

Faculty of Engineering

Department of Textile Engineering

REPORT ON

Industrial Attachment

At

SHASHA DENIMS

Shasha Denim Ltd situated at Saver DEPZ;

184-193, 277 DEPZ (Extn.) Savar Dhaka,

Dhaka 1349, Bangladesh.

Course Title: Industrial Attachment

Course Code: Tex-442.

Submitted By:

S/L No	Submitted By:	ID Number	Batch	Group (FM)
1	Md. Fariduzzaman Siam	TEX1801013099	13A	A
2	Mst. Aklima Khatun	TEX1801013053	13A	A

Academic Supervised

Kamrul Hassan Bhuiyan

(Lecturer & Coordinator)

Department of Textile Engineering

Sonargaon University (SU).

147/I Green Road, Panthapath, Dhaka.

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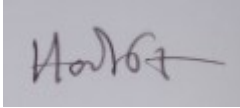
This report we have presented in partial fulfillment of the requirement for the Degree of Bachelor of Science in Textile Engineering.

Advance in Fabric Manufacturing Technology

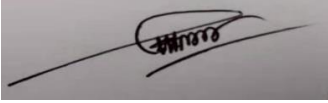
Duration: From 25 December 2021 to 8 February 2022.

DECLARATION

We hereby declare that, this Industrial Attachment on The SHASHA DENIM Limited, of Bangladeshis done by us under the supervision of Kamrul Hassan Bhuiyan, Coordinator & Lecturer, Department of Textile Engineering, Sonargaon University (SU), Dhaka. We also declare that, this Industrial Attachment report has not been submitted anywhere for award, degree or diploma. We ensure that, any part of this attachment has been presented anywhere.



Md. Fariduzzaman Siam
TEX1801013099



Mst. Aklima Khatun
TEX1801013053

Permission of industrial Training

Department of Textile Engineering
Sonargaon University (SU).

Department of Textile Engineering
SU/Textile/Int. Letter/2021/Spring/11
Date: 15/11/2021

To

Admin, HR Department.

Shasha Denim Ltd.

184-193, 277 DEPZ (Extn.) Savar Dhaka

Subject: Request for permission to undertake industrial training in your industry.

Dear Sir,

It is for your kind information that, Sonargaon University (SU) is a private University approved by the Ministry of Education (MOE), & UGC of Bangladesh. The Student named below with the Identification Number is very close to complete 4 years BSc in Textile Engineering of Sonargaon University (SU). As industrial training is one of the important core courses of 4 years BSc in Textile Engineering program, therefore the university seeks your kind help and cooperation in order to impart practical knowledge to our students. Duration of this program would be 12 weeks and it is advised to accommodate the students at your production unit from February 20, 2021.

Sl. No.	Student Name	Specialized	Student Id	Contact No.
1.	Md. Fariduzzaman	Fabric Manufacturing	TEX1801013099	01750268476

Therefore, I am requesting you to provide him with opportunity to conduct the industrial training in your well reputed industry. It will also be highly appreciated if you kindly consider them for training in Your Industry.

Your Co-operation will be highly appreciated.

Thanking you



Kamrul Hassan Bhuiyan

(Lecture & Coordinator)

Department Of Textile Engineering.

Sonargaon University (SU).

Cell Phone: 01955-529892

Copy to: For necessary information:

1. Dean, Faculty of Engineering, Sonargaon University (SU).
2. Office Copy.

LETTER OF APPROVAL

This is to that Md. Fariduzzaman, TEX 1801013099, Mst. Aklima Khatun

TEX180101353, BSc in Textile Engineering program, 13B Batch have successfully completed their Industrial Internship on Fabric Manufacturing Technology under my supervision. I do hereby approve their report. I also recommend accepting their report for partial fulfillment of Bachelor of Science in Textile Engineering Degree.



.....
Kamrul Hassan Bhuiyan
(Lecturer & Coordinator)

Department of Textile Engineering
Sonargaon University (SU), Dhaka

ACKNOWLEDGEMENT

All praises are to the Supreme Being, Creator and Ruler of the Textile Industry, whose mercy keeps me alive and enable to pursue my education in Textile Engineering and to complete the In-plant Training for the fulfill of the degree of BSc in Textile Engineering.

In-plant training program in any Textile industry is a part and parcel to complete the BSc Textile course. I am grateful to Mr. Robiul Hoque (DGM) Finishing & QC. Mr. Md. Sha Jahan (AGM) Production Planning. Mr. Md. Sabbir Hossain (Manager) -PP. Mr. Md. Eunus Khan- (Sr.Manager)- Weaving Mr. Md. Farid Uddin-(Manager)-Finishing & Q.C Mr. Md. Fakhruzzaman Bhuiyan (Rajon)-(Manager)-Inspection Mr. Md Faruk Hossin Manager), Finishing & Q.C Mr. Md. Anowar (Washing Technologist) - Washing Plant. they help us to complete my industrial training. I also grateful to my honorable teachers of Textile Department, Sonargaon University. I would like to express my sincere gratitude to Mr. Md. Golam Robbani- Sr. Manager (HR Admin & Compliance), SHASHA DENIM LTD. Who has allowed me to work in his organization within a congenial atmosphere during the industrial training period. Special thanks to all Managers of every department, my heart full thanks to all of different production officer, In-charges, Asst. In-charges, Executives, Supervisors, Asst. Supervisors, Senior Operators, Technicians, Operators, Helpers & all other Employees of SHASHA denim ltd. I would like to express our thanks to all officers and employees of SHASHA denim ltd. for their help in my training program. I wish the progress of SHASHA DENIM ltd.

ABSTRACT

For any technical education, practical experience is almost equal important in association with the theoretical knowledge. By means of practical knowledge it's not possible to apply the theoretical knowledge in the practical field. Industrial attachment is the first step to professional life of student, especially of technical side. It's an indispensable part of study a practically running processing technology of an industrial unit for a student. University education provides us vast theoretical knowledge as well as more practical attachment, in despite of all these industrial attachment helps us to be familiar with technical support of modern machinery and skills about various processing stages. This internship provides me sufficient practical knowledge about production management, efficiency, industrial management, pattern, cutting, sampling, washing, Finishing, Costing, purchasing, inventory control, utility and maintenance of machineries and their operation techniques etc. which cannot be achieved successfully by means of theoretical knowledge only. We were able to study on their different sections and their activities practically. Due to some limitation of the factory, we have found store section, cutting section, sewing section, finishing section and maintenance section, costing section washing section. Here we have also found the sample section but this section isn't fully operational as here only the Development sample, size set and production samples are produced. All the activities of this factory are performed according to the central orders of the company. This company works for Academy buyer and sometimes works for Pritha which is an own buying house of this group of company. During my internship we got the opportunity to study on some orders, from order receive to the delivery of the order. With the help of my supervisor we have acquired the knowledge of handling an order, the production procedure and the inspection procedure to maintain the quality of these orders. We have also learnt about the office management of this factory.



Certificate of Completion of Industrial Training

Shasha Denims **SHASHA DENIMS LTD.**
184-193, 277 DEPZ (Extn.), Savar, Dhaka, Tel : 778-9188, 778-9302-5. Fax : (88-02) 778-9307, E-mail : info@shashabd.com

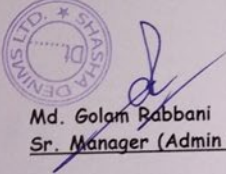
SDL/Admin/141/2022-27 Date: 08-02-2022

To Whom It May Concerned

This is to certify that Md. Fariduzzaman, Roll No TEX 1801013099 has been completed Industrial Training here from 25-12-2021 to 08-02-2022 under direct supervision of our experience officers. During this period he has gathered adequate knowledge in Denim Fabric. He has been giving practical experience in direct Warping, Dying & Sizing, Weaving, Finishing, Washing, Quality Control and Inspection Section. He has been giving proper lessons regarding handling raw materials, in process quality control of the product, production calculation, wastage control, inventory, manpower and utility.

I wish him every success in his life.

For Shasha Denims Ltd.


Md. Golam Rabbani
Sr. Manager (Admin & HR)

*Head Office : House - 23, Road-129, Gulshan-01, Dhaka-1212.
Tel : +88 02 9850548, 9854679, 9855263, 9856328, Fax : +88 02 9851698, Web : www.shashadenim.com*



Shasha
Denims

SHASHA DENIMS LTD.

184-193, 277 DEPZ (Extn.), Savar, Dhaka, Tel : 778-9188, 778-9302-5. Fax : (88-02) 778-9307, E-mail : info@shashabd.com

Ref: SDL/Admin/141/2022-26

Date: 08-02-2022

To Whom It May Concerned

This is to certify that Aklima Khatun, Roll Number TEX 1801013053 have been completed Industrial Training here from 25-12-2021 to 08-02-2022 under direct supervision of our experience officers. During this period she has gathered adequate knowledge in Denim Fabric. She has been giving practical experience in direct Warping, Dying & Sizing, Weaving, Finishing, Washing, Quality Control and Inspection Section. She has been giving proper lessons regarding handling raw materials, in process quality control of the product, production calculation, wastage control, inventory, manpower and utility.

I wish her every success in her life.

For Shasha Denims Ltd.



[Signature]
Md. Golam Rabbani
Sr. Manager (Admin & HR)

Head Office : House - 23, Road-129, Gulshan-01, Dhaka-1212.

Tel : +88 02 9850548, 9854679, 9855263, 9856328, Fax : +88 02 9851698, Web : www.shashadenim.com



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CHAPTER 01 - INTRODUCTION

1.1 Introduction

Industrial training is the important strategy to expose us to real work life situations and to equip us with the necessary skills that intensify job acumen. It is the organized way of improving and enhancing knowledge and skill set of engineering students. It improves one's capability, productivity, knowledge, creativity, skills and performance forming the core of apprenticeships and the backbone of content at institutes of technology. It provides us the knowledge of function of modern machineries, their working procedure, efficiency, time management, production management and maintenance of machineries and their operation techniques which is difficult to understand from only theoretical studies. So, to get acknowledged with the industry works and processes, attaining an industrial training is a must. It cultivates the leadership ability of the students and gives them the responsibility to execute and perform the given task. It helps in increasing self-confidence and identifying their proficiency.

Textile engineering is the study of various principles from engineering and scientific methodologies which are implemented for the processing and production of all kinds of textile fabrics, yarn. Four years course of B.Sc. in textile engineering consists of theoretical studies of relevant subject and some lab based practical knowledge of machines and processes. The authority of a textile industry wants to produce products of best quality with a possible shortest time and maintaining good quality raw materials in production. So, a textile engineer must be familiar with the procedure of industrial work. Industrial training has been made an essential part of four years bachelor program now since theoretical studies is never enough in practical sector.

SHASHA Denim Ltd. provided us a golden opportunity to complete an eight weeks long industrial training at their factory. It is equipped with modern machineries and facilities. SHASHA Denim Ltd. holding motto of "innovation". It is the only factory in Bangladesh which processes linen and uses them in making denim fabrics. Continuously investing on new equipment and technology, the company has the goal of satisfying the customer.

1.2 Objective

- To expose students to engineering experience and knowledge.
- To get a feel of the work environment.
- To apply the theoretical knowledge in real industrial situations.
- To find out the functions of various departments in a textile factory.
- To identify the role and responsibility of a textile engineer in a textile factory.

CHAPTER 02 - GENERAL INFORMATION ABOUT THE MILL

2.1 Factory name

SHASHA Denim Ltd.

2.2 Company Background

SHASHA Denims Ltd began its journey as a family owned company, with a vision to create a global standard in green and sustainable denim manufacturing industry. We have now positioned ourselves as one of the leading 100% export based denim manufacturers in Bangladesh, while we continuously develop and refine environmentally friendly techniques and procedures with a more-than-human consideration creating our denim products.

Incorporation of Shasha Garments Ltd. (Dt. 18th November, 1991) Incorporation of Shasha Denims Ltd. (28th October, 1996) SDL's Conversion into Public Limited Company (Dt. 1st October, 1997) Commencement of Commercial Operations (July-2000) Incorporation of Shasha Textiles Ltd. (Dt. 18th September, 2003) Incorporation of Energis Power Corporation Ltd. (Dt. 28 December, 2008) EPCL's Conversion into Public Limited Company (Dt. 20th April, 2009) Received BSEC's Approval for IPO (Dt. Nov-05, 2014) Enlisted with Dhaka Stock Exchange Ltd. (Dt. February 18, 2015) Enlisted with Chittagong Stock Exchange Ltd. (Dt. January 17, 2015) Signed MoU between Shasha Denims Ltd. and EOS Textile Mills Ltd. for acquiring 40% Shares of EOS Textile Mills Ltd. (Dt. 24 February, 2018) Shasha Denims Ltd started its journey from 1996 and went into production from 2000. It was founded by Barrister Anisul Islam Mahmud, whose father Sirajul Islam Mahmud set up the family's first textile unit in Chittagong in the 1950s, Asiatic Cotton Mills Ltd. Shasha Denims Ltd when established, was at that point in time the most modern denim mill in the world and the first denim mill to introduce the nitrogen fixation slasher technology. From that time we have continuously adopted groundbreaking technology in our production process together with traditional approach to respecting the fibers we work with and combined we have created a synergy which has through the years propelled the company to go ahead leap sand bound. The journey of Shasha is unique because it was this one denim mill, which has given birth to the backward linkage denim fabric sector in Bangladesh today. Almost all the mills which came into being after Shasha were lead by someone who was trained in Shasha and even the machinery technology was also replicated in most mills. This in turn has helped with the boom of the forward linkage sector since now denim fabric was available locally in Bangladesh. We were till 2015 a family owned business, but now have become listed in the stock exchange in Dhaka and Chittagong and so have now become a publicly listed company. Shasha Denims Ltd has been awarded Highest Export Gold trophy by the Government of Bangladesh for many years.

2.3 Vision

By their vertical setup they will satisfy customer which will help to make their sustainable growth.

2.4 Mission

Their mission is to achieve excellence and retain market leadership in Denim fabrics by ensuring continuous development through latest technology and highest standards in working atmosphere. They truly value highest ethical practices and strive to exceed the expectations of their clients.

2.5 Factory Achievements

A journey of our progress from the field to the final product.

- National Golden Trophy For 2011-2012,2012-2013
- National Golden Trophy For 2013-2014
- ICSB National Award 2016





2.6 Factory Publications

Latest news & media updates for SHASHA DENIMS



DENIM BANGLADESH
TIMES

ISSUE 42 - NOVEMBER 2017



DENIM COMMUNICATION

ON THE DENIM TIMES	INDUS BLOOMER BOARD	LONG LIVE INDUSTRY!	THE GET OF BOARD-BUILDING	ROD ROP TO A LITTON BOARD
Special of the last month Page 11	Integrating Fashion & Sci- ence Page 14	From work and leisure Page 16	Art like a brand Page 20	Communication strategies Page 26



2.6 Factory at a glance

Name of the factory	SHASHA DENIM LTD
Year of Established	28 Oct 1996
Name of the Chairman	Mr. Anisul Islam Mahmud
Name of MD	Mr. Shams Mahmud
Name of CEO	Md. Amin Tarique
Name of Director	Ms. Zareen Mahmud CPA, FCA
Name of Independent Director	Mr. N K A Mobin FCA, FCS, CFC
Name of Independent Director	Md. Shahadat Hossain FCA
Director (Operation)	Mr. Mohammad Jamal Abdun Naser
Director (Finance & CFO)	Mr. Md. Ahasanul Haque
Company Secretary	Mr. Aslam Ahmed Khan FCA
Name of General Manager	Lt. Col. Md. Quaderuzzaman (Rtd.)
Business line	Manufacturing and marketing of high-quality denim fabric

2.7 Contact Information

Head Office

+88-02-222260548

+88-02-222290659

Factory

+88-02-7789188

+88-02-7789302

Email: info@shashabd.com

Fax: +88-02-222284761

2.8 Factory Address

Shasha Denim Ltd situated at Saver DEPZ;

184-193, 277 DEPZ (Extn.) Savar Dhaka,

Dhaka 1349, Bangladesh.

2.9 Evacuation Plan of Factory Premises

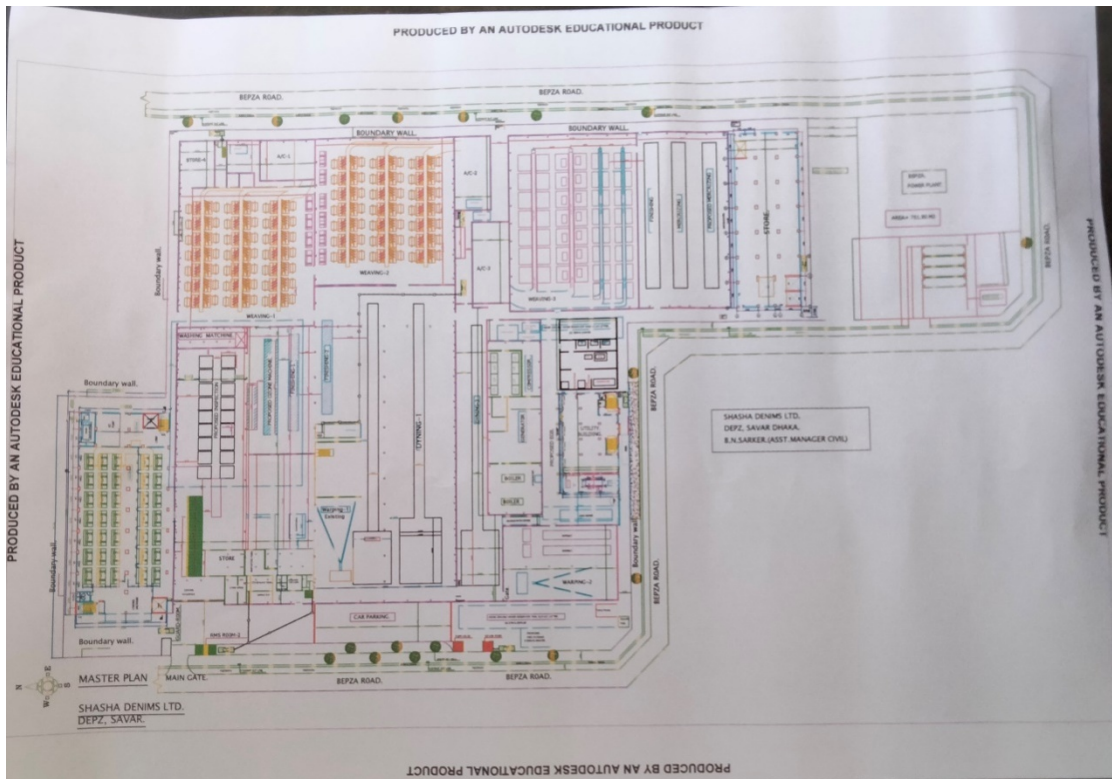
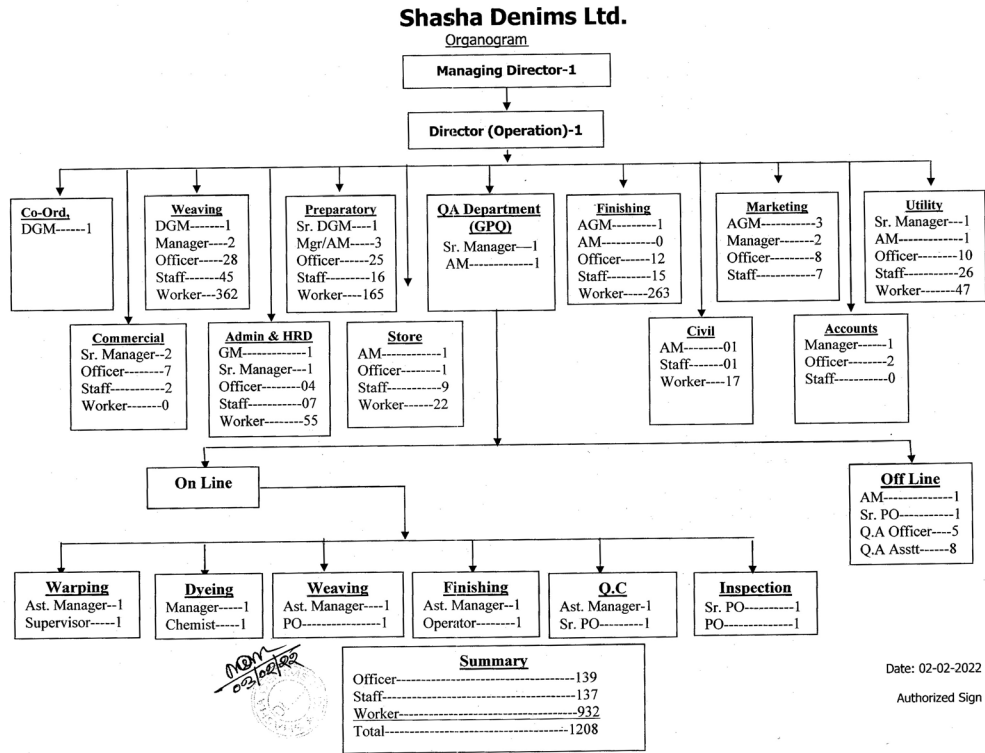


Figure: Layout plan of Warping, dyeing, sizing, Weaving finishing and inspection section

2.10 Organogram of SHASHA DENIM LTD





2.11 Working Shifts

SHASHA Denim Ltd. has three basic shifts and general shift per day. Each shift contains 8 working hours. Shift duration is given below:

Shift	Duration
A	06.00 am – 02.00 pm
B	02.00 pm – 10.00 pm
C	10.00 pm – 06.00 am
General	09.00 am – 06.00 pm

2.12 Leave Policy & Procedure


- Casual Leave: Total casual leave 10 days in a year
- Procedure: Employee need to apply first for this leave
- Medical Leave: Total medical leave 14 days in a year
- Procedure: Employee need to submit the application form within 48 hours after leave
- Festival Leave: Total festival leave 11 days in a year (for 2019)
- Maternity Benefit: Total maternity leave 112 days with full payment by maintaining proper process with valid documents. Payment of 56 days will be provided before leave & 56 days after joining.
- Procedure: Employee need to inform the company about pregnancy. Need to submit ultra-sonogram report with the application for maternity leave.



Department of Administration

Manpower System

Department	Officer	Staff	Worker	Total	Remarks
Mgt & Co-Ord	02	0	04	06	DB-4
Weaving	34	47	363	444	EOS10
Preparatory	27	5	131	163	
Maintenance	7	13	29	49	
QA	10	05	0	15	
Finishing	18	15	258	291	EOS 1
Marketing	14	07	0	21	
Utility	12	27	45	84	EOS 3
Commercial	09	02	0	11	
HRD	07	08	55	70	DB-2
Store	02	10	28	40	
Civil	01	01	19	21	DB-3
Accounts	03	0	0	03	
Total=	146	140	932	1218	


Asstt. Manager (Admin)

CHAPTER 03 – RAW MATERIAL AND PRODUCT MIX

3.1 Raw Materials

3.1.1 For Warp Yarn

Yarn Type	Yarn Count (Ne)
Ring yarn	7/1, 8/1, 9/1, 10/1, 12/1, 16/1, 20/1, 30/1
Ring slub yarn	7/1, 8/1, 9/1, 10/1, 12/1, 16/1, 20/1
Open end yarn	6/1, 7/1, 8/1, 9/1, 10/1, 12/1, 14/1, 16/1, 20/1
Open end slub yarn	6/1, 7/1, 8/1, 9/1, 10/1, 12/1, 14/1, 16/1, 20/1

3.1.2 For Weft Yarn

Yarn Type	Yarn Count (Ne)
Ring yarn	7/1, 8/1, 9/1, 10/1, 12/1, 16/1, 20/1, 30/1
Ring slub yarn	7/1, 8/1, 9/1, 10/1, 12/1, 16/1, 20/1
Open end yarn	6/1, 7/1, 8/1, 9/1, 10/1, 12/1, 14/1, 16/1, 20/1
Open end slub yarn	6/1, 7/1, 8/1, 9/1, 10/1, 12/1, 14/1, 16/1, 20/1
Tencel yarn	12/1, 16/1, 20/1, 24/1, 30/1
Linen yarn	60 L, 56 L, 40 L, 44 L, 36 L
Polyester yarn	450D/144F, 500D/144F, 600D/144F
Polyester spandex mix yarn	(150~300)- 40 D/70 D
Cotton spandex mix yarn	(10~30)Ne+ 40D/70D
Duocore yarn (T400)	(10~20) Ne+(75D T-400)+ 40 D/70 D

3.2 Source of Yarn

Salak Spinning Ltd.

Ravelly Spinning mills

Sinha, Square Spinning

Nagina Spinning mills

Hosheng Spinning mills

Srimouly Spinning mills

Mahmood Spinning Mills

Kader Synthetic fibers Ltd.

Esquire Textile Ltd. Sometimes SHASHA Denim Ltd. imports yarn from Pakistan, Thailand and India in order to fulfill the buyer's demand.



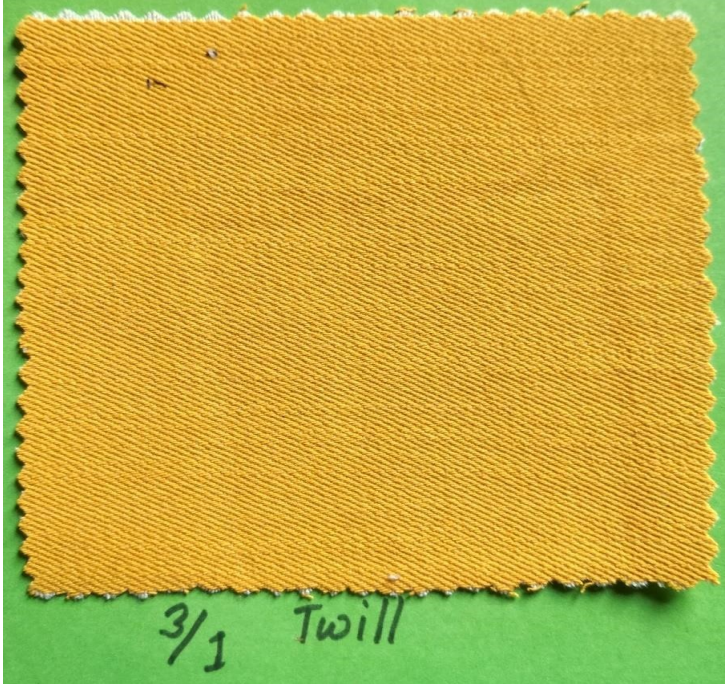

3.3 Product mix

SHASHA Denim Ltd. is specialized in Denim fabric with the state-of-the-art technologies and expertise used in every sphere in production range from machinery, research methods, human expertise and raw materials. They are offering a huge variation of denim products in between the range of 4.50 oz lightweight denim to 14.50 oz denim weaved in 100% cotton, Tencel, Siro, dual-core, blended, recycled, organic and linen etc.


Fabric Type	Sample
1/1 Plain weave	





<p>3/1 Twill weave</p>	
<p>Herringbone Twill weave</p>	



<p>Satin weave</p>	 <p>Satin Design</p>
<p>Broken Twill weave</p>	 <p>Broken Twill</p>



UGC & Govt. Approved

Sonargaon University (SU)

সোনারগাঁও ইউনিভার্সিটি (এসইউ)

WE WILL
RISE UP
WE WILL
SHINE

CHAPTER 04 - WARPING SECTION



4.1 Flow Chart of Warping Section in SHASHA DENIM LTD.

planning section

Collect yarn from warehouse by requisition

Load the creel

Knot yarn cone in the creel

Combing of the yarn by reed

Load the weaver's beam in the machin

Check the pressure of the machine

Winding on the weaver's beam

Check the length of the beam

Set the rpm of the machine

Run the machine

Check the tension of the yarn by tension
meter

Unload the weaver's beam

Keep record of individual beam

Transfer the warping sheet and beam to the
dyeing section

Collect the programmer sheet from the

4.2 Warping

Warping is the process of transferring yarns from a creel of individual packages forming a parallel sheet of yarns wound into a beam. Generally, in beam warping yarns are collected in a sheet form where the yarns lie parallel to each other and in the same plane on to a beam, which is a cylindrical barrel with two side flanges. The industrial warping process can be carried out according to different technologies:

A. Direct warping

B. Sectional warping

From these, SHASHA Denim Ltd. follows only direct warping.

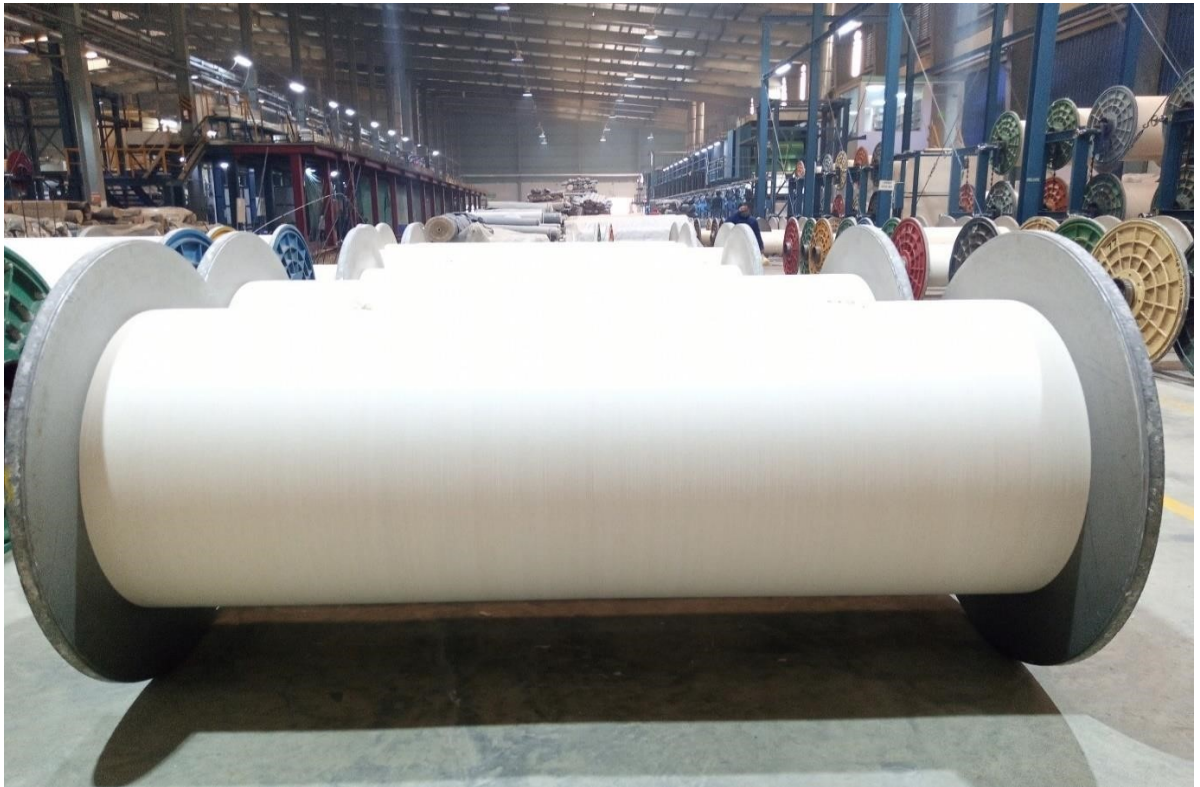


Figure: Warp Beam

4.3 Objectives of warping

- Arrangement of warp threads according to a desired sequence.
- To wound required length of warp yarn on to a warp beam.
- To make convenient yarn sheet for subsequent dyeing and sizing process.
- To improve weaving quality.

4.4 Components of warping Machine

In SHASHA denim, Two different machine are use for warping.

- BENNINFER
- Ramallumin

4.4.1. Creel



4.4.2. Head stock



4.5 Components of Creel

1. **Spindle:** To hold the yarn package
2. **Yarn guide:** To pass the yarn through the guide in the required way.
3. **Pensioner:** To provide required tension to the yarn.
4. **Breakage indicator:** To indicate yarn breakage with light signal and show which yarn is broken.
5. **Blower:** To remove the dust and dirt from the creel section.



Figure: Breakage indicator light Figure: Yarn guide & Tensioner

4.6 Components of Head stock

1. Yarn speed controlling device: To control the machine winding speed.
2. Suction unit: To suck the dirt and dust from yarn.
3. V-reed: Used for individualization of yarn and control the width of the warp section.
4. Hydraulic Pressure Unit: To hold the beam bracket and to stop the machine instantly when required.
5. Stop motion: It gives signal when yarn breaks to stop the machine.
6. Driving drum: To give uniform pressure on the warper's beam.
7. Break assembly: To instantly stop the machine when required.
8. Measuring Device: To measure the warp length.

4.7 Features of Direct warping

1. Higher production speed.
2. Higher length of warp sheet can be produced.
3. Higher creel capacity.
4. To produce solid dyed fabric in large quantities from these processes.

4.8 Machine Specifications (Warping 1&2)

Machine Name	High Speed Warping machine
Brand Name	BENNINGER
Quantity	2
Model	105350/177
Country of Origin	Switzerland
Creel Capacity	540 & 520
Machine Speed	1200 rpm
Beam Length	73 inches with flange
Yarn Capacity Per Beam	1025 kg

4.9 Machine Specifications (Warping 3)

Machine Name	High Speed Warping machine
Brand Name	RAMALLUMIN
Quantity	1
Model	105350/177
Country of Origin	ITALY
Creel Capacity	600
Machine Speed	800 rpm
Beam Length	73 inches with flange
Yarn Capacity Per Beam	1025 kg

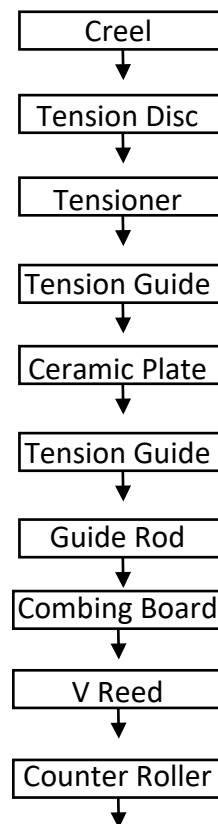
4.10 Count wise warp tension during warping

Count (Ne)	Tension (cN)
6-7	30-35
8-9	25-30
10-12	20-25
14-20	18-22
24-30	18-20



Figure: Tension measuring equipment

4.11 Yarn Path





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CHAPTER 05 - DYEING AND SIZING



5.1 Flow Chart of Dyeing & Sizing in SHASHA DENIM LTD.

Collect programme sheet from the planning section

Write down the beaming sheet, dosing sheet and headstock according to plan

Load the dyeing creel according to the count

Set the sizing machine according the sample standard

Check the feeding color of scouring, bottoming, indigo topping by operator

Record the Level, GPL, PH, MV in the dosing book

Leasing of the warping beam

Check the dyed beam according to the length

Clean the chemical box

Cut the beam according the standard length

Transfer the dyeing sheet and beam to the weaving section



5.2 Dyeing and Sizing

At SHASHA Denim Ltd. dyeing is carried out in sheet form, then in the same machine sizing is done after dyeing of yarn. At first program sheet is collected from planning department and according to that carefully checking the stickers through the beam transfer sheet warped beams are transferred from warping section. After that the beams are loaded on the creel according to the yarn counts and sample recipe and swatch card are followed to prepare recipe and dyeing route. Then the machine parameters are set according to dyeing route and recorded in the lot process register. Chemical dilution quality is tested in the lab and recorded in the register. After sizing and dyeing of the beam they are transferred to the weaving section by transfer sheet. When weaving is continuing and any problem arises due to faulty sizing, the fault is recorded in our register and solved.

5.3 Machine Specification (Dyeing and Sizing m/c 1)

Machine Name	Continuous Denim dyeing and Sizing machine
Brand Name	BENNINGER
Country of origin	Switzerland
Year	1998
Maximum speed	35 RPM
Warp beam feed capacity	14
Input accumulator yarn capacity	100 meters
Total no. of bath	11
Bath volume	1800 liters
Preparatory bath	1
Indigo bath	4
Sulphur Black bath	3
Washing bath	5
Drying cylinder unit 1 (dyeing)	10
Dyeing cylinder unit 2 (sizing)	14
Drying cylinder temperature capacity	Up to 150 Degree Celsius
Pressure range	Up to 7 kg
Sizing bath	1
Output accumulator yarn capacity	100 meters

**5.4 Machine Specification (Dyeing and Sizing m/c 2)**

Machine Name	Continuous Denim dyeing and Sizing machine
Brand Name	BENNINGER
Country of origin	Switzerland
Year	1998
Maximum speed	35 RPM
Warp beam feed capacity	14
Input accumulator yarn capacity	100 meters
Total no. of bath	14
Bath volume	1800 litres
Preparatory bath	1
Indigo bath	6
Sulphur Black bath	3
Washing bath	5
Drying cylinder unit 1 (dyeing)	10
Dyeing cylinder unit 2 (sizing)	14
Drying cylinder temperature capacity	Up to 150 Degree Celsius
Pressure range	Up to 7 kg
Sizing bath	1
Output accumulator yarn capacity	100 meters
Beam tension	50-600 kg



Figure: Continuous Denim dyeing and sizing machine

5.5 Dosing Tank Arrangement

Type	No. of tank	Volume
Scouring Mixing	2	1300 litres
Indigo Mixing	2	1300 litres
Sulphur Black Mixing	2	1300 litres
Neutralization	2	1300 litres
Caustic Mixing	2	450 litres
Indigo Mixing	2	450 litres
Liquid Indigo Dosing	2	1150 litres

5.6 Recipe Used in SHASHA Denim Ltd.

5.7 Scouring / Mercerization

Chemical	Box(g/L)	Feed(g/L)
Caustic Soda	10	15
Wetting Agent	4	6
Sequestering Agent	1	2

Figure: Scouring Tank



Figure: Caustic Soda Mixing Box

5.8 Bottoming

Chemical	Box(g/L)	Feed(g/L)
Sulphur Dyes	10	25
Reducing Agent	15	30
Caustic Soda	15	25
Wetting Agent	4	6
Sequestering agent	1	2



5.9 Indigo Preparation

Chemical	Feed(g/L)
Indigo Blue	100
Sodium Hydrosulphide	80
Caustic Soda	70
Wetting Agent	6
Dispersing Agent	3
Sequestering Agent	2



Figure: Indigo mixing tank

5.10 Sulphur Black Preparation

Chemical	Box(g/L)	Feed(g/L)
Sulphur Black Dyes	10	220
Caustic Soda	15	25
Reducing Agent	15	30
Wetting Agent	4	6
Sequestering Agent	1	2



Figure: Black Preparation Tank

5.6 Sizing

5.6.1 General Recipe Practice at SHASHA Denim

Water	700 litres
Starch	80 kg
PVA	3 kg
Binder	25 kg
Wax	4 kg

5.7 Temperature Parameter

Mixing Tank	Room temperature
Cooking Tank	96 °C
Reserve Tank	85 °C
Size Box	(85-90) °C

5.8 Tank volume

Tank Name	Quantity	Volume
Mixing Tank	01	1300 litres
Reserve Tank	01	1300 litres
Cooking Tank	01	1600 litres



Figure: Cooking tank of sizing

5.9 Equipment for viscosity measurement:

5.9.1. Viscosity measuring cup

Using a cup which is 100 ml in volume and has a pore which is 3.5 mm in size, filled with sizing material. Then by using a stop watch measure the time to empty the cup. Time varies from one sizing material to another due to different viscosity. Average standard time for denim yarn is 13 seconds.



Figure: Viscosity measuring cup

5.9.2. Refractometer

Opening the front side of the refractometer some sizing materials input inside it. Then looking through the refractometer reflection is measured by the line inside it which indicate the solid content %. The percentage value range is up-to 30%. The average standard value is 5-7% for denim yarn sizing.



Figure: Refractometer

5.10 Size box

Total number of size box = 2

Total number of Immersion roller = 4

Total number of Squeezing roller = 4



Figure: Sizing box

5.11 Drying chamber

Total number of cylinders = 14

Temperature Capacity =120-135 Up to 150 °C

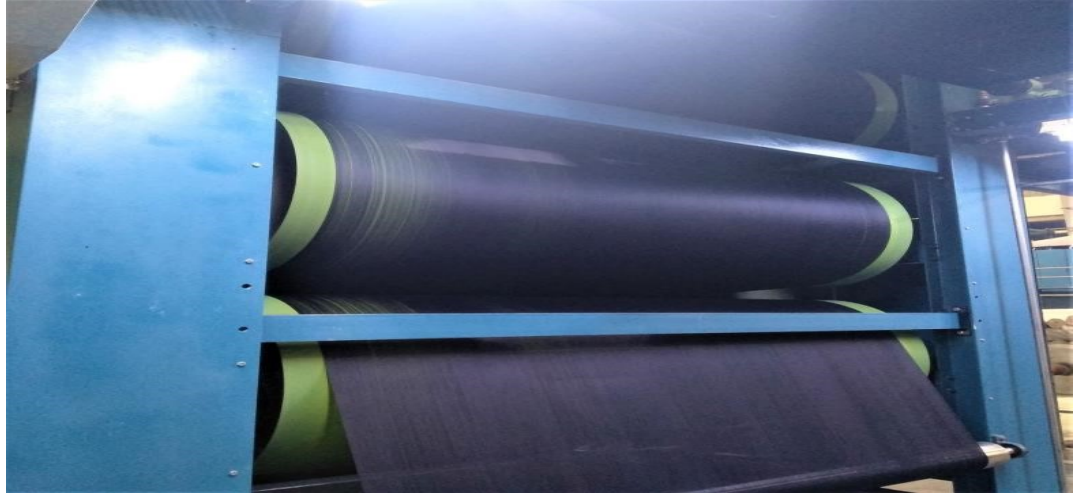


Figure: Drying cylinder

5.12 Accumulator

Accumulator reserve yarns without stopping the whole machine when head stock stops during changing the beam. The capacity of this accumulator is 100 meters.



Figure: Accumulator for dyed sized yarn

5.13 Leasing Rod

Leasing rod is used to separate and identify the yarns of different warp beam. It also reduces the friction of yarns at headstock zone for smooth operation.



Figure: Leasing unit

5.14 Moisture Controller

Used to control the moisture% for different types of fibers used in the yarn.

Machine Name: BENINGER

Country of origin: Switzerland



Figure Moisture Controller

5.15 Adjustable V-reed/ Zigzag reed

Used to reduce friction of yarn, prevent the overlapping of yarns.

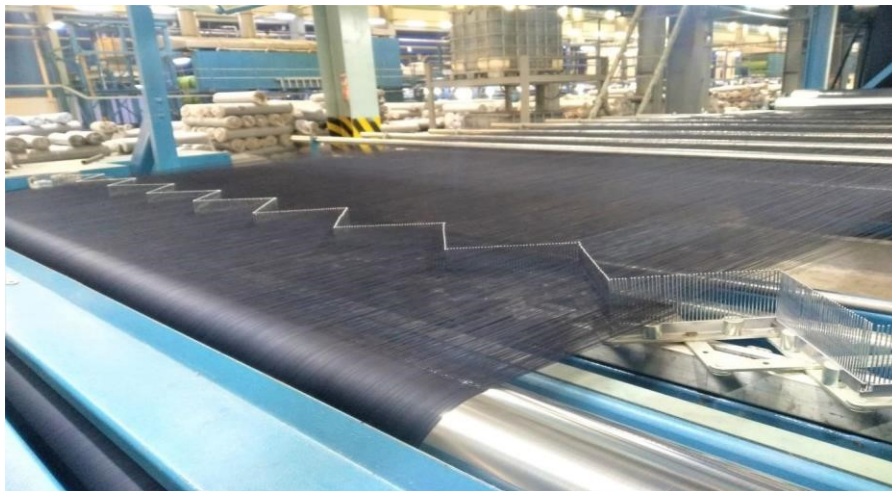


Figure: Adjustable V-reed



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CHAPTER 06 - WEAVING

6.1 Flow Chart of Weaving Section in SHASHA DENIM LTD.

section

Drawing in of the dyed beam according to the loom card by manually

Denting of the beam according to the denting plan

Set the cam arrangement according to the design

Set the rpm of the machine

Run the machine

Check for any broken yarn and faults

Check the beam according to the length

Cut the beam according to the standard length

Keep record of individual beam

Transfer the weaving sheet and beam to the finishing section

Collect the programme sheet from the planning

6.2 Weaving

Weaving is the process of fabric manufacturing by interlacing two sets of yarn called warp and weft. In the weaving, many developed machines are using in the textile industries. For example, Air jet loom, Shuttle less loom, Jacquard loom, etc.

In the SHASHA DENIM LTD. weaving floor Air jet and Jacquard looms are used to operate the whole weaving process. The first process that is done to the weaver's beam is Drawing In where the threads of the warp are pulled through the heald wire's eye according to drafting plan. After that, Denting action takes place which signifies drawing the warp thread through the dent as reed plan requirement. This more reliably specifies the fabric width and ends per inches. At the start of the new warp, the tail end of the warp from the exhausted weaver beam is attached. it is called tying-in. All knots are pulled through the drop wires, heddles, and reeds after the tying-in process. The loom is ready for use now.

6.3 Drafting Plan

The process of drawing the warp yarn through the eye of heald frames according to design is called drafting and the plan which indicates how drafting needs to be done is called drafting plan.

In SHASHA Denim Ltd. 3/1 right hand twill denim is mostly produced. A design for this particular fabric is:

H1

H2

H3

H4

			X
		X	
	X		
X			

Here, H = Heald Frame	
E = End	P =
Pick	<input checked="" type="checkbox"/>
Warp up =	<input type="checkbox"/>
Weft up =	<input type="checkbox"/>

Drafting Plan

P1

P2

P3

P4

	X	X	X
X	X	X	
X	X		X
X		X	X

		X	X	X
X		X	X	
X		X		X
X			X	X

E1 E2 E3 E4

H1 H2 H3 H4

3/1 Twill weave

Lifting Plan

6.4 Drawing-in

In this process every single end from a beam is drawn through drop wire, heald frame (heald eye), reed correspondingly as weaving preparation. Drawing-in is done manually.



Figure: Drawing in through drop wire and heald eye

6.5 Denting

In the loom, Denting is done with the beam that is sent. It is done according to the denting plan which stands for how many ends will be inserted from one dent. Denting plan is carried out with the no. of total warp and required fabric width.



Figure: Denting Process

6.6 Different elements for Drawing and Denting

6.6.1 Drawing Stand

Drawing stand is used to draw the warp and hold the drop wire bars, heald frames, and the beam itself.



Figure: Drawing Stand

6.6.2 Heald Frame

Heald frames are held by the drawing stand and are used to individualize warp yarns, form shedding and reduce the correlated friction between warp yarns.

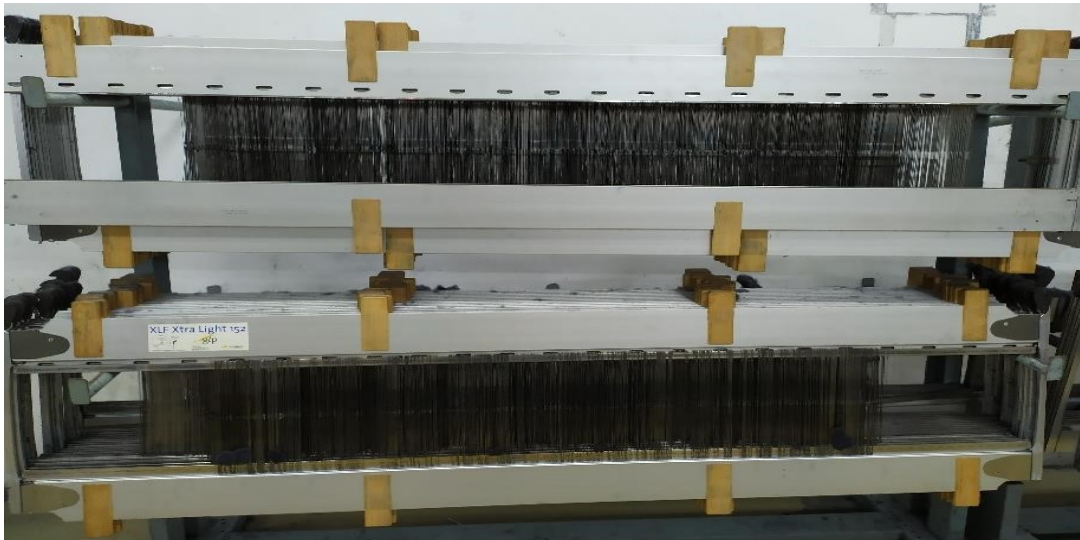


Figure: Heald Frame

6.6.3 Drawing Hook

This hook is used to draw ends through drop wire and heald eye. It can draw two ends at a single time



Figure: Drawing hook

6.6.4 Drop Wire

Drop wire bars are held by the beam stand. Drop wires are hanging from the bars and ends are passed through. There are 6 bars in an assembly.



Figure: Drop Wire

6.6.5 Reed Knife

This device is used to draw warp from heald frame into dent. As per denting order no. of yarn is drawn with this knife.



Figure: Reed Knife

6.7 Loom Specifications of weaving floor

Total no. of looms: 142

Model	OMNIplus Summum	OptiMax
Reed Width	220 cm	220 cm
Maximum RPM	1000	690
Maximum Heald Frame Capacity	6	12
Shedding Mechanism	Cam shedding	Cam shedding
Shedding Type	Positive	Positive
Type of Shed	Open Shed	Open Shed
Weft Insertion Mechanism	Air jet	Rapier
Maximum Weft Color Capacity	2	6
Selvedge Type	Leno	Leno
Beat up Mechanism	Cam beat-up	Cam beat-up
Warp stop	Drop wire	Drop wire
Weft stop	Filling Detector	Filling Detector
No. of Feeling Detector	2	1
No. of Main Nozzle	2	-
No. of Tandem Nozzle	2	-
No. of Valves	16	-
Distance between Relay Nozzle	76mm	-
Main Motor	Sumo motor	Sumo motor
Average Power Consumption	3.40 KW/h	6.15 KW/h
Average Air Consumption	1.5 m ³ /min	0.3 m ³ /min

6.8 Images of looms and other machines

6.8.1 Picanol OMNIplus Summum

Brand Name: Picanol

Model: OMNIplus Summum

Country of Origin: Belgium



Figure: Picanol OMNIplus Summum

6.8.2 Picanol OptiMax

Brand Name: Picanol

Model: OptiMax

Country of Origin: Belgium



Figure: Picanol OptiMax

6.8.3 Tying Machine

Brand Name: JEIJINGJI

Model: TPM - 200

Country of Origin: Switzerland

Machine Speed (rpm): 600 knots/min

Knotting Type: Single Knot

Knotting count: 4-50 Ne



6.8.4 Leno Bobbin Winder

Brand Name: IZUMI International

Model: HBW - 220M - B

Country of Origin: Japan



Figure: Leno Bobbin Winder

6.8.5 Bobbin Winder for Dummy Selvedge

Brand Name: DUKI

Country of Origin: China



Figure: Bobbin Winder

6.8.6 Selvedge Bobbin Winder Machine

Brand Name: Brandt

Model: FLSM/K2

Country of Origin: Germany



Figure: Selvedge Bobbin Winder

6.9 Different Mechanism of Loom

6.9.1 Shedding

Shedding is a device to form shed. With the help of heald frame warp yarns are separated individually into two layers i.e., shed to insert weft yarn. Shedding is the primary motion of loom to form woven fabrics.

Among other shed types, Open Shed is mainly practiced at SHASHA Denim Ltd. In SHASHA Denim Ltd. there are two shedding types:

- Cam Shedding
- Electronic Dobby Shedding



A. Cam Shedding



In cam shedding raising and lowering of heald frames are controlled by cam design. Cams are selected according to the design of fabric. In NZ Denim Ltd. cams are available in ranges as: 1/1, 1/2, 1/4, 2/1, 2/2, 3/1, 4/1. By these cams, structures as Plain, Twill, Satin etc. can be done.



Figure: Cam Shedding

❖ Available Cams

<p>1/1 Plain</p>	
<p>1/2 Z Twill</p>	

<p>1/4 Z Twill</p>	
<p>2/1 Z Twill</p>	

<p>2/2 Plain</p>	
<p>3/1 Z Twill</p>	



B. Electronic Dobby Shedding

Dobby shedding is done when number of cam is maxed out to produce any particular design. Shedding program is done in the control panel. With touch pad sensor in control panel, raising-lowering sequence of heald frames are created.

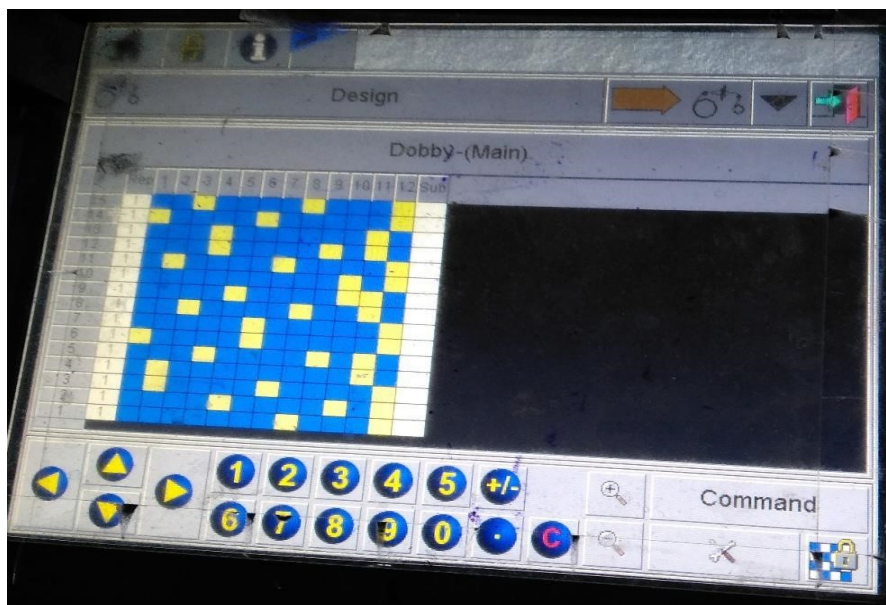


Figure: Electronic Dobby Shedding

6.9.2 Picking

Weft insertion mechanism through shed is known as picking. In picking, weft yarn is inserted from one end of loom and delivered to other end of the loom to ensure full fabric width insertion. The inserted weft is cut after one or two picking using weft cutter.

There are two types of weft insertion system in available in NZ Denim Ltd.

- Air Jet
- Rapier

1. Air jet

In air jet loom picking is done with compressed air. Feeler yarn is projected by main nozzle inside the shed using air pressure and for full insertion to the other side of the loom. There are numbers of relay nozzles that work in the loom to carry the weft to full width.



Figure: Weft Insertion by Air Jet Loom

2.Rapier



Figure: Gripper



Figure: Receiver

In Rapier loom weft is inserted with double rapier in NZ Denim Ltd. There is one Gripper that grips the yarn and carries it to middle then Receiver carries the yarn from there to the other side of loom and completes picking.

6.9.3 Beat up

Beat up is to take the newly inserted yarn to the fell of the cloth to finish one weaving cycle. Reed does the beat-up action by pushing newly inserted yarn to fell of the cloth. This beat up action can be of two type. Cam beat up and Crank beat up. In NZ Denim Ltd. all looms have cam beat up mechanism.

Main motors drive the gears that give to and fro motion to the sley where reed is attached.

6.9.4 Take Up

To roll the produced cloth take up is carried out. Take up is done with a servo motor named ETU motor. It is synchronized with the let off motion.

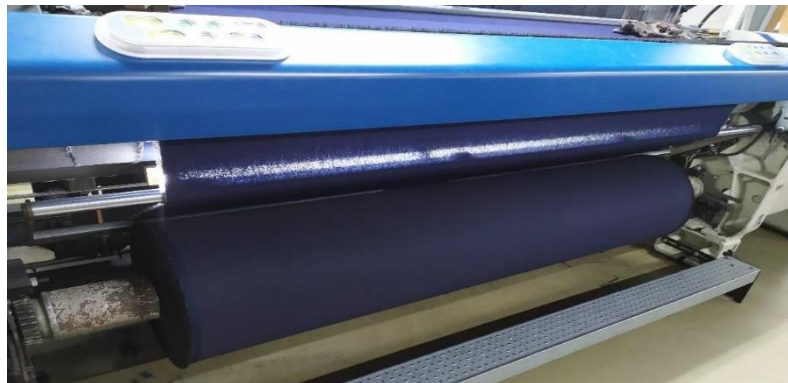


Figure: Take up

6.9.5 Let Off

To unwind the warp from beam and feeding to the machine. Let off is done by servo motor called ELO motor. With the decrease of beam diameter speed of let off increase.



Figure: Let off

6.9.6 Warp Stop Motion

Warp Stop Motion is the automation used in industrial looms. Warp is inserted in drop wire. That drop wire is inserted in metal bars without it. When a warp breaks there is nothing left to hold that particular drop wire and it falls on the bar completing circuit within bars and circuit box that stop the loom immediately. Then broken warp is knotted in that area.



Figure: Warp Stop Device

6.9.7 Weft Stop Motion

In case of any weft breakage, weft running out, partial picking loom stops immediately. This automation stands for weft stop motion. It gives operator much time to insert new weft package or correct any difficulties in picking.

6.10 Parts of loom

6.10.1 Pre Winder

It is a device which is in between weft package and main nozzle that unwinds a predetermined length of weft from the package and store it in the form of no. of coils on a cylindrical

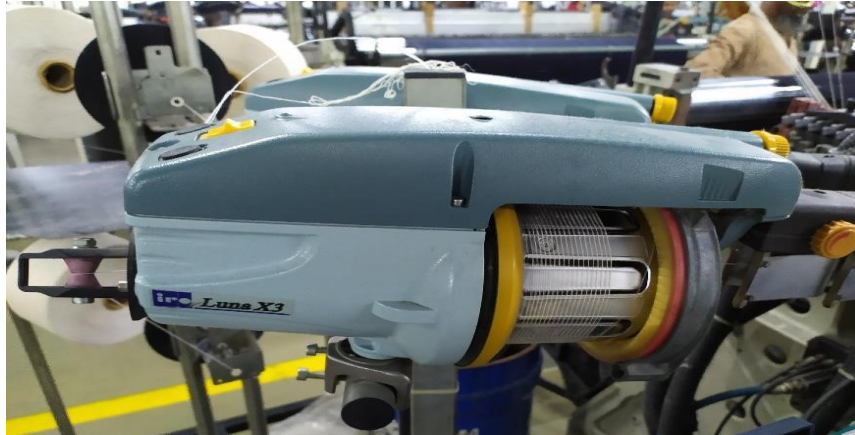


Figure: Pre winder

6.10.2 Balloon Breaker

It is positioned just after the pre winder. Any winding or unwinding of yarn forms balloon if that yarn gets enough space. Balloon Breaker works as in such a way that the yarn can not have that space to form balloon.



Figure: Balloon Breaker

6.10.3 Reed

In SHASHA DENIM Ltd. two kinds of reeds are used. For Rapier Loom Plain Reed is used, and for Air Jet Loom Profile Reed is used.



Figure: Plain Reed



Figure: Profile Reed

Reeds of several counts are used in industry. Maximum reed count 80 inch is available. It can be customized as per required fabric width

6.10.4 Main Nozzle

Main Nozzle delivers the weft inside the shed.



Figure: Main Nozzle

6.10.5 Relay Nozzle

Relay Nozzle carries the fed yarn from Main Nozzle to other side of the loom to complete weft insertion. Adaptive Relay Valve Drive (ARVD) system controls the air pressure in Relay Nozzle to ensure full insertion of weft.



Figure: Relay Nozzle

6.10.6 Main Valve

Main valve sends the supplied weft yarn to the other side using compressed air

6.10.7 Sub Valve

To create additional air flow in direction to air jet to compensate air velocity in Relay Nozzle and ensure full weft insertion. They come in a series and fitted along the sley. One valve can provide air in 2 Relay Nozzles.

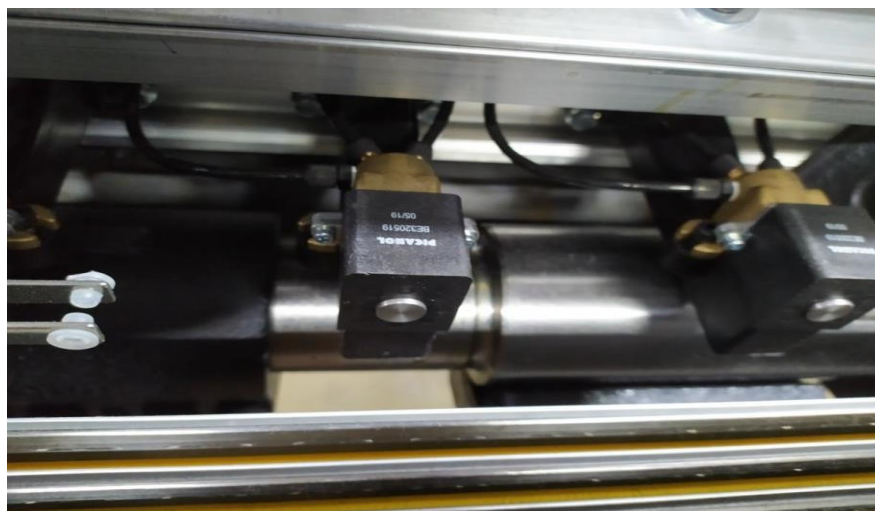


Figure: Sub Valve

6.10.8 Weft Cutter

Completing weaving cycle after beat up weft yarn is cut by weft cutter. It grips and cuts the weft yarn from insertion side after every pick around beat up.



Figure: Weft Cutter

6.10.9 Selvedge Cutter

At loom ends selvedge cutters are placed. This device cut the auxiliary selvedge and protruding yarns at fabric ends and passed as wastage.



Figure: Selvedge Cutter

6.10.10 Temple

Temples hold the produced fabric at both ends maintaining the fabric width.

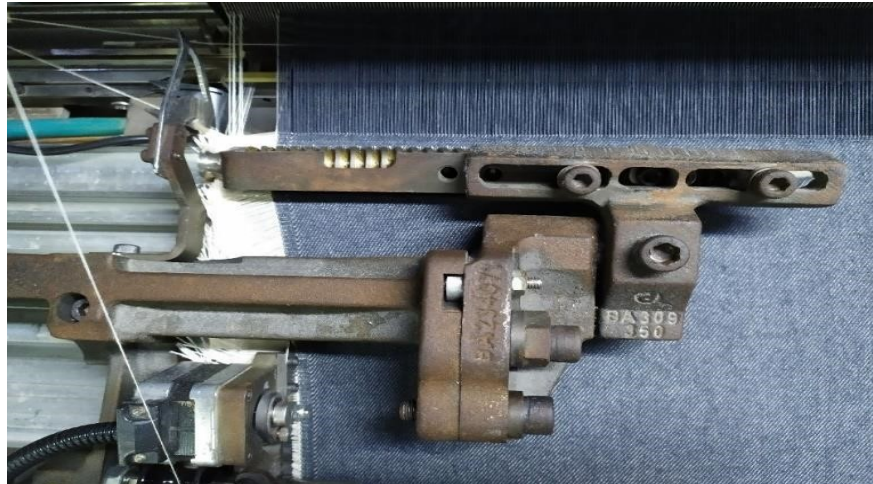


Figure: Temple

6.10.11 Electronic Leno Selvedge System (ELSY)

In looms for leno selvedge Electronic Leno Selvedge System (ELSY) is used. By using this device extra heald frames for selvedge is not required and takes lesser power consuming than heald frame.

Picanol OptiMax, Picanol OMNIplus use ELSY device and Picanol OMNIplus Summum uses upgraded ELSY PLUS device.

Selvedge has an individual design that is done on the control panel.



Figure: ELSY Device

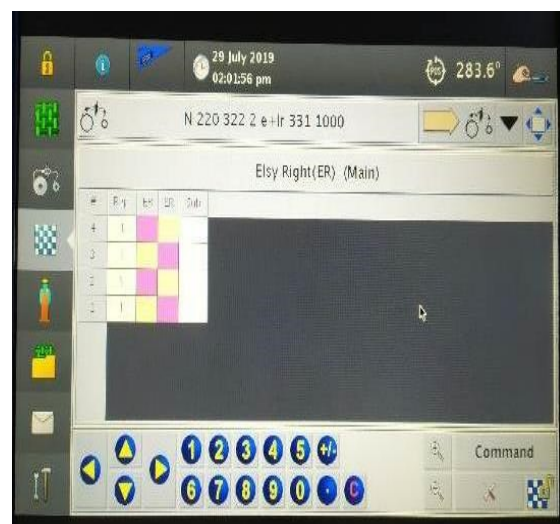


Figure: Selvedge Design

6.10.12 Leno device

For making leno selvedge is leno device is used. Leno packages are fed into the device to form selvedge.



Figure: Leno device

6.10.13 Control Panel

The display shows the status updates of any operation, any parameter can be set on the loom by touch sensor control panel.



Figure: Control Panel

6.10.14 Loom Indicator

Green: It indicates any mechanical complication or adjustment fault

Orange: It shows the electric warp stop

Red: Indicates the weft stop

White: Indicates doffing



Figure: Signal light

6.10.15 Bourdon Pressure Gauge

In air jet looms, valve pressures are measured to ensure if all the valves, nozzles are receiving adequate pressure for full width weft insertion. Main valve pressure: 2 bar
Relay valve pressure: 2.2 bar



Figure: Bourdon Pressure Gauge



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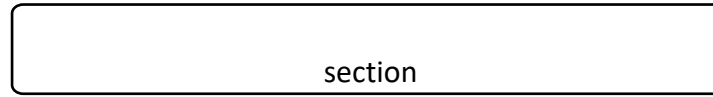
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CHAPTER 07 - FINISHING SECTION

7.1 Flow Chart of Finishing Section in SHASHA DENIM LTD.



Singeing of the beam according to the plan

Transfer the beam for Pad Steam/ Sanforizing according to the buyer's requirements

Check the beam for any kind of faults

Transfer the beam to the inspection section

Collect the programme sheet from the planning

7.2 Finishing

Finishing of grey denim fabric normally carried out after weaving. It takes an important role in fabric properties, appearance, softness and residual fabric shrinkage. The finishing of denim fabric is carried out for several purposes. Finishing of denim fabric can be varied according to the specific requirement of customer.

7.3 Finishing Machine

7.3.1 Singeing Machine Purpose:

- Singeing machine is used to remove protruding fiber.
- Hairiness
- Neps from fabric surface.



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Machine Name	Finishing Machine
Brand Name	Monforce
Country of origin	Germany
Maximum speed	80 m/min
Width control capacity	Up to 80"
Nip roller speed	120 m/min
Total guide roller	6
Brusher unit	1
Brusher roller	2
Brusher to fabric distance	0-10 mm
Beating unit	1
Burner unit	4
Burner to fabric distance	10 mm
Temperature	(60-70) c
J-box	1



Figure: Singeing Machine

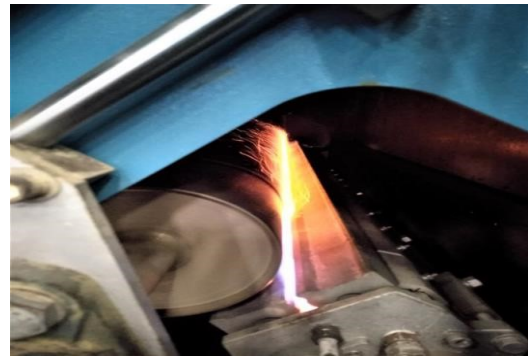


Figure: Burning unit of singeing machine

7.3.2 Pad Steam Machine

Process done in this machine:

- Over dyeing
- Scouring
- Bleaching
- Desizing
- Hot wash
- Cold wash

❖ Machine Specification

Machine Name	Finishing
Brand Name	Sperotto Rimar
Country of origin	Italy
Speed Range	10-80 m/min
Width control capacity	Up to 80
Volume of chemical bath	800 liters
Total wash box	10
Volume (1st and 2nd)	800 liters
Volume (3rd to 10th)	1000 liters
Temperature first 6 box	80-85°C
7 no box	Room temperature
Total dry cylinder	30



Figure: Chemical Bath

Figure: Wash Box

7.3.3 CIBITEX Enhancing Finishing Machine

Sanforizing is a physical treatment carried out on denim fabric with the help of pad steam machine. It is technically called control shrinkage due to compression. Both weft as well warp yarn undergo a series of movements which allow controlled shrinkage. Shrinkage is required to prevent turning of seams in the direction of the twill structure once the garments has been tailored and washed.

Purpose:

- Softening
- Skewing
- Bowing
- Length & Width shrinkage control
- Lycra damage

❖ **Machine Specifications**

Machine Name	CIBITEX Enhancing Finishing Machine
Model	Bluetex
Country of origin	Italy
Width control capacity	6-80 meters
Padder volume	800 litres
Total number of drying rollers	16
Drying temperature	120°C



Figure: CIBITEX Enhancing Finishing Machine

7.3.4 Stenter Machine Purpose:

- Heat setting
- Pudding (colour coating)
- Width & Length shrinkage control

❖ Machine specification

Machine Name	Marcerizing
Brand Name	DHALL
Country of origin	India
Machine speed	5-80 m/min
Bath volume	80 L
Skew roller	3
Nip roller	2
J-box	1



Figure: DHALL machine

Overview

The action of the concentrated lye on the cellulose polymeric structure may be summarized as follows: firstly, the lye hinders the formation of cross linkages between polymeric chain causing a partial re-orientation of the crystallites in the cellulose structure. The section of the fibre changes from kidney-shaped to almost circular due to the swelling and to the modified structure, which involves also the “twisting” of spiral coils in the cellulose. The so modified polymeric chains finally lose the convolutions that are their peculiarity before the mercerizing, and this results in quite interesting effect on the macroscopic scale.

- Increase of dyeing affinity up to 35%
- Dimensional stability
- Improved lustre
- Better mechanical properties
- Coverage of immature/dead cotton
- Softer hand
- Colour brilliance

Features

- Modular assembly
- Automatic lye preparation system on board of the machine
- Bottom grown rolls driven
- Holed rolls lifted by mechanical devise for easy maintenance
- Lye distribution along the whole width
- Automatic fresh caustic soda feeding controlled by reading lye concentration

Specifications

Impregnation & reaction: 28-32

- Stabilization
 - Fabric inlet: 6-8
 - Fabric outlet: 1-2
- Washing
 - Fabric inlet: 1-2
 - Fabric outlet: 0
 - Neutralized fabric exit: 0

100% NaOH (g/kg) On the fabric

- Impregnation & reaction: 200–270
- Stabilization
 - Fabric inlet: 200-270
 - Fabric outlet: 50-80
- Washing
 - Fabric inlet: 50-80
 - Fabric outlet: Neutralized
 - Neutralized fabric exit: Neutralized

L/kg weak lye o l/kg fresh water

- Impregnation & reaction: n.a.
- Stabilization
 - Fabric inlet: 4–5
 - Fabric outlet: 4–5
- Washing
 - Fabric inlet: 4–5
 - Fabric outlet: 5 – 6
 - Neutralized fabric exit: 5 – 6

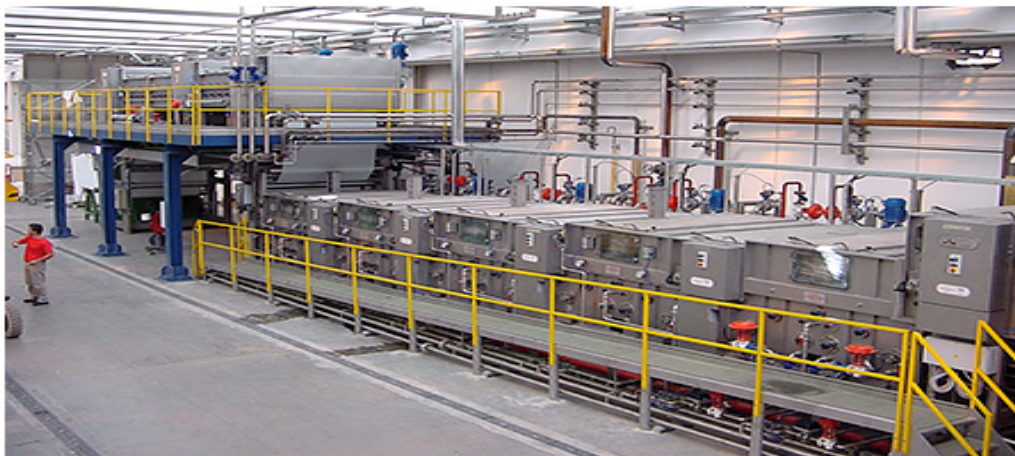


Figure: Mezzera Mercerizing



UGC & Govt. Approved

Sonargaon University (SU)

সোনারগাঁও ইউনিভার্সিটি (এসইউ)

WE WILL
RISE UP
WE WILL
SHINE

CHAPTER 08 - INSPECTION SECTION

8.1 Inspection

Inspection can be defined as measuring, testing, gauging, one or more characteristics of a product or source comparing these with specific requirements to determine conformity. It is the process of checking the fabric sheet for defecting faults in the fabric and preparing an inspection report. After inspection, grading of the fabric is done according to the fabric quality level.

In fabric inspection, fabric rolls are opened and passed through a fabric checking machine having the light under the fabric and fabric checker does the visual inspection of the fabric. While checking fabric checker marks the defects with different color chinks and remove it if could possible.

8.2 Machine specifications

8.2.1 Tubular Inspection Machine

Machine name	Tubular Inspection Machine
Brand	Yuyao Textile Machinery Co. Ltd
Model	MB551FBL
Country of origin	China
Machine speed	5-80 m/min
Total no of machine	7

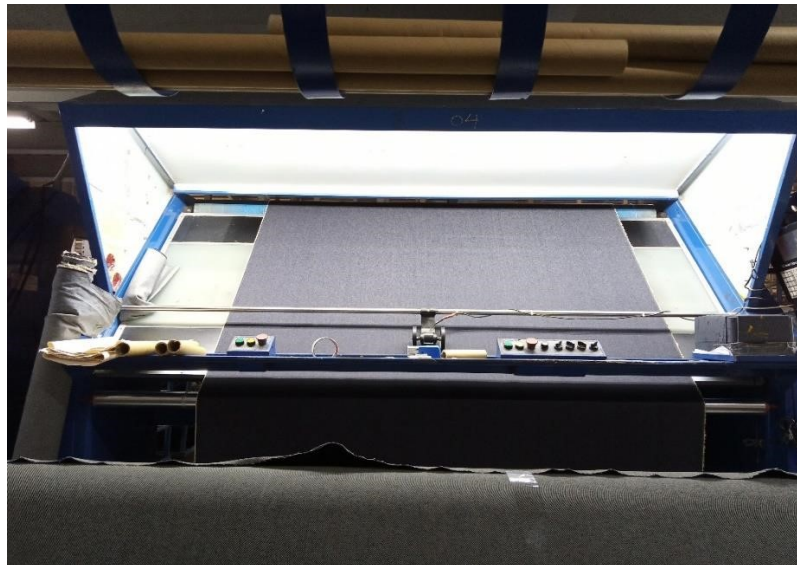


Figure: Inspection Machine

8.2.2 Auto Packing Machine

Machine name	Auto Packing Machine
Brand	Yuyao Textile Machinery Co. Ltd
Country of origin	China
Machine speed	20-30 yards/min
Total no of machine	01



Figure: Auto Packing Machine

8.3 Machine Parts

- Sensor Controller
- Tension Roller
- Roller controller motor
- Front roller
- Electric length counting meter
- Inspection Board
- Inspection light
- Back roller
- Guide roller
- Selvedge sensor
- Paper tube holder
- Roll weight machine

8.4 Inspection system

Fabric inspection is an important aspect in fabric manufacturing. Fabric has certain desirable characteristics depending on end use.

The purpose of fabric inspection is to determine the quality and acceptability of the fabric. There are various inspection systems. 4-point system, 10-point system, Dallas system, Graniteville 78 system.

From these, SHASHA Denim follows 4- point system.

4-point system

The 4 - point System assigns 1, 2, 3 and 4 penalty points according to the size and the significance of the defect. Defects can be in either lengthwise or width wise, the system remains the same. The faults which can be mended and removed are not given any points. When the faults can't be mended, points are assigned as per size. According to this system, if the total defect points per 100-yard square of fabric is more than 20 then fabric is going to be rejected.

8.5 Measuring system

The penalty points are assigned as given below

Length of defect in Fabric	Points allotted
Up to 3 inches	1
Over 3 inch up to 6 inches	2
Over 6 inch up to 9 inches	3
Over 9 inches	4
Holes and stop marks	
Holes and Opening	Points allotted
1 or less	2
Over 1 inch	4

**8.6 Points calculation**Total Points in roll $\times 36 \times 100$ Points Per 100 yard square = $\frac{\text{Total Points in roll} \times 36 \times 100}{\text{Fabric Length in yards} \times \text{Fabric width in inches}}$ Total Points in roll $\times 100$ Points per 100 meter square = $\frac{\text{Total Points in roll} \times 100}{\text{Fabric length in meter} \times \text{Fabric width in mm}}$ **8.7 Fault chart and code Of SHASHA DENIM****Department wise Deefects & Coade for Various Deefects in Fabric**

yarn		Dyeing		Sizing		Weaving		Finishing		Sales	
Deefects	Code	Deefects	Code	Deefects	Code	Deefects	Code	Deefects	Code	Deefects	Code
✓ Slub	101	Shade vari:	201	Slack End	221	✓ Broken Pick	301	✓ Water Stain	401	Short Length	501
Corser weft	102	Stains	202	B.F	222	Thick Place	302	E.H Mark	402	Extra Fents	502
Fluffy Yarn	103	Stop Mark	203	Bad Sel	223	Badf Sel	303	✓ Creases	403	Extra rags	503
✓ Coarser Warp	104	S.S.V	204	Loose Pin	224	Sel Cut	304	Sleeve Mark	404		
Bad Pieceing	105	Dyeing Patta		Tight End	225	✓ Double Pick	305	✓ Hole	405		
Slubby Weft	106			Beam Stain	226	✓ Lashing Pick	306	Un Singed	406		
✓ Oily Warp	107			Size Spot	227	T.R.M	307	Width vari:	407		
oily Weft	108					Float	308	M/C Stop	408		
✓ Contamination	109					Floating End	309	Stain	409		
Finer Weft	110					F.T.M	310				
Finer Warp	111					✓ Double End	311				
						Long End	312				
						Over Pick	313				
						Reed Mark	314				
						Smash	315				
						Slough Off	316				
						Wrang Drawn	317				
						Pick kato	318				
						Less Width	319				
						Foreing Matt	320				
						Djstortion	321				
						✓ Missing Pick	322				
						Starting Mark	323				
						Stains	324				
						Snarls	325				
						✓ Knot	326				

8.8 Some tools for grey fabric inspection



Knife: It is use to cut the fly or loose yarn



Scissor: It is use to cut the cut piece



Textile Marker: To write on the fabric.



Measuring Tape: It is used to measure the fabric width and length of faults.



Nipper: It is use to remove the slubs and knots.



Glass Maker: It is use to mark the fault

8.9 Some faults and causes

8.9.1 Starting mark



o Causes

1. Due to long time machine stoppage.
2. Because of improper tension on beam.
3. Due to less efficiency of operator.

o Remedies

1. Checking back rest motion.
2. Developing performance of operator.

8.9.2 Slub in weft





o Causes

1. Due to floating dust in floor.
2. Because of poor yarn quality.

o Remedies

1. Using good quality of yarn.
2. Properly maintaining the blower.

8.9.3 Snarl



o Causes

1. Low weft tension.
2. Due to over twist in weft yarn.

o Remedies

1. Providing sufficient tension during weft insertion.
2. Ensuring proper twist in yarn.

8.9.4 Miss pick



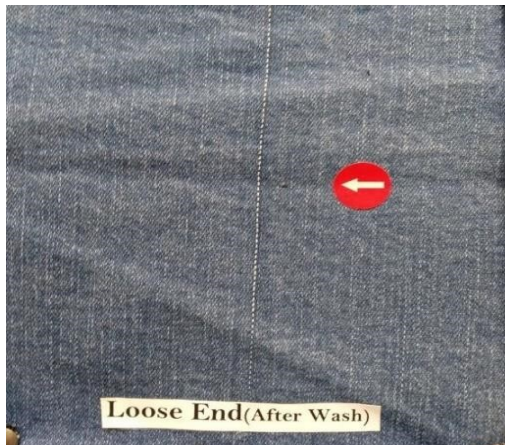
o Causes

1. Excess air pressure in main nozzle.
2. Due to problem in filling detector.

o Remedies

1. Air pressure should be appropriate
2. Mechanical problem should be identified as quick as possible.

8.9.5 Loose end



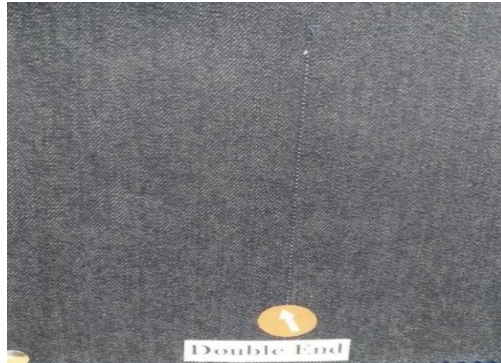
o Causes

1. Due to the low tension in warp yarn.

o Remedies

2. By controlling proper tension.

8.9.6 Double end



o Causes

1. Because of faulty drawing system
2. Due to careless operating of worker.

o Remedies

1. Carefully checking and giving proper knot.

8.9.7 Lycra problem

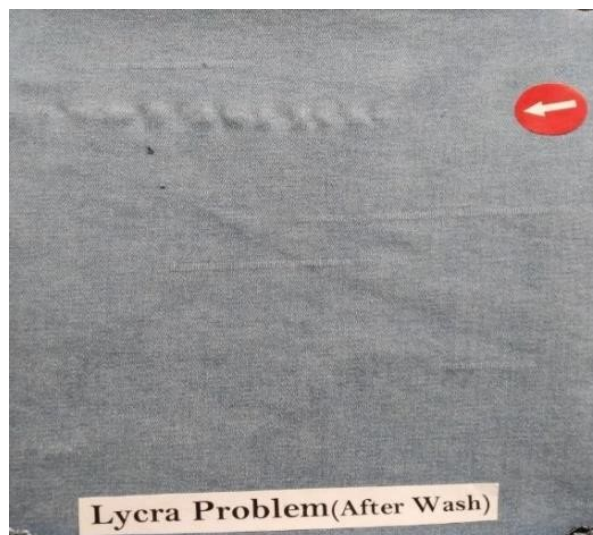
oCauses

1. Because of temperature variation in finishing process.

oRemedies

1. Properly maintain temperature during finishing process.

8.9.8 Smash





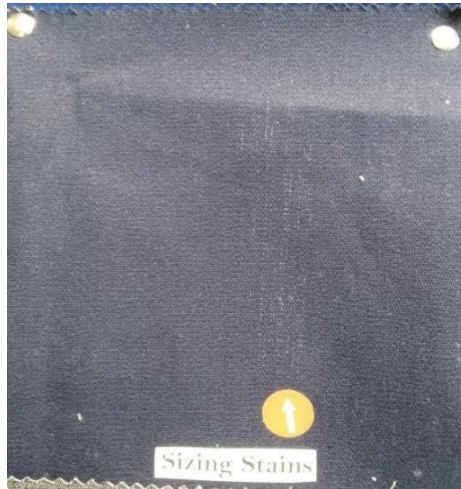
oCauses

1. Due to weft carrier is trapped in the shed, harness strap breakage.
2. Because of broken warp ends and floating picks.
3. Improper timing of shedding and picking.

oRemedies

1. Tune the loom properly.
2. By checking the mechanism properly.

8.9.9 Sizing stains



oCauses

1. Due to poor sizing material handling.
2. Lack of care on the part of workers.

oRemedies

1. Developing the performance of the worker.

CHAPTER 09 - WASHING SECTION

9.1 Washing

Denim washing is an aesthetic finish that is imparted to fabric to improve the softness and comfort of the fabric. In addition, the fabric achieves a different look such as a faded or worn-out appearance. It also enhances the appeal and to provide strength. Washing plays an important role in the denim chain because of the various effects that the consumers are looking for on their jeans.

9.2 Types of washing

- Desize wash
- Enzyme wash
- Bleach wash
- Enzyme stone wash
- Neutral wash

9.3 Machine specification

Machine name	Washing machine
Brand name	SANTA metal engineering works
Country origin	Bangladesh



Figure: Washing machine



Machine name	Washing machine
Brand name	YILMAK
Model	HBM 575 S
Country of origin	Turkey



Figure: Washing Machine

Machine name	Hydro machine
Brand name	YILMAK
Model	HG 30
Country of origin	Turkey



Figure: Hydro Machine

Machine name	Dryer machine
Brand name	Stu Lick
Model	HNS 600
Country of origin	Malaysia

Machine name	Dryer machine
Brand name	Aziz metal Engineering works
Country of origin	Bangladesh



Figure: Dryer machines

Machine name	Hand brush machine
Brand name	JIANYE group co. Ltd.
Model	GT-H
Country of origin	China
Year of manufacturing	2013
weight	50kg



Figure: Hand Brush Machine

Machine Name	Grinding Machine
Model	JQ3115
Maximum speed	30000



Figure: Grinding Machine

Machine Name	P.P Spray Machine
Brand Name	JIANYE
Model	GC-11
Country of origin	China



Figure: P.P spray Machine



Figure: Tacking Machine

CHAPTER 10 - QUALITY CONTROL

10.1 Quality control

SHASHA Denim Ltd. is very sincere about maintaining quality. Both online and offline quality is checked here in different stages of the production process & finally the finished product is tested according to buyer's given standard.

10.2 Quality check for yarn

- Warp and weft count
- Count CV%
- CSP
- Tenacity
- IPI
- Fiber composition
- TM

10.3 Quality check for warping

- Warping ratio and divide of total warp beam
- Creel tension
- Ends/beam
- Set length and machine speed

10.4 Quality check for dyeing

- Dyeing route
- volume
- Shade%
- GPL
- pH
- Temperature
- Padder and beam pressure
- Moisture%
- Set length and machine speed

10.5 Quality check for sizing

- Viscosity
- Solid content
- Volume of size tank and bath
- Temperature
- Padder and steam pressure
- Moisture%
- Set length and machine speed

10.6 Quality check for weaving

- Construction of fabric
- Weave design
- Reed count and Reed space
- Grey EPI and PPI
- Efficiency and RPM of loom
- Grey width
- Grey GSM
- Ratio of warp and weft yarn
- Selvedge type and structure

10.7 Quality check for finishing

- Skew
- Padder and steam pressure
- Moisture%

10.8 Quality check for areal density and dimension

- Areal density (before wash and after wash)
- Shrinkage% (length wise and width wise)
- Construction (before wash and after wash)

10.9 Different test and standard

After finishing, there some tests are done of the fabric both before wash and after wash. All the test should be passed within buyer's requirements.

10.9.1 Test Name: Measuring pH of Fabric

Test Method: ISO 3071:2006 & ISO 3071:2005

❖ Machine used

Machine name: Orbital Shaker

Brand name: JSR

Function: It is used to mix, blend or agitate samples in flasks by shaking them.



Figure: Orbital shaker machine

Machine name: pH Meter

Brand name: NEOMET

Function: This electric device used to measure acidity, alkalinity or neutral point of the solution.



Figure: pH meter

10.9.2 Test Name: Color fastness to Rubbing

Test Method: ISO 105-x12

❖ **Machine used Machine name: Crock MASTER**

Brand name: James Heal

Function: It is used to determine the level and intensity of transfer colour from the surface of one material to another surface by rubbing.



Figure: Crock Master Machine

10.9.3 Test Name: Tensile strength

Test Method: ISO 13934-2

❖ Machine used

Machine name: Titan 5 Universal Strength tester

Brand name: James Heal

Function: It is designed for determining tensile, elongation, compression, fold resisting, adhesive, bending, extension and shearing strength of the objects.



Figure: Titan Universal Strength tester

10.9.4 Test Name: Color fastness to saliva

Test Method: GB/T1886

❖ Machine used **Machine name: Incubator**

Brand name: Daihan

Function: This machine is used to grow and maintain microbiological cultures in fabrics.



Figure: Incubator Machine

10.9.5

❖ Machine used Machine name: Flexi Frame

Function: To determine the fabric stretch, Growth & Recovery.

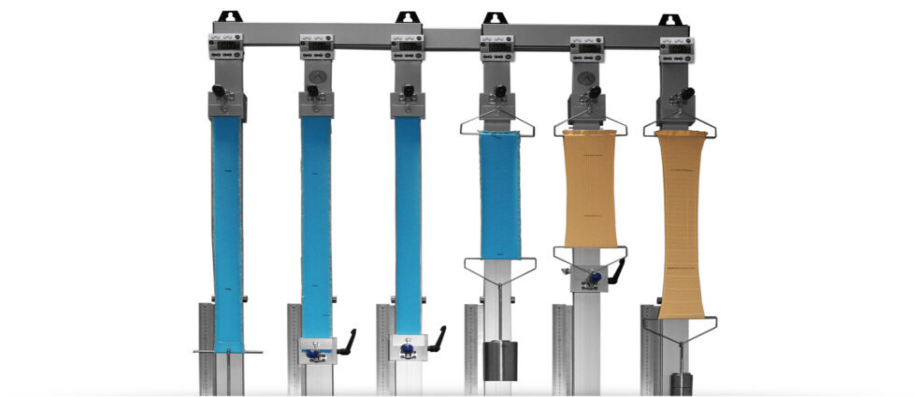


Figure: Flexi Frame Machine

10.9.6 Test Name: GSM Tester

❖ Machine used

Machine name: Electrical GSM Cutter

Function: To determine the fabric GSM.



Figure: GSM cutter Machin

10.9.7 Test name: Pilling Assessment

Machine name: Pilling Assessment Viewer



Figure: Pilling Assessment Viewer M/C

10.9.8: Washing and Drying lab

Machine name: Whirlpool washing Machine



Figure: Whirlpool washing Machine

10.9.9: Electrolux Washing machine

For sample washing



Figure: Electrolux Washing machine

10.10 Gester Rotaesh M/C

For sample washing



Figure: Gester Rotaesh M/C

10.10.1 Electrolux dryer MC

For sample dry

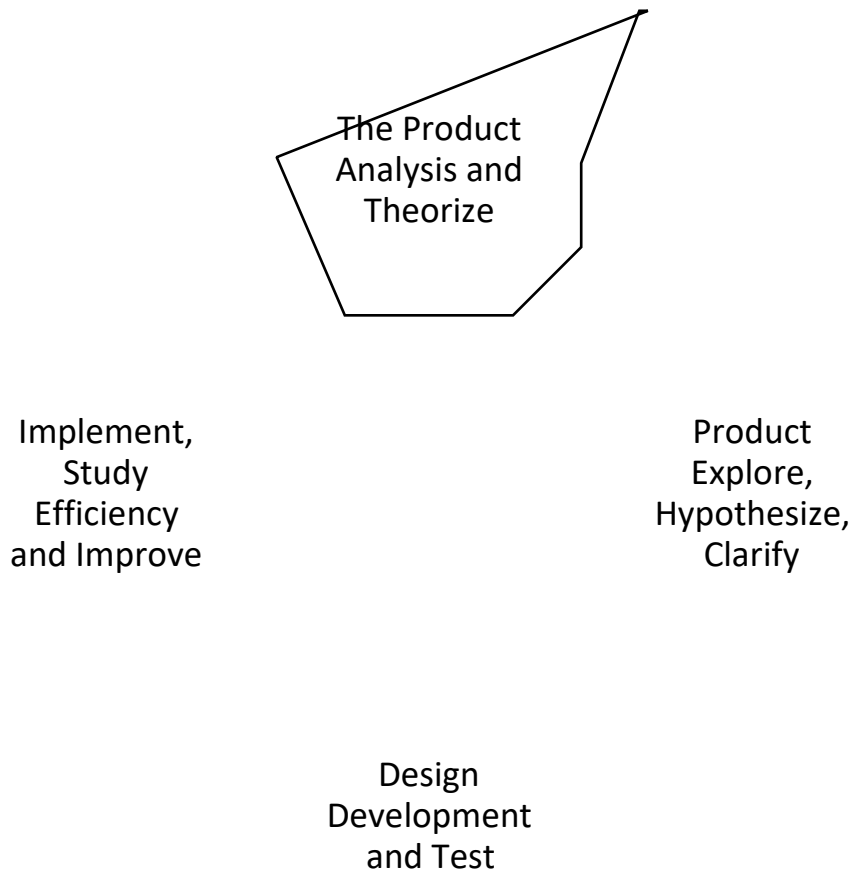


CHAPTER 11 – RESEARCH & DEVELOPMENT

11.1 Research and Development

SHASHA Denim Limited understand the need for continuous evolution. So higher importance is given to research and development. They work by two process Innovation and Duplication. With the help of advanced technology and a dedicated team of experts composed of members of this factory ensures continuous development and sampling at every stage production.

11.2 Research and Development cycle



11.3 Process flow chart of R&D department

Swatch received from marketing department

Swatch analysis

Particulars of yarn	Particulars of color	Weave find out	Checking fabric areal density
1. Yarn type (To identify the yarn whether it is Ring / Ring slub / Open end / Open and slub / Tencel / Viscose / Linen or any other type and No. of plies, single or double. 2. Yarn count 3. Speciality (Characteristics of yarn. Lycra / Core spun / Slub) 4. Yarn Composition (Percentage of different types of fiber in a yarn)	1. Burn test (Fibers are burnt at first, and smudged on paper to analyses the dye) 2. Steeping (Lea prepared from fibers is dipped into nitric acid and observed the color)	1. Analyzing the interlacement repeat of weave find out.	1. Taking a small piece of fabric, fabric weight, length & width is measured, using a formula areal density is measured in oz/yd ²

Practice formula to determine yarn count (*Ne*)

$$= \frac{\text{Total number of yarn in yarn strand} \times \text{Length of each yarn in cm} \times 0.0059}{\text{Total weight of yarn strand in gm}}$$

Practice formula to determine Areal density (oz/yd²)

$$= \frac{10,000 \times \text{weight of the fabric in gm}}{\text{fabric length in cm} \times \text{fabric width in cm} \times 33.91}$$

Matching the swatch details with developed available sample

1. (If matches) Make a swatch from the available sample. Send it to the marketing team for approval.
2. Upon agreement with buyer, send the reference number of available sample to production section for bulk production.

1. (If doesn't match) Send the swatch data to the production for sample development.
2. Quality check for conformity with swatch.
3. Send the sample to marketing for buyer approval.
4. After approval sends the new reference number of sample to production for bulk production.

11.4 Design Studio

All the finished samples stored in a room & displayed categorizing the fabric type and hanging them in hangers. Buyers can visit there and choose to place order of any preferable product.

11.5 Purposes of Design Studio

- To display all the finished products
- To give idea about already developed products so far
- To show buyers the category capability

11.6 Fabric Category

S/N	Fabric Type	Stand number
1	100% Cotton Ring Spun Slub Denim	1
2	100% Cotton Regular denim	2
3	100% Cotton Ring Denim	3
4	Cotton Ring Spun Slub Stretch Denim	4
5	Cotton Regular Stretch denim	5
6	Cotton Ring Stretch Denim	6
7	Cotton Ring Spun Slub Poly Stretch Denim	7
8	Cotton Regular Poly Stretch Denim	8
9	Cotton Ring Poly Stretch Denim	9
10	Light Weight Denim	10
11	Tencel Denim	11
12	Stripe Denim	12
13	Satin Denim	13
14	Printed Denim	14
15	Bi Stretch Denim	15
16	Cotton Polyester Denim	16,17
17	Re-cycle Denim/Cotton Organic Denim	18
18	Cotton Linen Denim	19
19	Cotton Viscose Blend Denim	20
20	Cotton T400 Stretch Denim/PC Stretch Denim	21
21	Over Dyeing Denim	22,23,24
22	Brush Denim	25
23	Development Sample/ Master Copy	26,27
24	RFD/Ecru/White Denim	28,29
25	Dobby Denim	30,31
26	Color Denim	32

11.7 Images of different product type in Design Studio





Figure: Different types of denim fabric of SHASHA DENIM

CHAPTER 12 - SUSTAINABILITY

12.1 Sustainability Management

The sustainability or the sustainable development is defined as development which meets the needs of the present without compromising the ability of future generations to also meet their needs. The concept seemed to cover environmental sustainability by saving water and chemicals. But as people started using it, it became broader including social sustainability as well as environmental awareness.

12.2 Sustainability of SHASHA DENIM LTD.

Water	Mission: 10% reduction by 2021 Water recycle and reuse. Water consumption reduction project.
Green House Gases	Mission: 15% reduction by 2021 Using wet scrubber system to remove harmful materials from environment.
Electricity	Mission: 12% reduction by 2021 Using sunlight system and LED light.
Social, Health & Safety	Mission: 100% health and safety by 2021 They are committed to ensure 100% health and safety of their team members.
Chemical	Mission: 100% ZDHC free chemical To ensure ZDHC mission 2021 they have a chemical management team and structured policy.
Waste	Mission: 4% reduction by 2021 They believe in recycle and reuse.
Air Emissions	Mission: 12% reduction by 2021 Available wet scrubbers and bag filter system to reduce pollution in flue gases.
Coal & Gas	Mission: 10% reduction by 2021 Condensate recovery process, economizer and heat exchanger process are available to reduce energy consumption.

12.3 Saving Water

Among our total uses of water we use 70% of water is used for processing and 30% is used for steam production.

12.3.1 Water Consumption Reduction:

- Steam Recovery
- Steam Consumption Reduction
- Recycling of cooling water
- Effective planning for change over reduction to minimize water drops.

12.4 Steam Recovery Systems:

Condensate recovery is a process to reuse the water and sensible heat contained in the discharged condensate. Recovering condensate instead of throwing it away can lead to significant savings of energy, chemical treatment.



Figure: Steam Recovery Device

12.5 Heat Exchangers

A heat exchanger is a device designed to efficiently transfer or "exchange" heat from waste to inlet water. To reduce energy consumption most of our machines have installed with heat exchanger systems.



Figure: Heat Exchanger Device

12.6 Waste Water Management:

EFFLUENT TREATMENT PLANT (ETP)

Capacity: 288 m/Day

Process Flow Diagram

Influent water coming from dyeing plant through drainage system

Then influent water goes through bar screen filter

Collection tank

Colling tower

Equalization tank (3 consecutive tanks)

Adding sulphuric acid to control the ph

Adding chemicals, PAC, Polymer

Electrocoagulation skidichemical dosing tank

Dissolved air flotation (DAF)

Primary clarifier

Biological tank

Secondary clarifier

Sand filter

Sludge thickener

Filter press

Dried sludge

Neutral water goes out through outlet

12.7 Air Emission and Pollution Control

- A wet scrubber is one type of scrubber that is used to remove harmful materials from industrial exhaust gases.
- Bag filter systems is flue gas lines to remove half-burn particles release to the environment.
- Economizer system at coal boiler is the system where water passes through an economizer, then fuel requirements for heating is lowered.

12.8 Reduction of Electricity

- To reduce the usage of electricity sunlight system and LED & T5 light are used at the factory.
- To create awareness among employee training and awareness program are conducting
- The deploy of energy efficient planning system to reduce half of the changeovers through effective planning systems.

12.9 Future Strategy of SHASHA DENIM LTD on environment

EMS	Implementation of full fledged EMS system by 2021.
Energy & GHG	Reduction of 10% of energy usage per yard by 2021.
Water Use	Reduction of 10% water consumption per yard by 2021.
Effluent Management	Run the ZLD ETP by 2021.
Air Emission	Reduction of air emission 12% by 2021.
Chemical Management	Use less harmful chemicals substitutes for current chemicals.

CHAPTER 13 – COMPLIANCE

13.1 Compliance:

Compliance means maintenance of established standard in working place. Every textile industry should maintain a certain working condition for their employees if they want to do business with foreign buyers.

In 2013, “Rana Plaza” an eight-story complex in Savar, Dhaka collapsed. This disaster caused 1134 deaths and more than 2500 injuries to their employees. This incident attracted the concerns of buyer’s community and they realized violation social compliance not only affect the safety of millions of workers worldwide but also threaten the thousands of brands that purchase from suppliers overseas.

So, importers decided to investigate any potential suppliers before beginning work with them is vital to limiting this risk. As a result, factory owners had to work on it. SHASHA Denim strictly follows the SA8000 standard which is an industry standard for measuring social compliance. This standard is based on

- The United Nations Declaration of Human rights.
- International Labor organization conventions.
- International Human rights norms & national labor laws.

13.2 This standard includes:

- **Child Labor:** Anyone younger than 15 years cannot work in a factory.
- **Discrimination:** The factory cannot engage in any discrimination in hiring, remuneration, promotion, termination.
- **Disciplinary practices:** The factory cannot tolerate mental or physical oppression, corporal punishment or verbal abuse of staff.
- **Forced labor:** The factory cannot employ work that worker has not offered to in the contract. The factory cannot threat of punishment to any worker.
- **Freedom of association and collective bargaining:** All staff must have the right to form, join and organize trade union(s) and bargain on their behalf.
- **Health & safety:** A safe and healthy workplace environment must be provided. The factory needs to take effective steps to prevent occupational injuries.
- **Management system:** the factory must develop policies and procedures to implement and review compliance to the SA8000 standard.
- **Remuneration:** The factory must respect the right of staff to a living wage.

Working hours: The factory must comply with industry standards on working hours, break & public holydays.

13.3 Compliance audits:

Compliance audits is a tool for evaluating a factory's operations and facility. Major retailers often conduct audits both before and after choosing a supplier.

- Auditing before working with a new company can help to avoid working with bad suppliers. It ensures whether supplier is already in compliance before they start production.
- Auditing after selection of a supplier ensures factory is constantly in compliance.
- A proper & detail audit not only ensures compliance in the retailers supply chain but also will help and encourage factory managers to improve compliance over time.

❖ Compliance audits are of two categories:

1. Official audits: These audits are conducted by a brand, retailer or government body.
2. Unofficial audits: These audits are conducted by individual third party.

Major retailers prefer official audits. Specifically, some compliance points can be noted which were present during our intern period in NZ Denim Ltd:

1. Working environment:

- National festival holiday Accident register.
- Equal remuneration Overtime register.
- Labor welfare.
- Child labor abolition policy.
- Working hour policy.
- Hiring policy. Canteen.

2. Health

- Drinking water facility.
- Clean drinking water vassal.
- Suggestion box. First Aid box.

3. Fire

- Emergency exit.
- Sufficient fire extinguisher and active.

4. Safety guard

- Eye guard.
- Mask.
- Hand gloves.
- Safety shoes. Helmet.

5. Toilet

- Separate toilet for women and men.
- A seat with proper privacy and lock facility.
- Effective water sewage system.
- Dustbins.
- Soap.
- Regular cleaning.

6. Others

- Lighting facility.
- Regular and proper cleaning.

CHAPTER 14 – MAINTENANCE

14.1 Maintenance:

Maintenance is the work that keeps the machine running smoothly and keeps the breakdown time to its minimum.

14.2 Purpose of Maintenance:

- To keep machines at their optimum running condition To ensure the best quality output from the machines.
- To minimum the idle time due to breakdown.

14.3 Importance of Maintenance:

- Proper maintenance increase machine lifetime.
- Proper maintenance reduces wastage thus increases machines efficiency.
- Ensures the best quality product.

14.4 Effects of Maintenance:

- Proper maintenance reduces the chance of breakdown because the operation includes changing and repairing the worn-out parts.
- Proper maintenance also ensures the optimum running condition because it includes routine lubrication and oiling of the parts.

14.5 Operation involved in Maintenance:

- **Setting:** Setting is the activity which includes the installation and collaboration of machines.
- **Checking:** Checking includes regular inspection of machines and recognize any failure or forecasting any future failure in the machine.
- **Repairing:** This operation includes repairing the faulty parts and replace them if necessary.
- **Overhauling:** It is a work of maintenance, but not frequent or scheduled work. It is done if necessary.

14.6 Maintenance approach:

- **Reactive Maintenance:** Maintenance is done after the breakdown occurs.
- **Proactive Maintenance:** Maintenance is done before any breakdown or failure occurs. (In SHASHA Denim Ltd. Proactive Maintenance is being practiced)

CHAPTER 15: Marketing Department

15.1 Buyer's Name and Logo of SHASHA Denim Ltd.

Buyer's Name	Country
H&M	Sweden
LEVIS	U.S.A
C & A	Germany
GAP	U.S.A
KIABI	France
Just Jeans	Austrila
ZARA	Spain
CASTRO	Israel
CELOPMAN	Spain
GYNBORee	U.S.A
HEMA	Netherlands
OVS	Italy
PUL & BEAR	Spain



CHAPTER 16 - CONCLUSION

By the grace of Almighty ALLAH, we have completed our industrial training at SHASHAS Denim Ltd. The duration of training was 2 months.

Industrial training is an essential part of our graduation from which we get practical knowledge about industrial system. It also enables us to orientate ourselves with the practical environment of workplace.

This training taught us many things that is being practiced in the manufacturing process. By the help of this industrial training the gap between theoretical knowledge and practical knowledge in Denim Manufacturing is reduced to us. We also learnt about factory etiquette and rules that is being practiced. During the training the authority and the personnel was very helpful and polite. But they were very serious about their work, production and quality.

SHASHA Denim Ltd. is a very successful company in the market for its good quality, comfortable and fashionable denim. Maintenance quality makes SHASHA Denim Ltd. one of the fastest growing denim manufacturers company. In Bangladesh SHASHA Denim Ltd. tries a lot of unique way to enter the new market that is totally different from other brands. Currently they are preparing to install ball warping to enhance their production and quality of the denim.

We would like to express our sincerest gratitude to our honorable teachers for their constant support & valuable advice. We are grateful to the authority of SHASHA Denim Ltd. and all the employees there for providing necessary information, their enormous support and care and every little detail they taught us throughout the internship.