slasher Dyeing & Sizing:

According to the brand of machine the quality of product and production can different. The specification of Machine is given here-

Table: 07: Machine Specification of Slasher Dyeing & Sizing Machine.

Brand Name	**PANON**
Origin	Taiwan
Creel Capacity	12
No. of color Dye Bath	11
No. of Size Bath	2
Total No. Of Box	17
Production Capacity	Continuous Dyeing Method
Year	2016
Stop Motion	Auto
Dye bath volume	1800 litre

3.5. Production in Weaving:

NZ Denim Ltd. have two weaving floor and one new floor is being preparing till now they using only slasher dyeing process to dye weft yarn. Weaving process are start running by unwinding the size yarn. Though drawing, denting & shedding is done before run the machine. Then picking & beating process start preparing the fabric and finally fabric is delivered to wound into the cloth roller. Due to machine stoppage or starting some wastage is introduced. In NZ Denim Rapier and Air jet loom is used to produce denim fabric. Those machine RPM is very high 700 to 1000 RPM.Air-jet machine have highest 1000 rpm, so those Air-jet machine have high efficiency as there are minimal amount of weft breakage. Crimp percentages range is 8.5 to 12+ sometimes. Due to improper sizing warp breakage is more in weaving, which causes lower quality of fabric.NZ Denim have two weaving floor named as weaving-i and weaving-ii. Weaving-i contain 80 machine and weaving-ii 74 machine. Their production capacity is 36000 yds. per day.

Table: 08: Loom Specification of Weaving Floor:

Brand Name	Picanol	Picanol	Picanol
Model	OMNI Plus 800	OMNI Plus (Summum)	Optimax-i
Origin	Belgium	Belgium	Belgium
Max RPM	900	1000	690
Reed Type	Profile Reed	Profile Reed	Plain Reed
Shedding Mechanism	Cam Shedding	Cam Shedding	Cam shedding/Electronic Dobby
Average Power Consumption	3.55 kW/h	3.40 kW/h	6.15 kW/h
Number of Relay Valve	14	16	
Number of Heald Shaft	6	6	12
Weft color capacity	2	2	2/4/6
Let Off Motion	Electronic	Electronic	Electronic
Take Up Motion	Electronic	Electronic	Electronic
Reed width	190 cm	220 cm	220 cm

3.5.1. Details Data About Weaving Section:

We both worked in the weaving floor to collect data of weaving production.

Table: 09: Details Data about Weaving Section (Slasher Dyeing):

SL. No	Fabric Construction				Warping	Dyeing & Sizing Warp	Weaving, Fabric	
	EPI	PPI	Warp Count	Weft Count	Length (M)	Length (M)	Length (yds)	Crimp %
1	72	53	12 RSL +12 OE	16+40D (lycra)	11000	Beam No-1 = 2050 Beam No-2 = 2050 Beam No-3 = 2050 Beam No-4 = 2000 Beam No-5 = 2000 **Total length = 11050 m**	Beam No-1 = 1929 Beam No-2 = 1983 Beam No-3 = 1948 Beam No-4 = 1950 Beam No-5 = 1950 **Total length = 10685 yds** **Total length = 9803 Meter**	12%
2	64	52	7 OE	10 R (Recycled)	900	Beam No-1 = 1010 Total length = 1010 m	Beam No-1 = 956 Total length = 956 yds **(Total length = 873.78 Meter)**	13.40%
3	69	51	9OE	450 D	1900	Beam No-1 = 2050 Total length = 2050	Beam No-1 = 2000 Total length = 2000 yds **(Total length = 1828 Meter)**	10.75%

4	64	46	7RSL+7R+8OE	12+40D (lycra)	1700	Beam No-1 = 1850 Total length = 1850	Beam No-1 = 1808 Total length = 1808 yds **(Total length = 1652 Meter)**	10.62%
5	62	50	9 OE	9 OE +40D (Lycra)	21800	Beam No-1 = 2500 Beam No-2 = 2500 Beam No-3 = 2500 Beam No-4 = 2500 Beam No-5 = 2500 Beam No-6 = 2500 Beam No-7 = 2500 Beam No-8 = 2500 Beam No-9 = 2000 Total length = 22000	Beam No-1 = 2350 Beam No-2 = 2300 Beam No-3 = 2300 Beam No-4 = 2300 Beam No-5 = 2300 Beam No-6 = 2300 Beam No-7 = 2300 Beam No-8 = 2300 Beam No-9 = 2250 Total length = 20700 yds **(Total length = 18919.9 Meter)**	16.3%

3.5.2. Calculation:

1/ If,

EPI=64

Per Dent=4

Reed Count=EPI / Per Dent X 2

=64 / 4 X 2

=32

2/ If,

RPM= 700

Pick= 55

Production in 24 hours=?

Production= RPM X Hour X 60 / Pick / 36

=700 X 24 X 60 /55 / 36

=509 yards

3.6. Production in Finishing

Finishing is a process which is one of the most important and essential process for fabric production. The main objective of finishing is to make the surface of fabric More Smooth & enhance luster of the fabric. During our internship also in the time of collecting data for thesis we observed Cibitex Enhancing finishing machine which use for fabric finishing, there also have other machines for mercerization, brushing, singeing, stenter, pad-steam machine and skewing is done in finishing process. In NZ denim generally shrinkage is controlled and the skewing is done and sometimes over dyeing is done according to buyer recruitment. So a finishing section in a denim industry performs a very important role. Here, The Employs always focus on machine speed and some standard recipe is set.

Table: 10: Finishing Machine Specification:

Brand Name	Cibitex Enhancing Finishing Machine
Origin	Italy
Model	Bluetex
Width Controlling Capacity	6 to 80 meter
Padded Volume	800 L
Drying Roller	**16**
Drying Temperature	120°C

Table: 11: Singeing Machine Specification:

This Machine is used to remove protruding fibre and hairiness with the help of flame.

Brand Name	DHALl
Machine Name	Singeing
Origin	India
Maximum Speed	80 m/min
Temperature	**(60 to 70)°C**
Brushing Unit	1 (2 roller)
Burning Unit	4

Table: 12: Stenter Machine Specification:

Stenter machine generally control length and width Shrinkage also setting heat on fabric.

Brand Name	Sun Super
Origin	South Korea
Machine speed	5 to 80 m/min
Bath Volume	80 L

Table:13: Machine Specification of Pad Steam Machine:

This machine is run depending on buyer requirement. Over dyeing can be done by this Machine.

Brand Name	SAGA
Origin	China
Machine speed	10 to 80 m/min

Table:14: Information About Finishing Section:

SL. No	Weaving Length (m)	Finish Length (m)	Shrinkage (%)	Skewing in cm
1	9803	8800	11	8 cm
2	873.78	800	9	11 cm
3	1828	1725	6	8 cm
4	1652	1500	9	11 cm
5	18919.9	18285	4	12 cm

3.7. Inspection:

Fabric inspection is a process where the fabric is checked to find faults if have in the fabric then grading is done so that the quality of fabric can be identify easily. A grade refers to best quality of fabric; B grade means fabric quality is less than A which means here some fault is meet. And here in NZ Denim 4-point system is used to grade the fabric. By using this method anyone can understand the fabric quality either good or bad also the fault can be find out. During internship we saw Tubular Inspection Machine and how the machine is Run and four light are used so that faults can be seen easily. Marker & Chalk is very important instrument for marking the fault area. Scissor, measuring tape, nipper, knife etc. are used there.

Table:15: Machine Specification of Inspection.

Machine Name	Tubular Inspection Machine
Brand Name	Yuyao Textile Machinery Co.Ltd.
Model	MB551FBL
Machine Speed	5 to 80 m/min

Table: 16: Details Information About Inspection Section.

SL. No	Finish Length (m)	Inspection Length (m)	Percentage (%)
1	9015	**A-Grade =6003** **B-Grade = 3007** **Total length = 9010**	**A=67 %** **B=33 %**
2	12200	**A-Grade = 8995** **B-Grade = 3200** **Total length = 12195**	**A=73 %** **B=26%**
3	18400	**A-Grade = 11290** **B-Grade = 7100** **Total length = 18390**	**A=61 %** **B-=39 %**
4	15000	**A-Grade = 9005** **B-Grade = 5990** **Total length = 14995**	**A=60%** **B=40 %**
5	9405	**A-Grade = 5930** **B-Grade =3475** **Total length = 9400**	**A=63%** **B=37 %**

CHAPTER-4
DISCUSSION

4.1. Productivity Analysis of Slasher Dyeing Denim.

4.1.1. Productivity in Direct Warping Section:

To winding 33000-meter length of yarn the time will required 65 to 80 minutes. And the machine speed is 750RPM. The machine we saw in NZ Denim Ltd. This can be running at 1000 RPM. But normally this machine is running (750 to 800) RPM. When the machine starting this time the machine running very slowly, after passing the time the machine running very fast. There are different reasons for stop the machine. If the machine is stoppage because of break, then the worker knots it after that the machine is run again. Because all of this reason the actual production time is higher than the calculated time. Here we saw that when the production is running some workers put the cone package other side of the creel to save the time. The causes of yarn breakage in direct warping is tension variation in yarn, loose yarn, bad slub, bad knotting, pig tail, thin place, dust etc. We can say 55% stoppage is occurred because of spinning faults and 45% is for warping faults.

By observe the collected data from direct warping we can through the following comments-

1.Average machine stop rate: In Denim production the machine stoppage is in average 4-6 time for Denim Production dignity to yarn count, number of length and regular length.

2.Machine Speed: Yarn breakage is depending on the machine speed in direct warping. In case of high speed machine, the machine stoppage will be higher. In NZ Denim Ltd. We saw that the warping machine is running at (700 to 800) RPM for better efficiency.

3/ Creel Design: Here we saw H Creel in direct warping system. The angle is transmitted 180 degrees which causes yarn separation due to variation of tension. May be V creel can be used.

4/Variation of Tension: Yarn separation is depending on variation of tension. If there is tension variation, then the yarn separation may increase also the yarn breakage will be higher.

When we collect the data from warping floor we saw that in case of one cone after making some beam they put off the cone with some yarn because they can’t use this yarn. And other wastage is near 130-190 meter.

After saw that we talk to the manager, supervisor, production officer and operator that what is reasons of wastage and how to decrease it. Here I given some point-

4.1.2. The Mechanical Causes of Production Loss:

- Unevenness of warp beam
- Piecing
- Disparate length
- Uneven warp beam
- Warping beam with Soft beam
- Defective Yarn guide
- Fault in reed
- Fault in beam flange

4.1.3. Operational Causes:

- Variation in speed
- Excess speed
- Unequal weight of cone or cheese
- Broken end
- Snarl form in warp
- Wrong angle of winding
- Angle of yarn path

4.1.4. How to decrease the Problems-?

- ✓ The machine operator can't run the machine excessive speed.
- ✓ The tension on the yarn must stay as required.
- ✓ Before running the machine have to clean the machine
- ✓ Before running the machine have to check the beam flange and set the beam correctly.
- ✓ The spinning also need good.
- ✓ If there is dust in room the yarn breakage will increase so clean the room continuously.

If we maintain this, then the production will be higher as well as the warping quality will be good.

4.2. Production in Slasher Dyeing & Sizing Department:

In NZ Denim Ltd. We saw the Slasher dyeing & sizing process which is Continuous process. The speed of the machine is 25 m/min generally. Here we saw 3 machine. When we saw the dyeing and sizing process realize that there are some reasons for decreasing production. According the based on data here I give details about that-

From the observation data, we have known that machine productivity rate is loss due to machine speed, abrasion, loose yarn, faulty yarn, weak yarn, tight package of beam, tension variation, improper roller pressure etc.

From the observation data of slasher dyeing section, we have discussed about it. We can say the following comments-

1.Majority problems of production loss: Because of excessive machine speed, tight package, faulty yarn, abrasion, weak yarn the production is lower. Some of this are mechanical reasons and also improper roller tension, and pressure variation is the reason.

2.Concentration of Chemical: The production is relatable to chemical concentration.

3.Dryer Temperature: Here we see drying is occurred two times, one is after dyeing and another is after sizing method. There is a limited temperature that can't damage the yarn but if the temperature is excessive the yarn/fiber will damage.

4.Variation in Pressure: For every roller there was a determine pressure if the pressure did not remain optimum the production may hamper.

We discussed with Manager, Production Officer, Operator, Supervisor about different types of faults in this section and also talk about the factors that affect the production. Here I point of this-

4.2.1. Mechanical Causes:

- Faulty parts of Machine
- Fault in Roller Surface
- Defective Cylinder Surface
- Error backrest setting

4.2.2. Operational Causes:

- Excess speed of machine
- Unsuitable viscosity
- Wrong recipe calculates
- If the size material being hard
- Machine stoppage
- If dry is excessive
- Improper chemical concentration

4.2.3. Some other Reasons:

- RH% or Relative Humidity
- Fault in warp yarn
- Moisture Content
- If the worker is unskilled

In the process of Slasher dyeing the loss of productivity is close about (300 to 400) meter for all of this reason.

4.2.4. Decreasing this problems:

- The spinning quality of yarn should be good.
- The temperature in dry drum should be suitable and the pressure should be correct.
- Before starting the machine, we have to check all things.
- The recipe calculation is a very serious matter; we have to care about this.
- To overcome the shade variation problem, we have to stay alert and check the PH, ORP, Viscosity.
- Controlling the floor moisture and RH%.

In NZ Denim Ltd we saw that the production loss is very small but I think by following this thing we can increase the productivity more.

4.3 Productivity of Denim Weaving:

Weaving is after process of dyeing & sizing process. In NZ denim Warp yarn are dyed in slasher dyeing machine then as a continue sizing is done and delivered in Weaving Section. Weaving is done by omniplus800, Omni plus and Optimax-I all of them are from Picanol brand. Here, average warp breakage is 6 to 10 times and weft breakage is 8 to 12 times within 2500 yds. length of fabric when machine is run around 700 to 900 RPM.

4.3.1 Factors Effecting productivity in Weaving:

- Faults in warp yarn during dyeing & sizing.
- Poor quality of weft yarn.
- Yarn damage during dyeing and sizing.
- Too much machine Speed & air pressure.
- Improper care of loom.
- Lack of production engineer on floor also hamper production due to laziness of the machine operator.

4.3.2 Our Comments to increase productivity in Weaving;

1.Machine RPM: RPM of loom machine have effect on yarn breakage during weaving in denim production. So, average machine rpm should keep into a standard range during production.
2.Major causes of production loss: Faulty yarn and tension variation during production is the major cause of production loss in weaving. Some mechanical & process faults are responsible for this.
3.Excessive Air Pressure: Due to higher air pressure the filling yarn breaks down. If the pressure is so high yarn will break. But if the pressure is low the weft yarn will not pass properly to the end. Air pressure is 6 to 9 bar.
After discussion with machine operator, supervisor, production officer and manager the following faults are frequently found in weaving section are,

4.3.3 Mechanical Causes:

- Defect on machine part.
- Improper care of machine.
- Fault in setting of backrest according to count.
- Electricity problem.

4.3.4 Operational Causes:

- Improper tension on the warp yarn.
- Faulty warp yarn preparation.
- Sizing Faults
- Knotting Faults
- Thick place or thin place on yarn.
- Too much machine Speed (RPM)
- Improper care by operators.

4.3.5 Others Causes:

- Improper Relative humidity
- Lack of skill in worker.
- Lack of production Engineer in weaving floor.

In weaving floor wastage is around 4 yds during machine run (knotting) another is when process finished. It is around 8 yds.

4.4 Productivity in Finishing Section:

Finishing process is one of the most important process for denim production. Generally, before send for marketing the product, all the process which is applied the fabric after weaving is finishing. Two types of finishing process are usually done. In our data collecting period we saw that chemical finishing such as mercerization, softening, and different types of wash both cold and hot wash. In mechanical finishing brushing, singeing etc. are done for make the surface Smoother than before. In NZ Denim generally singeing is used as the first finishing process, which remove all the protruding fiber and hairiness of fabric. Then send to pad steam Machine According to buyer requirement to control shrinkage and Stenter for over dye is done.

In finishing process shrinkage percentage range is average 8% the skewing is 8 to 12 cm

4.5 Productivity of Inspection:

Inspection is done to check fabric quality fabric quality. In NZ Denim faults are measured by 4-point system method. Inspection is done two times during whole process of Textile. Firstly, Inspection is done after weaving is done in the weaving floor then second inspection means final

inspection is done after finishing fabric. Here, input is finished fabric and output fabrics are ready to deliver. During inspection different types of fabric faults are found according to fault size or number of faults inspect is divided into two categories which is ready for delivery A & B. On the other hand, grade C & D will return to finishing section if fault can be remove then it will remove & again come to inspection. According to buyer requirement generally grade A & B are approved by Quality Control Department for delivering.

In Inspection section the amount of wastage is increase when the point is more, then the fabric roll is cut so that point can be minimized. If point can be minimizing, then the fabric will be graded as grade A or B which will be approved for QC.

CHAPTER-5
CONCLUSION

Conclusion:

conclusion of Our thesis we can say that according to our analysis to increase productivity of slasher dyeing & Weaving. We have to focus on some factors to improve both dyeing & Weaving floor. In Slasher dyeing proper oxidation facilities should have and Before run the machine proper recipe should prepare according to requirement by analysis the swatch. Then Operators should check ORP, pH value, Dye percentage and Dossing rate. In weaving more production engineer needed for follow up the production and if the operators are focusing on machine when it's stop they have to run again as soon as possible. Weaving floor should keep clean and Relative Humidity should be keep on standard range. Weaving floor temperature should not be too high, as high temperature causes yarn breakage. On the other hand, best quality of yarn should be ensure & warping should be proper. If yarn carried more faults like thick or thin place then thick or thin place on fabric will be inspected, so wastage will be increase means production loss is more.

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