Faculty of Engineering
Department of Textile Engineering

REPORT ON
Industrial Attachment

At
Pacific Jeans Limited
Plot# 14-19, Sector# 5, CEPZ
Chattogram 4223, Bangladesh

Course Title: Industrial Attachment
Course Code: Tex-442

Submitted By:

Submitted By:	ID Number	Group (E)
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Manuarul Haque	TEX1803015087	(E)
Md.Hasibur Rahman	TEX1803015005	(E)
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Academic Supervisor

Md Kamrul Hasan
Coordinator and Lecturer
Department of Textile engineering
Sonargaon University (SU)
146 Mohakhali, Wireless Gate. Dhaka

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

Advance in Apparel Manufacturing Technology
Duration: From 04 October 2021 to 04 January 2022

LETTER OF SUBMISSION

Date……..
Md Kamrul Hassan
Coordinator and Lecturer
Department of Textile Engineering
Sonargaon University (SU)

Subject: Submission of Internship Report

Dear Sir,

With due respect, we the students of Textile Engineering, Sonargaon University (SU) have successfully completed our industrial training program. In this stage we are submitting our industrial training report as part of our B.Sc. in Textile Engineering Degree requirement that bears three (03) credit hours under your supervision. We are submitting this report for our academic purpose only. Please be kind enough to evaluate this dissertation with your valued suggestions.

Sincerely Yours

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(1) Samsul Alam
ID: TEX1901016160

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(2) Manuarul Haque
ID: TEX1803015087

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(3) Md.Hasibur Rahman
ID: TEX1803015005

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(4) Faysal Ahmed
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(5) Ranjan Kumar Deb
ID: TEX1803015019

DECLARATION

We hereby declare that, this Industrial Attachment on **Pacific Jeans Limited** of Bangladesh is done by us under the supervision of **Md Kamrul Hassan,** Coordinator & Lecturer, Department of Textile Engineering, Sonargoan 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.

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(1) Samsul Alam
ID: TEX1901016160

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(2) Manuarul Haque
ID: TEX1803015087

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(3) Md. Hasibur Rahman
ID: TEX1803015005

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(4) Faysal Ahmed
ID: TEX1803015019

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(5) Ranjan Kumar Deb
ID: TEX1803015061

LETTER OF APPROVAL

This is to certify that Samsul Alam, ID: TEX-1901016160, Manuarul Haque, ID: TEX-1803015087, Md.Hasibur Rahman, ID: TEX-1803015005, Faysal Ahmed, ID: TEX-1803015019, Ranjan Kumar Deb, ID: TEX-1803015061 BSC Engineering Textile program, 15B Batch have successfully completed their Industrial Internship on Apparel 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 (BSCTE) Degree.

.....

Md Kamrul Hassan

Coordinator & Lecturer
Department of Textile Engineering
Sonargaon University (SU), Dhaka

ACKNOWLEDGEMENT

First of all, we would like to express my gratitude to **Almighty Allah** to enabling me to complete this report on "**Report on Industrial Training**".

Successfully completion of any type of project requires helps from a number of persons. We have also taken help from different people for the preparation of this report. Now, there is a little effort to show our deep gratitude to that helpful person.

We would like to express our deepest appreciation and sincerest gratitude to our respected Coordinator Sir, **Md Kamrul Hassan**, Department of Textile Engineering, Sonargaon University, for his valuable guidance, suggestion, encouragement, and inspiration throughout this industrial training period.

We would also like to express our foremost gratitude to officials of **Pacific Jeans Limited** who helped us and gave their valuable time, providing us with the most relevant information on the basis of which we have prepared this report. We are thankful to all of them for helping and guiding us and for being nice and kind to us.

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.

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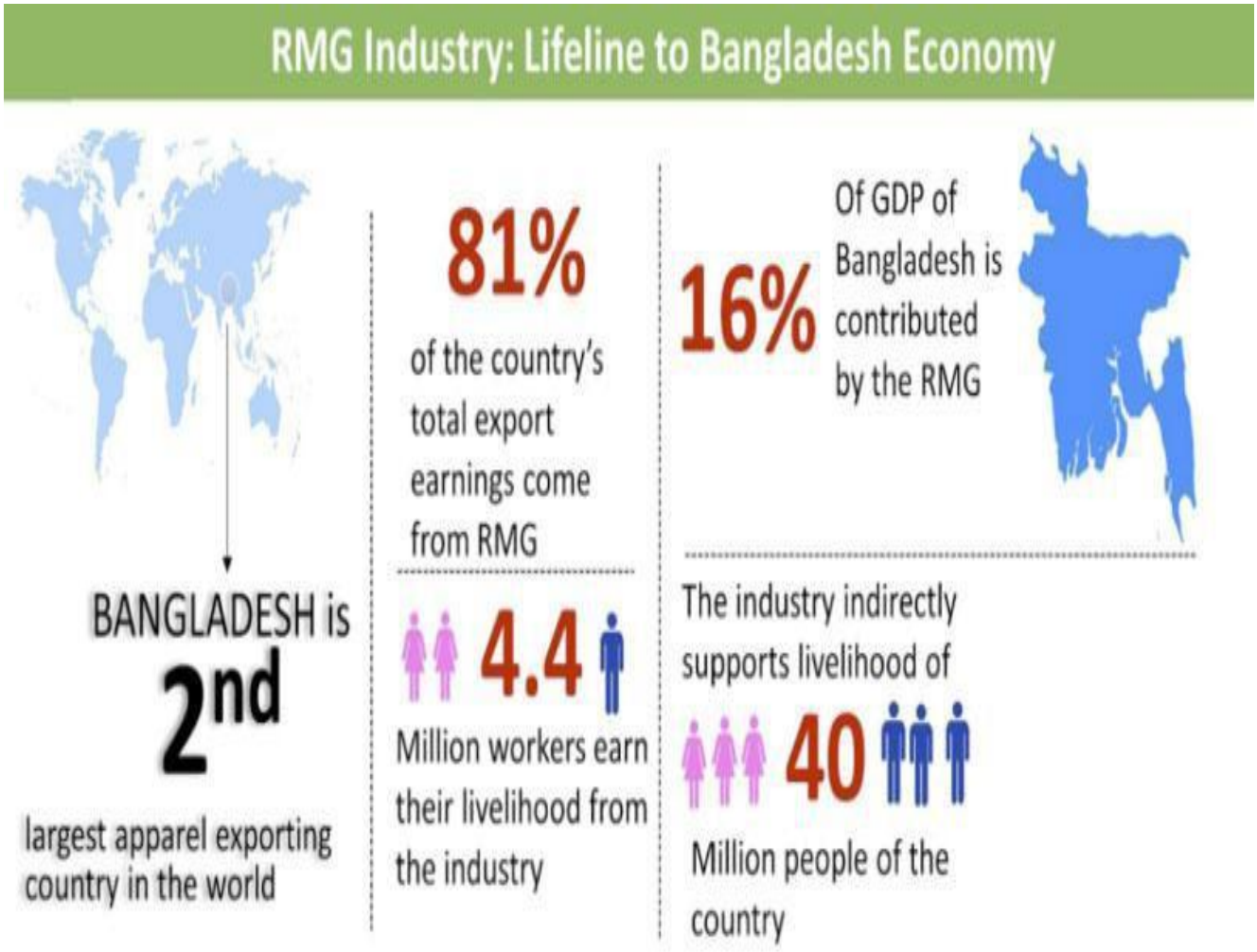
Particular **Page NO.**

Chapter 1

Introductory Chapter



The readymade garments industry acts as a catalyst for the development of Bangladesh. The "Made in Bangladesh" tag has also brought glory for the country, making it a prestigious brand across the globe.

The apparel industry of Bangladesh started its journey in the 1980s and has come to the position it is in today. The late Nurool Quader Khan was the pioneer of the readymade garment industry in Bangladesh. He had a vision of how to transform the country. In 1978, he sent 130 trainees to South Korea where they learned how to produce readymade garments.

With those trainees, he set up the first factory "Desh Garments" to produce garments for export. At the same time, the late Akhter Mohammad Musa of Bond Garments, the late Mohammad Reazuddin of Reaz Garments, Md Humayun of Paris Garments, Engineer Mohammad Fazlul Azim of Azim Group, Major (Retd) Abdul Mannan of Sunman Group, M Shamsur Rahman of Stylecraft Limited, the first President of BGMEA, AM Subid Ali of Aristocrat Limited also came forward and established some of the first garment factories in Bangladesh.

Following their footsteps, other prudent and hardworking entrepreneurs started RMG factories in the country. Now we are the 2nd largest apparel exporter in the world. In our country 81% of total export earning come from RMG sector.RMG sector contributed 16% of total GDP in Bangladesh. About 4 million workers directly connected with RMG sector and most of them are women. The industry indirectly supports livelihood of 40 million people of our country. More than 4000 local and foreign industry are run and increasing day by day.

Significance of the Study

The aim of industrial practice is to make us familiar with any kind of industry, the whole process going on the industry, its environment and also with the management system of the industry. As a student of **Apparel Manufacture and Technology Department**, the target of should be to know the merchandising process, sampling procedure, production planning, production process, management system, marketing, supply chain, quality assurance, compliance, commercial department, cutting & sewing, printing, embroidery, laser department, ICT department, finishing department etc. R&D and D&D department are also important and interesting to know. It is because of the fact that to run any industry not only production department is obvious but also the capability of managing the whole system is an obvious matter. It is also a responsibility of an engineer is to develop the ongoing process into a better system to cope with the present competition. Thus a diversified challenge emerges in front of the manufacturer and other organizations. With a view to overcome this consequence a new generation of engineering graduates with leadership skills and management capabilities altogether are in demand.

We the students of **Apparel Manufacture and Technology Department** were sent to different industries and assigned to different tasks. We were assigned to **Pacific Jeans Ltd**.

Objectives

General objective:

- To gather practical knowledge related to our study.
- To identify the difference between theory (what we have learned from the text) and practice (what is really happened).
- To observe the effectiveness of garments.

Specific Objectives:

- To broadly know about **PACIFIC JEANS LTD.**
- To know details about **Denim.**
- To identify the activities of **Different Department of Pacific Jeans LTD.**
- To know details about **Merchandising Department and Buyer ZARA.**
- To learn details about the **R&D department of PACIFIC JEANS LTD.**
- To gain practical knowledge through **Garment Development.**
- To find the **SWOT** Analysis of **R&D and Pacific Jeans LTD.**
- To find out the **Findings and Recommendations of R&D department**.

Methodology

Basically methodology means a method that involves a process on technique in which various stages or steps of collecting data or information are explained and the analytical techniques are defined. Collected data will be tabulated, processed and analyzed profusely in order to make the program more informative, fruitful and purposeful. Both primary and secondary data have been used for preparing this report.

Primary Data

- Practical work experience at the different departments of PACIFIC Jeans Ltd.
- Discussion with authorized officer, senior officers, employees, and workers of all the department of PACIFIC Jeans Ltd. Regarding their feelings, opinions and feedback regarding PACIFIC Jeans Ltd.
- I use observation process of survey to collect information.
- I collect data from our class lecture and books.

Secondary Data

- For the secondary data, I have used the website of PACIFIC Jeans Ltd. which mainly consists of the basic data and some department‘s process of the company.
- I have also taken information from various reports and articles of University seniors and PACIFIC Jeans Ltd.
- In addition, I have taken some related information from the internet.
- Garments industries and also some other related journal Daily and weekly newspaper, journals etc.
- Supervision of activities/functions all the department of PJL. Direct conversion with authorized officer and senior officers.

Scope of the study

Apparel Manufacture & Technology (AMT) is a professional course. The course is designed with an excellent contribution of both theoretical and practical aspect. After completion of the theoretical course a student is required to work for gathering practical knowledge to anywhere base on his/her major area so that it can be aware of that one. According to choice I was in a garments manufacturing concern named PACIFIC JEANS LIMITED for internship. I am personally believed that scope is not made but scope should to be made. I enjoyed many facilities that may not be enjoyed by other such as officials are so friendly and helpful to each other and gives me every possible support as my requirement. Anytime I can talk with merchandiser, senior manager, team manager and other department head. Finally, I always feel free to do anything and they give full freedom to know anything. So my scope more than enough for preparing my internship report.

Limitation of the study

Everything has a limitation but the level may be more or less. However, there are some problems associated myself while conducting the organization program. The main limitations of the report are given below:-

- My first limitation is that the period of this study was very limited.
- I had to face problems when I was with production department because it is fully technical oriented work.
- The website of this company does not provide a good deal of information.
- The company does not publish any brochures or annual reports from which information could be collected.
- Some data could not be collected because of company restriction.
- I could not learn about laser department because of entry restriction policy.

Chapter 2
Pacific Jeans LTD.

HISTORY

Pacific Jeans LTD. is a world class casual wear manufacturing company known for its state of the art production facility, extensive and unique research and development canter and high skilled resources which has transformed a small garment factory established in 1984 into a supreme institution of premium jeans design and manufacturing house. At that time the factory began manufacturing jeans for an Italian brand in the following year when there was no denim laundry in the country. The factory used to stitch the jeans and ship them unwashed to Italy. M Nasir Uddin owner of Pacific Jeans first established denim laundry in Bangladesh in 1986.In 1996; he set up **Pacific Jeans** in Chattogram Export Processing Zone with 1500 people. At present, Pacific Jeans Ltd is one of the leading premium jeans manufacturers, source of 28000 people, producing over 40 million jeans every year and exporting to over 30 countries, with annual export turnover of $360million.In 2000,they added another production facility **Jeans 2000 Ltd.** In 2008 they expanded further with **Universal Jeans LTD.** And their latest addition in 2014 is **NHT Fashion LTD.**

Pacific Jeans produces jeans garments which are worldly recognized. Mainly it imports denim fabric as a raw materials from various countries or supplied by buyers. Then the final garments are made by using different processing, washing and finishing.

Pacific Jeans has eight production units. Exporting products to the US and around 20 countries in Europe in the last decade, Pacific Jeans has also focused on unconventional marketers in Asia like China, Japan, Thailand, Malaysia and Singapore. They are also trying to enter Brazil, Argentina, South Africa & Russia.

Instead of following a business model that offers a variety of products to customers they prefers a different strategy, which is to specialize in one single product and to keep climbing up the value chain. The group‘s management takes good care of their workforce by allowing them to participate in decision making, so that they develop a scene of belongingness.

In 2013 the group tied up with Marriott International to construct a 5-star luxury business hotel in Chattogram.

Company Overview

Pacific Jeans Limited is a 100% export oriented garments manufacturing industry. It has started commercial production in 1994. It is a private limited company and it is a ―C‖ categories company that means there are 100% local investors. It is located in Chattogram Export Processing Zone known as CEPZ, Bangladesh. Md. Nasir Uddin is the Managing Director of this company. He is a well experienced business personnel and industrialist. He has the vast marketing experience and for exploring the export business he had the opportunity to travel all over the world and established a good business relationship with the overseas buyers. To maintain world-class quality garments Pacific Jeans concentrates on the following factors Quality of the input (such as fabrics, accessories, chemicals etc.) quality of sewing, quality of sewing thread, quality of washing, quality of packing, quality of Finishing.

- ✓ **Company Name:** Pacific Jeans Ltd.
- ✓ **Country**: Bangladesh
- ✓ **Products**: Garments
- ✓ **Type of Company:** Private Limited Company
- ✓ **Category of the company: _**C‘ Type (100% Bangladeshi Investment)
- ✓ **Date of incorporation:** march in1993
- ✓ **Date of commercial production:** 26 November 1994
- ✓ **Date of 1stExport:** 12 December 1994
- ✓ **Tax exemption period:** 10 years (1994 to 2004)
- ✓ **Companies authorized capital**: Taka 1,00,00,000.00(One Crore)
- ✓ **Companies Paid Up Capital:** Taka 30,00,000.00 (Thirty Lac)
- ✓ **Chairman of the company :** Md. Nasir Uddin
- ✓ **Directors of the Company:**
  1. Md. Nasir Uddin
  2. Mrs. Syeda Umme Habiba Begum
  3. Mr. Sayed Mohammed Tanvir.
- ✓ **Connected Bank Name:**
  1. The Hong Kong and Shanghai Banking Corp. Ltd.
  2. Credit Agricole Indosuez
  3. Agrani Bank
  4. City Bank NA
  5. Bank Asia
  6. HSBC
  7. Standard Chartered Bank

- ✓ **Workforce :** 10445 (as on Dec 2013)
- ✓ **Floor Area :** 6,80,000 Sq. Ft
- ✓ **Number of Machines:** 4500
- ✓ **Working Hours:** 9 am to 5.00 pm. (Normal)
- ✓ **Production Capacity (pieces per day) :** 120,000 PCS per day.
- ✓ **Total Production :** 12.48 Million per Annum.
- ✓ **Cost of the Project :** BDT 50.00 Crore
- ✓ **Material Searching Area:** Hong Kong, Indonesia, Taiwan, China, India, Dubai, Pakistan, Mexico, Japan, South Korea, Bangladesh
- ✓ **Fabric Warehouse Area:** 10,000 sq. ft within the premises, there are 4 other warehouses in the EPZ area.
- ✓ **Competitors:** Cambodia, China, Vietnam, India and all other local Competitors.
- ✓ **Marketing Area:**
  - USA -45%
  - Europe -50%
  - Japan -2%
  - Canada -3%
- ✓ **Sanction Date of BEPZA**: 26 Sep 1993
- ✓ **Contact Details (Top Management) :**

Name	Nationality	Designation	Mail ID	Contact No
Md. NasirUddin	Bangladeshi	Managing Director	nasir@pacificjeans.com	+8801717121277(PS)
S M Tanvir	Bangladeshi	Director	tanvir@pacificjeans.com	+880-1713100789
M N Huda	Bangladeshi	Group General Manager	huda@pacificjeans.com	+880-1711749942

- ✓ **Address with Fax/ Telephone No :**

Factory: Plot # 14-19, Sector # 5 Export Processing Zone Chattogram, Bangladesh.
Telephone #88-031-741006 - 8, 741338 Fax # 88-031-741339, E:info@pacificjeans.com

- ✓ **Web Site :** www.pacificjeans.net

Short Description of Pacific group of Factories:

Pacific Group Concerns	Year of Establish	Main products	Per day capacity	Total Employee	Male	Female
NHT Fashion Ltd. Plot#20-22,Sector-5, CEPZ, CTG.	2013	Woven	25,000 pcs.	5290	2609	2681
Universal Jeans Ltd. Plot#9-11,Sector-6/A,CEPZ, CTG.	01/01/2008.	Woven	40,000 pcs.	10141	6392	3749
Jeans 2000 Ltd. Plot#67, Sector-7,CEPZ, CTG.	02/05/2004.	Woven	15,000 pcs.	3455	1918	1537
Pacific Jeans Ltd. Plot#-14-19, Sector-5, CEPZ, CTG.	01/07/2000.	Woven	40,000 pcs.	10506	5802	4704
Pacific Accessories LTD.		Accessories		400		
Pacific Casual Wear		Knit				

Number of industrial plants: 8

Production Capacity of PACIFIC JEANS (Items per Day)

Total Capacity: 120,000.00

	ITEM	**Unit**
1.	Men‘s Ladies & Boys‘ 5 pocket Jeans	80000.00
2.	Cargo Pants/Shorts/Men‘s Carpenters	10500.00
3.	Chinos	10500.00
4.	Overall/Short all	10000.00
5.	Skirt	2000.00
6.	Men‘s Shirt	7000.00

- ✓ **Workers' Absenteeism and Labor turnover (Percentage):**
  - ➢ Monthly Absenteeism- 9.68%(March)
  - ➢ Labor Turnover- 10.80% (average)
- ✓ **Workers' Insurance Scheme:** BEPZA Insurance Scheme
- ✓ **Workers' Council:** Workers' Representative Welfare Council (WRWC)
  No Labor Union
- ✓ **Expenditure on (as a percentage of total expenditure):** 2-4%
- ✓ **Expenditure on Human Resource Development:** 11-20%
  (as a Percentage of total expenditure)
- ✓ **Expenditure on Management Information system or IT (as a percentage of total expenditure):** 10%
- ✓ **Security Measures adopted by the Organization:**
  - ➢ Fire extinguishers
  - ➢ Tow-way entry
  - ➢ Evaluation plan
  - ➢ Preventive Masks & hand gloves
  - ➢ Fire-fighting demonstrations every two months.

Focal point at company level:

NHT Fashion Ltd. Plot#20-22,Sector-5, CEPZ, CTG.	Anwarul Islam 01713-163110 anwar@pacificjeans.com
Universal Jeans Ltd. Plot#9-11,Sector-6/A,CEPZ, CTG.	Anwarul Islam 01713-163110 anwar@pacificjeans.com
Jeans 2000 Ltd. Plot#67, Sector-7,CEPZ, CTG.	Anwarul Islam 01713-163110 anwar@pacificjeans.com
Pacific Jeans Ltd. Plot#-14-19, Sector-5, CEPZ, CTG.	Anwarul Islam 01713-163110 anwar@pacificjeans.com

General information on factory time-table, leaves, holidays, wages and others	
Daily general working hour	8 hours
Weekly general working hour	48 hours
Leisure	Along with lunch time
Daily over time	2 hours (if needed)
Weekly holiday	1 day (Friday)
Festival holiday in a year	12 days with full wages
Earned leave in a year	17 days with full wages
Maternity leave	112 days with basic wages
Minimum wages	6800- monthly
Maximum wages	13000/- monthly
Average wages	9400/- monthly
Mode of payment of regular workers	Monthly (following Christian era)
Wages of daily laborer	Tk. 100/- per day excluding Over time.
Mode of payment of daily laborer	On daily basis.
General pay-day	Within 7th of the following month.

Growth Plan:

Every Business organization makes their Growth plan to acquire within a Target period. Pacific makes their growth plan through -2017, which is given below:

Production Line growth Plan	2014	2015	2016	2017
Total No of production Line	95	137	180	220
Number of production line increase Year By Year	30	42	25	30
Growth of Production line year by year %	32%	44%	18%	19%

Production capacity:

Production oriented business firm have production capacity with their productive equipment. Pacific Garments have their monthly production capacity, which is given below.

Monthly production Capacity plan	**2014**	**2015**	**2016**	**2017**
Monthly production capacity (pcs) /Average Per month	1.8 Million	2.3 Million	2.9million	3.5million
percentage increase year by Year	32%	44%	18%	19%

Washing Capacity: Pacific established it washing plan namely in 1986, with worlds renowned washing Machinery, good term of technicians guided by some expertise.

Wash Type	**Production per month (pcs)**
Garment	**2.7 Million**
Light wash	35%
stone wash	17%
Bleach wash	10 %
Tinting	8%
Acid wash	3 %
Enzyme stone	20%
Rinse	7%

Yearly statement:

Pacific jeans Yearly statement has given on below –

YEARLY STATEMENT -2016

UP TO 31.12.16

BUYER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TTL SHIP (PCS)
BR	61,498	60,287	65,290	29,215	57,418	72,238	17,373	33,037	60,682	32,635	96,644	35,438	621,755
C&A	357,739	242,466	166,439	297,633	231,712	470,366	401,019	662,284	269,398	327,389	456,595	125,353	4,008,393
CELIO											10,387	9,120	19,507
CV	77,799	41,114	17,998	16,114	117,213	64,667	100,468	41,685	17,490	72,891	51,933	130,227	749,599
GAP	77,823	112,287	106,448	71,728	86,450	250,127	117,248	145,309	165,741	67,568	149,414	82,041	1,432,184
H&M	206,075	387,545	200,409	394,405	534,851	550,896	253,264	241,252	103,045	235,536	335,059	325,566	3,767,903
LEVIS				535	0	0	0	36,011	24,394	78,336	134,474	26,066	299,816
MUSTANG					3,101	0	0	12,698	0	3,025	1,331	99	20,254
NYGARD													
OLD NAVY	9,988	74,989	135,208	38,898	80,361	194,126	110,637	74,497	182,916	124,583	44,946	35,473	1,106,622
STOCK	0	28,842	11,313	875	15,501	13,473	8,080	10,386	0	2,816	8,282	504	100,072
TESCO		43,664	0	0	779	0	0	28,419	0	0	19,050	75,169	167,081
TOM TAILOR	350,315	197,133	170,867	136,948	128,506	135,418	171,742	124,081	82,949	211,418	182,349	185,533	2,077,259
UNIQLO	1,107,865	1,366,069	941,271	1,243,328	1,104,098	966,223	484,819	379,011	374,282	579,343	1,246,386	1,347,707	11,140,402
ZARA	243,765	128,634	327,342	84,224	162,032	406,341	324,077	221,886	75,979	74,565	85,225	416,755	2,550,825
TTL	**2,492,867**	**2,683,030**	**2,142,585**	**2,313,903**	**2,522,022**	**3,123,875**	**1,988,727**	**2,010,556**	**1,356,876**	**1,810,105**	**2,822,075**	**2,795,051**	**28,061,672**

YEARLY STATEMENT -2017

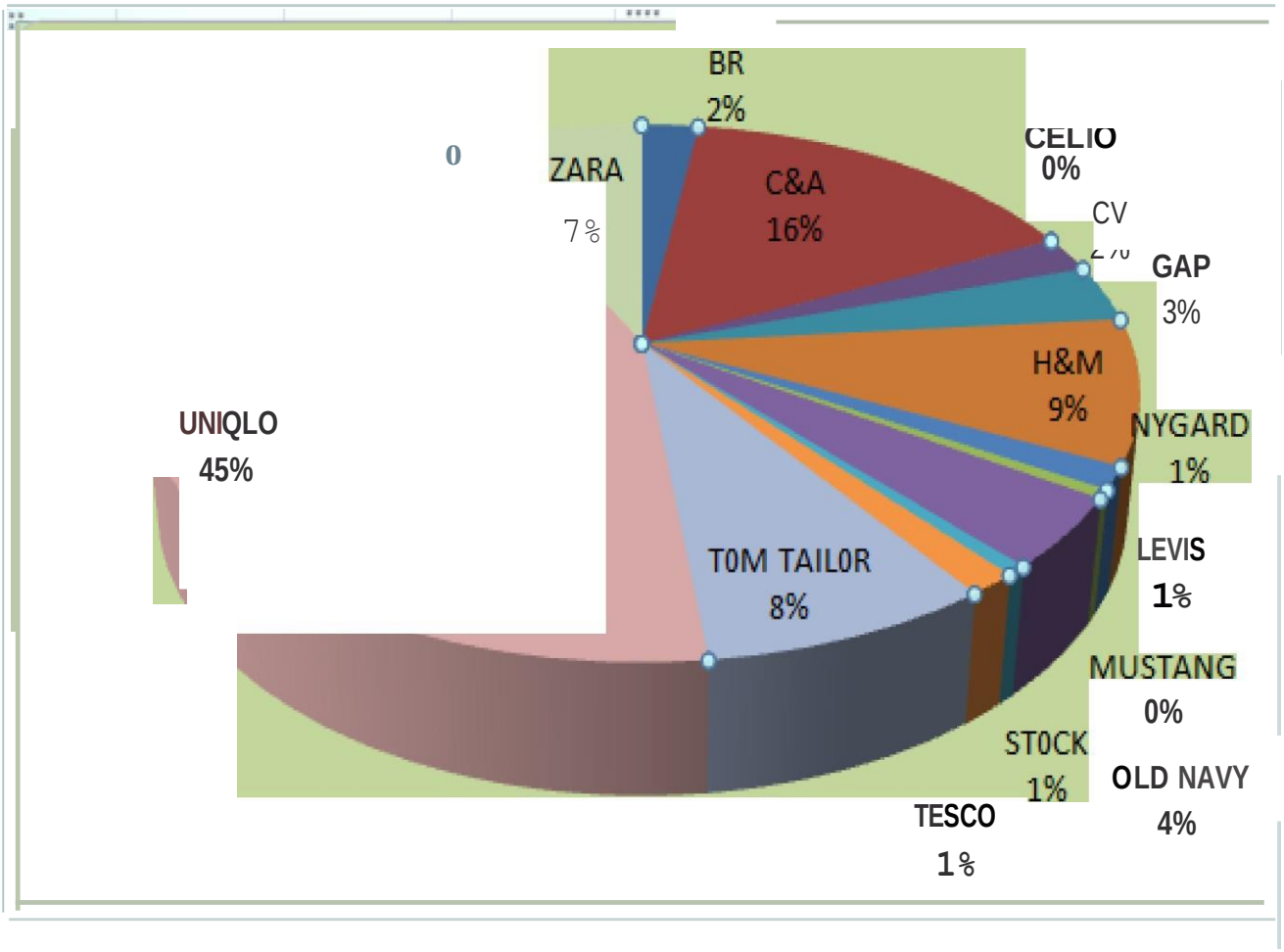
UP TO 31.03.17

BUYER	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TTL SHIP (PCS)
BR	47,742	26,235	73,906										147,883
C&A	475,171	385,205	208,761										1,069,137
CELIO	0	377	0										377
CV	39,080	41,003	64,463										144,546
GAP	76,870	82,106	71,398										230,374
H&M	362,953	154,950	71,056										588,959
LEVIS	18,735	10,644	61,647										91,026
MUSTANG	0	0	0										0
NYGARD		12,318	22,419										34,737
OLD NAVY	21,052	216,406	49,302										286,760
STOCK	0	0	39,195										39,195
TESCO	21,582	32,783	37,753										92,118
TOM TAILOR	281,378	146,665	113,811										541,854
UNIQLO	642,113	1,139,282	1,238,254										3,019,649
ZARA	258,101	80,793	148,431										487,325
TTL	**2,244,777**	**2,328,767**	**2,200,396**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6,773,940**

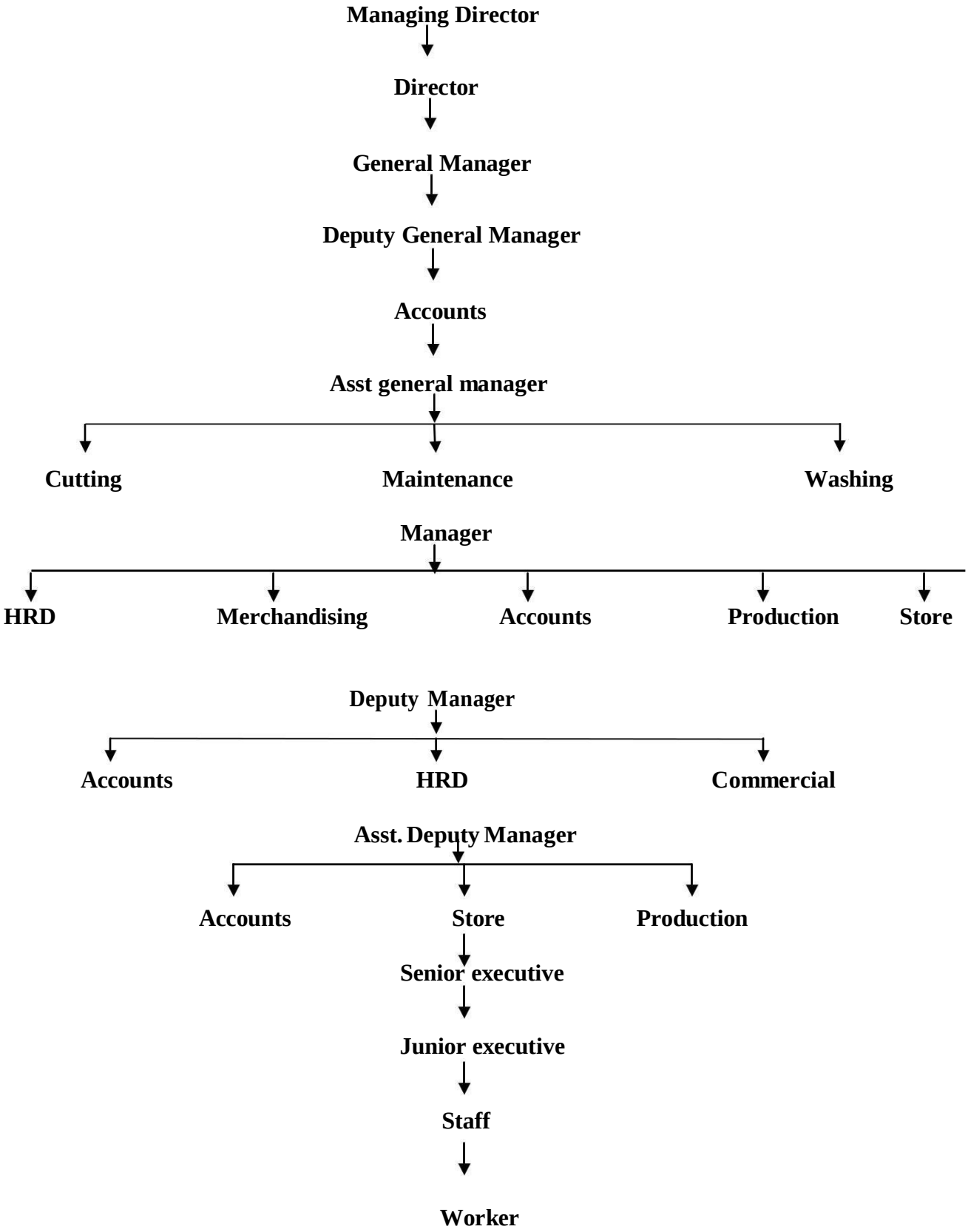
Variation (2017-2016)

YEARLY STATEMENT -2017

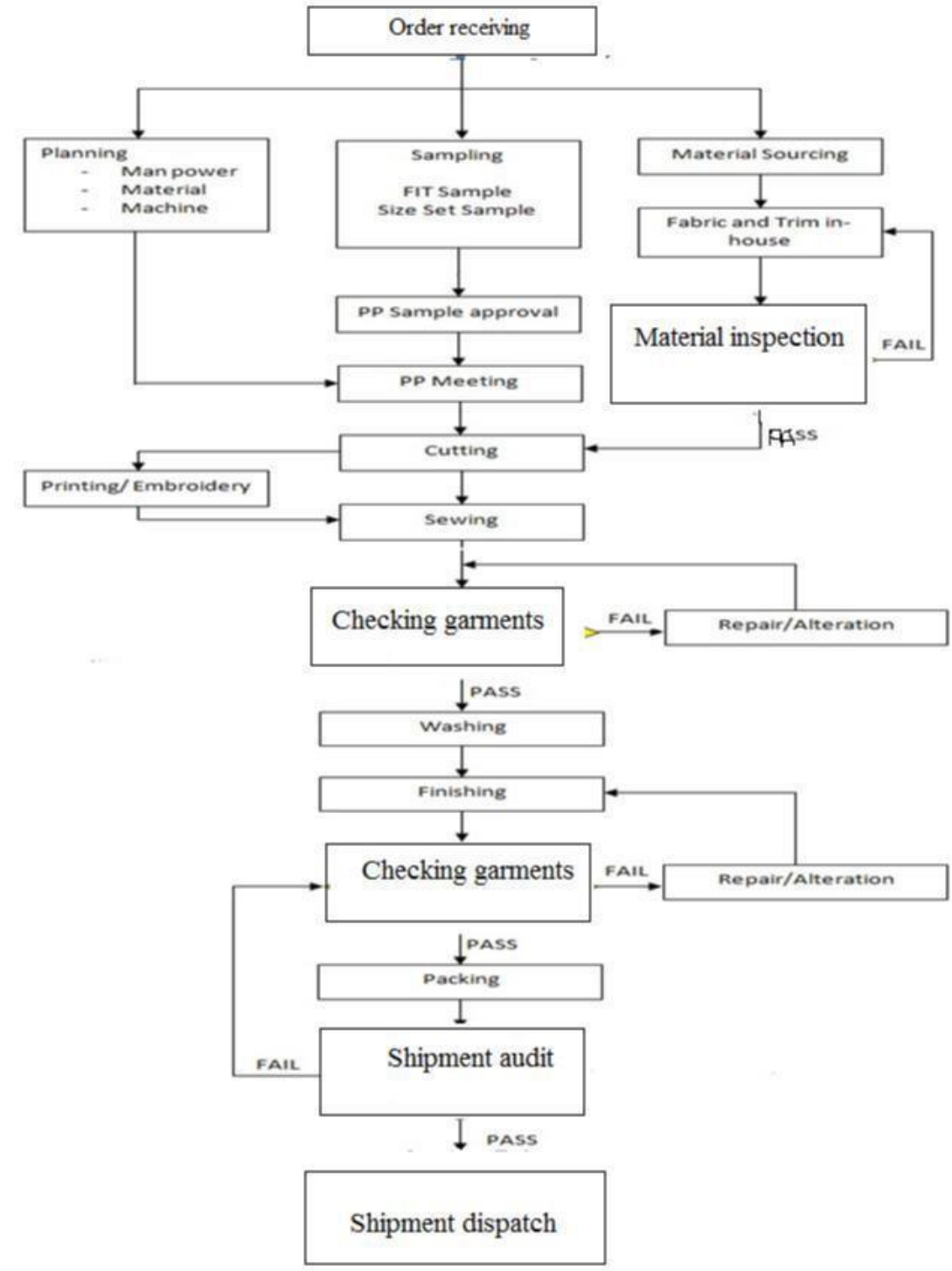
BUYER	.wt	FEB	IIAR	APR	liAY	.AJN	.AIL	AUG	SEP	OCT	NOV	IE	TTLSIII (PCS)
BR	(13,756)	(34052)	8616										(39,192)
C&A	117,432	142,739	4 322										30 493
CB.JO	0	3n	0										377
CV	(38,719)	(111)	46,465										7635
GAP	(953)	(30,181)	(35050)										(66,184)
H&ll	156878	(232,595)	(129,353)										(205070)
LEVIS	18,735	10644	61647										91,026
IAUSTANG	0	0	0										0
NYGARD	0	12318	22419										34,737
OLD NAVY	11064	141417	(85906)										66,575
STICK	0	(28842)	27882										(960)
TESCO	21582	(10881)	37,753										48,454
TIHAILIR	(6893n	(50,468)	(57056)										(176461)
UNIQI	(465,752	(226.78n	296983										(395556)
ZJJI.A	14336	(47841)	(178911)										(21 416)
TTL	(248,000)	(354263)	57811	0	0	0	0	0	0	0	0	0	(544542)



Organogram of Pacific jeans



Working Procedure of Pacific Jeans LTD.



Objectives of the company

Pacific Jeans Ltd. is one of the foremost manufactures of the garment industry in this country. Pacific Jeans Ltd. is a 100% export oriented garments manufacturer. To maintain world-class quality garments Pacific Jeans concentrates on the following factors.

- Quality of the input Such as fabrics, accessories, chemicals etc, Quality of sewing, Quality of sewing thread, Quality of washing, .Quality of packing, Quality of Finishing.
- Best use of potentiality of garments industries of Bangladesh.
- Use the most modern technology in business field to the best possible extends, which matches with the socio-economic condition of Bangladesh.
- Give opening to the new jobs.
- Developing a set of human resources with the most modern business philosophy, practice and Technology.
- Ensure 100% security.
- Ensure 100% on-time delivery.
- Ensure 100% quality right from the commencement to the finish of production.
- Ensure 100% transparency in all activities.
- Ensure 100% honesty, discipline and punctuality.
- Maintaining at least 80% efficiency

Principles of Pacific Jeans LTD

- All the employees, customers/consumers and suppliers are behaved with morality.
- All types of corruption must be prevented when and where it is occurred.
- To recognize the contribution of all workers and help others to contribute.
- To ensure the equal facility for all workers and to avoid all types of partiality.
- Always ensure the maximum utility of wealth and resources.
- To ensure the health care of employees and provide the safe work environment.

Policies and procedures of Pacific Jeans LTD

- Maintain cordial relations with all stakeholders, namely- customers or buyers, suppliers and employees
- Fight against dishonesty, fraud and corruption as and when it occurs.
- Recognize the contribution of each individual and assist others to make meaningful contribution.
- Equal rights for all and no discrimination in any field,
- Always ensure maximum utilization of resources,

The vision of the company, which is also its motto- ―RESPECT FOR INDIVIDUAL‖ , has been set up at the very entrance of the building. Boards bearing these words are placed on the walls of each floor. The officials informed us that all the employees right from the top-level to the junior most position is treated with respect and dignity for his/her work.

Code of conduct of Pacific Jeans Limited

- Pacific Jeans Ltd. abides by the principles that decisions on hiring, salary, benefits, advancement, termination or retirement are based solely on the availability of and individual to do the jobs.

- Forced labor: Pacific Jeans Ltd. does not use force labor in any from Prison, indentured, bonded or otherwise.

- Child labor: Pacific Jeans Ltd. does not employ any person below the age 18.

- Compensation: Pacific Jeans Ltd. provides each employee at least minimum wage or higher and provided each employee a clear, written accounting for every pay period.

- Benefits: Pacific Jeans Ltd. provides each employee all legally mandated benefits. These include meal subsidies, transportation or transportation subsidies. Others cash allowances, health care, pregnancy or sick leave, vacation, religious holiday, leave and contributions for provident fund

- Hours or Work/overtime: Pacific Jeans Ltd. complies with legally mandated work hour uses overtime only when each employee fully compensated according to local law and on a regularly scheduled basis provides one day off in seven and requires no more than 60 hours of work per week.

- Management of Environment, Safety and Health: Pacific Jeans Ltd. has written health safety guidelines, has a factory safety committee provides personal protective equipment free of charge and mandates its use and complies with all applicable local environmental, safety & health regulations.

- Every employee shall be treated with respect and dignity. No employee shall be subject to any physical, sexual, psychosocial or verbal harassments or abuse. Written disciplinary procedures shall be applied fairly among all workers.

Products of Pacific Jeans Ltd.

Pacific Jeans Ltd. manufactured various types of garments:

- Long Pant
- Short Pant
- Three Quarter Length Trousers
- Long Skirt
- Short Skirt
- Jacket
- Denim Dress
- Joggers
- Kids Pant
- Ladies Overall

Buyers of the Pacific Jeans Ltd.

- Uniqlo
- ZARA
- Tesco Men
- Tesco Ladies
- Mango
- Next
- Khols
- Target
- GAP
- Lee
- Banana Republic
- C&A Men
- Celio
- C&A Ladies
- Tom Tailor
- Clock House
- Bonita
- Wrangler
- MASH
- H&M
- V.F. Asia
- Lin Dex
- Henric and Laurence
- Miles
- American Eagle
- The Denim

Valued Customer:

Production units:

NHT Fashions Ltd.

Universal Jeans Ltd.

Pacific Jeans Ltd.

Jeans 2000 Ltd.

Pacific Accessories Ltd.

Company Achievement:

National Trophy Gold
1998 - 1999

National Trophy Silver
1999 - 2000

National Trophy Gold
2000-2001

National Trophy Silver
2001-2002

National Trophy Gold
2003 - 2004

National Trophy Bronze
2010 -2011

National Trophy Silver
2010 -2011

Bangladesh Business Award
2006

HSBC Export Excellence Award
2010

HSBC Export Excellence Award
2012

National Award: 7times

1998-1999 – National trophy Gold

2000-2001- National Trophy Silver

1999-2000- National trophy Gold

2001-2002- National Trophy Silver

2003-2004- National trophy Gold

2006 – Bangladesh Business Award

2010-2011- National Trophy Bronze

2010-2011- National Trophy Silver

Pacific Jeans has been awarded for its outstanding contribution in many occasions. We have been awarded as the top exporter of Bangladesh for consecutive five years. In addition Universal Jeans Ltd. and Jeans 2000 Ltd. under Pacific Jeans group have been awarded the National Export Trophy for the year 2010-2011. The Chairman of the company was awarded with best businessman of the year of Bangladesh in 2006. Pacific Jeans has also been awarded with the prestigious HSBC Export Excellence Awarded 2010 and 2012 for strong contribution towards national economy.

Certifications:

- **LEED GOLD** Certified from USGBC.
- **ISO 9001:2015.**
- **GOTS** (Global Organic Textile Standard)
- **OCS** (Organic Cotton Standard)
- **RCS** (Recycled Claim Standard)
- **BCI** (Better Cotton Initiative)
- **BSCI & SEDEX/SMETA** Approved
- **SCAN Security Audit** (Approved with 93% Score)
- **Supplier Ownership Program** Certified for buyer C&A.
- **Lab Accreditation** Certification for LEVI'S, GAP INC., FR (Uniqlo), C&A and H&M.
- **Alliance/Accord approval** on 100% completion of Structural, Fire & Electrical

Environment Planning:

- Actively participating & submitting HIGG Index FEM 3.0 & Social Module.
- Actively participated CP and PAcT program to reduce Energy & Water consumption to ensure Environmental Sustainability.
- Sustainable Wash program for different buyers which help us to reduce water & Energy consumption, Manpower and Chemical.
- Participating H2O water management program of buyer GAP Inc.
- ETP Modification/Automation done to get more sustainable result with less chemical & energy consumption.

Water/Energy/Emission

Water

- Rain Water Harvesting
- Installed RO with UV Lamp for Clean drinking water for workers.
- Installed modern wash machine to reduce water & Chemical consumption.
- Installed water flow meter in the outlet & inlet of production process & others areas for proper monitoring of water consumption.
- We have reduced water consumption by spraying Enzyme in machine instead of conventional way.

Energy

- **70 KW/H Solar Power Plant** Installed for lighting in the production floor.
- **100% LED** lights installed in the factories.
- Installed servo motors in the sewing machine to reduce energy consumption.
- **Installed inverter** in the dryer & Air Compressor to reduce energy consumption.
- **Installed modern boiler with economizer & auto blow down system** to reduce energy consumption.
- **Installed cogeneration boiler** running with exhaust of gas operated generators. So no energy used at all for this boiler which is also reduced air emission.
- **Installed condense steam** recovery system.
- We are using low Curing temperature resin for Wrinkle, 3D to save energy.
- We are using Cold Enzymes (For De-sizing, Enzyme stone, Bio-polishing) which save steam.

Emission

- Recycling material in production.
- Moving towards paperless office.
- Planting trees/adopted gardens etc

Chemical Management

- Most of the chemicals using by the factory are approved as per ZDHC MRSL as well as buyer MRSL/RSL. We are also screening and Communicating with our Chemical Supplier to ensure that 100% of our chemical will be purchased from the supplier those are registered in the ZDHC gateway.
- Joined roadmap towards ZDHC (ZERO DISCHARGE OF CHEMICALS).
- Moved from regular dyestuff to Avitaradyes which consume less energy/time (developed by HUNTSMEN).
- We are using zero formaldehyde resin for wrinkle 3D production.
- We are replacing our dye stuff chemicals with ETAD certified dye stuff chemicals.

Labor Practice:

Incentives & Benefits

- Provident Fund
- Festival Bonus.
- Paid Maternity Leave
- Group insurance
- Production Incentive Bonus.
- Attendance bonus.
- Yearly Earn Leave Encashment
- Transport Allowance.
- Food Allowance.
- Wages payment through Bank

Facilities

- Subsidized Transportation / Pick and Drop service
- Subsidized Tiffin

Well-being

- Day Care facility
- Free Eye Care facility
- Medical Facility

- Yearly Routine medical checkup program for the workers who work in Hazardous/risky areas.
- Blood Donation Program.
- Gift to the children of Child Care room.
- Reward for the workers for best Idea.

Social Responsibility:

Women Empowerment

- P.A.C.E. (Personal Advancement & Career Enhancement) Program- An innovative factory-based program of buyer GAP, that positively impacts female garment workers (FGW‘s) by providing them with foundational skills and support that will help them advance in the workplace and in their lives.
- WSD (Writing Skill Development) program for female workers those who can read but don‘t know how to write.
- HER Health program.
- Comprehensive Internal Trainings / Skill Development Programs.

Children Welfare

To improve children‘s welfare and access to resources (education) in the nearing Communities, Pacific Jeans Foundation has engaged in the following:

Elementary school

Pacific Jeans foundation has established 1 Primary School (Amena Biddya Niketon) & 2 High Schools (Latifpur A.A. Jalil High School & Hazi. Khaja Kalu Shah R. Girls H School) for the local community, where population is generally very poor and families don‘t have basic education nor can provide it to their offspring. Pacific Jeans foundation paying the development & other expenses including teacher‘s Salary& Bonus to above schools on regular basis. 2,885 students are attending in these 3 schools.

Scholarship

Since 2016 Pacific Jeans foundation started scholarship program for the poor student of local community. In the year of 2017, Pacific Jeans foundation provided tuition fee to 27 schools & 05 colleges. Total 872 numbers of students got this tuition fee. Moreover, Pacific Jeans foundation also provides food & educational stationary to those students. Pacific Jeans Foundation also

provide financial support to the talent but poor students of Sitakunda Upazilla those who are studying different college & University.

Orphanage

Since 2010 Pacific Jeans foundation donates for orphan students (Total 300 Students) of 17 Orphanages located in Sitakunda Upazilla.

Donation

Pacific Jeans foundation donates to different types of schools & Institutes as a part of social commitment. Pacific Jeans foundation donate to:

Dr. S. K. Majumder Agriculture College, Pirujpur for new school building construction purpose,
Bir Bikrom Zainul Abedin High School for new school furniture,
Autistics Children Dev. Foundation,
Sitakund Govt. High School,
B.A.F Sheheen College, Chattogram,
Sitakund Upazilla Crira Sangstha,
Latifpur Govt. Primary School,
Sitakunda Samity, Chattogram,

Social Commitment

Pacific Jeans is committed to be part of social development and always tries to help the under privileged people of the society. For a long time of year Pacific Jeans is serving different types of activities such as:

- **Free Eye Campaign which includes the following:**
  - Free eye check up
  - Medicines free of cost
  - Provide spectacles
  - Arranged free operation when needed
- Donation for poor patients of Chattogram medical college hospital (Rogi Kalyan Samity of Ctg. Medical College Hospital).
- Financial help to Freedom Fighters in Independence Day Celebration time.

Workers Healthcare & Welfare:

Pacific Jeans Joined "Pathways for Promise" program of Asian University for Women (AUW) for Ready-Made-Garments workers: Pathways for Promise is the world's first initiative to offer free degree courses at the Asian University for Women to improve the prospects for workers in Bangladesh's clothing factories. Under this program Pacific Jeans will continue to pay selected students' wages while they are enrolled.

Blood donation program:

BEPZA Hospital often arranges blood donation campaign. It's a collaboration program with BEPZA Hospital & Factories of CEPZ. Pacific Jeans also participates with a blood collection program for workers & management. It includes the following:

- Awareness sessions of the benefits blood donation brings to volunteers
- Full blood test to identify any deficiencies (vitamins, minerals, etc.)
- Medicines if needed
- Free blood transfers for participating and non-participating workers and their families (otherwise a costly resource).

Pacific Jeans Foundation also providing financial support to the employees for expensive medical treatment.

Eco care

Pacific believe that the delectation of natural resources consumed by our business. Operations must be restored to the environment. So that our presence will not be detrimental to future life.They committed to future corporate growth that will balance economic progress while instilling a culture of sustainable development for the environment and community.

To validate their corporate environmental commitment they are recycling toxic water everyday.To become more energy efficient they are heavily invested on high tech machines, highly reflective flooring and energy efficient light source. They are also generating energy using waste heat which has substantially reduced their energy consumption.

CSR

Pacific jeans foundation is the CSR wing of the group relentlessly working on children education in Bangladesh. The foundation has already established one high school and two primary schools in remote areas of Bangladesh. Two more primary schools are under construction. Pacific jeans foundation is also giving scholarship to talented students for higher education. It helps under privileged people with free medical treatments and medicines. The foundation is also a financial patron of an organization that provides assistance to leukemia affected children.

Mission

Hit the Billion By 2028

Vision

Be a Global Life ware Solution Company

Values

Chapter 3

DENIM

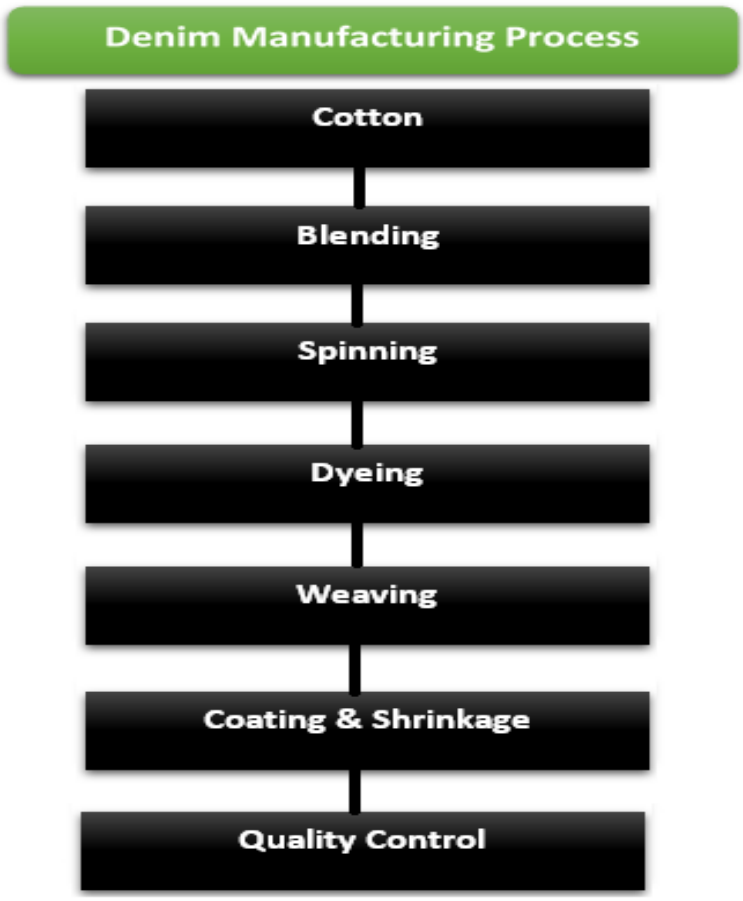
(An Important Chapter for Pacific Merchandiser)

Basic Component of a Denim Pant:

What is Denim?

Many people ask me what is denim fabric and what is the difference between denim and jeans. For your better understand I have written this article. Actually, denim is a special type of fabric made from 100% cotton fiber but sometimes denim is blended with spandex and polyester. Denim is manufactured by twill weave. Blended denim fabric has a very good stretchability, comfortable wear. The denim fabric was introduced by Levis Strauss.

Basically, denim is used for making jeans (pants, jacket). Blue indigo color is normally used for coloring denim. The popularity of denim product is increasing day by day. Because denim is fashionable and comfortable to wear. Teenagers prefer denim as a part of their commonly used garments. Lots of research and development has been done on denim and now you are getting world class fashionable, stylish denim jeans, and jackets. It will give you a classic look. You may eagerly want to know how denim fabric is made and what are the steps involved. The difference between denim and jeans is, the fabric used for making jeans is known as denim.



Denim Fabric:

Types of Denim fabric:

1. Cotton Denim/100% Cotton Denim
2. Raw Denim/Dry Denim
3. Cotton Serge Denim
4. Colored Denim
5. Stretch Denim
6. Selvedge Denim
7. Waxed Reverse Denim
8. Crushed Denim
9. Printed Denim
10. anforized Denim
11. Washed Denim/Acid Wash Denim
12. Bubblegum Denim
13. Poly Denim
14. Bull Denim
15. Thermo Denim
16. Ramie Cotton Denim
17. Ecru Denim
18. Slub Denim
19. Vintage Denim
20. Fox Fiber Denim
21. Marble Denim
22. Reverse Denim
23. Ring Spun Denim/Dual Ring Spun Denim

Other Fabric Use in Pacific Jeans:

1. Brocken Twill
2. Hearing bone
3. By stretch
4. Rigged Fabric
5. Super Stretch fabric
6. Warp Stretch fabric
7. Cool max
8. Stray black
9. Chambray fabric
10. Light Weight fabric
11. nit and Dobby
12. Jacquard fabric
13. PFD fabric (white)
14. Corduroy fabric
15. Coating fabric
16. Metal coating
17. Rolex
18. Panama canvas
19. Rib stop
20. Poplin
21. Gabardine
22. Camouflage

Some denim fabric detail with picture:

1. Raw denim or dry denim:

Raw denim or dry denim is not washed after being dyed during its production. So raw denim is dark, stiff and very durable. Such type of denim color will fade over time, which many people like.

Fig: Raw denim fabric

2. Selvedge denim:

Selvage denim is a unique kind of denim. It forms a clean natural edge that does not unravel. It‘s made by one continuous cross-yarn: quite an advanced process that leads to a strong, durable piece of clothing. The selvage edge is usually stitched with colored thread: green, white, brown, yellow, and red (red is the most common). This type of denim is more expensive as compared to other types of denims.

Fig: Selvage denim

3. Organic denim:

Organic denim is manufactured from 100% organic cotton. To make organic denim, all types of chemical are excluded. Potato starch is used instead of chemicals.

Fig: Organic denim fabric

4. Stretch denim:

Stretch denim is one of them most comfortable form of denim. It is closest to pure denim. To manufacture stretch denim 2 to 3% spandex material are used. So it allows to move more freely than other denim fabrics. It is widely used to make women jeans.

Fig: Stretch denim

5. Poly denim:

Poly denim looks like a dressier denim. To make casual wear poly denim is used. It is lightweight and easy to wash and dry. It is comfortable to wear and still maintain a professional look. This fabric is more resistant to wrinkling.

Fig: Poly denim

6. Ramie cotton denim:

Ramie denim is blended with other fabrics such as cotton, polyester and spandex. Which reduces wrinkling and it keeps its shape. This denim has a silky luster look, which makes for perfect casual denim dress, tops, and overalls.

Fig: Ramie cotton denim

7. Cotton serge denim:

Serge denim is considered as traditional type denim. It is made with 100% cotton serge. Serge is actually a fabric having a diagonal pattern. It is known for being sturdy and resilient.

Fig: Cotton serge denim

8. Colored denim:

Colored denim is manufactured with dyed yarn either warp or weft. Now it is trend. Colored denim is a great way to bring interest, femininity, and sunny personality to regular jeanswear. This type of denim can be obtained by piece dyeing process. Technically, colored denim is really twill and not denim. "Denim" specifically refers to the indigo-and-white fabric that is traditionally used for jeans.

Fig: Colored denim

9. Bubblegum denim:

Bubble gum denim is **lycra** containing denim that has between 35 to 50% stretch. Bubblegum denim is widely used to make women items like as shorts.

Fig: Bubblegum denim shorts

10. Denim from fox fiber:

This denim fabric manufactured by coloured cotton fiber. Developed and patented by California cotton breeder, Salley Fox. NITRA, India has also done work on this line.

Fig: Denim from fox fiber

11. Crushed denim:

Crushed denim is woven with an over twist weft yarn. This denim that looks permanently wrinkled. The fabric then shrinks when washed. The effect can also be improved by using bleach and stone.

Fig: Crushed denim

12. Vintage denim:

Vintage denim is old looked denim. Normal denim is treated with stone wash or organic enzyme cellulose wash with bleach results in torn and old looking texture over a denim.

Fig: Vintage denim

13. Ecru denim:

Denim that has not been dyed indigo. This denim contains single color yarn (mostly gray colored yarn is used) in its weft and wrap.

Fig: Ecru denim's jacket

14. Marble denim:

This is also called acid washed denim. Marble denim is washed with a strong bleach solution.

Fig: Marble denim

15. Reverse denim:

In reverse denim face side and reverse side is same.

Fig: Reverse denim's bag

16. Bull denim:

A heavy weight denim weave (14oz. Plus). Bull denim is durable and heavy, takes dye well with very good results. This denim is perfect for slipcovers, upholstery, draperies, pillow covers, headboards and much more.

Fig: Bull denim fabric

17. Printed denim:

That has been printed with a pattern-a batik, stripe or floral.

Fig: Printed denim

18. Slub denim:

Slub denim is denim that has been woven using uneven, or slub, yarn for both the warp and weft threads. It is a more rare type of denim and develops a unique crisscrossed pattern as it fades. It is also called crosshatch denim.

Fig: Slub denim fabric

Construction of Denim Fabric:

Material use to manufacture denim:

- Cotton/BCI cotton
- Spandex/Lycra/Elastrance/stretch
- Polyester/EME (Elastromultiester)
- Spun poly
- Lyell
- Modal
- Tencel
- Viscose/Rayon
- Greycycle poly
- T-400/special poly
- PWC (cotton)

Color of Denim:

Mainly denim fabrics are based on indigo color. IT also manufactured in some basic color like blue, black, grey, ecru etc.

- Indigo
- Roxy baby blue
- Roxy Smokey blue
- Roxy mossy blue
- Roxy Lime blue
- Roxy azure blue
- Mid blue
- Sail blue
- OD blue
- OD black
- Charcoal (Grey)
- Ecru (White)

Different Types of Denim Product:

Although denim is used for making jeans jacket, shirt, and trouser. We can see there is various use of denim. Here is the list of denim products which are commonly made of denim.

- Denim Shirt, Denim Long T-shirt
- Denim Pant, Jeans, Trouser, Short Jeans Pant
- Denim Jacket, Sleeveless Denim jacket
- Denim Skirt, Piper Skirt, Crossover Skirt
- Denim Shoes
- Denim Bags
- Denim Caps

Thread use in denim jeans:

Sewing thread is usually less than 1/1000th of the weight of apparel, but it carries more one half the responsibilities for its performance.

Threads are used to form the stitches that hold the fabric parts together. They can be described by fiber type, constriction, and size. Threads can be made from a single fiber type such as cotton, linen, silk, rayon, nylon, polyester, or rubber or from a combination of fibers such as cotton/polyester.

Thread Type:

- **Natural:** Use for dye to match garment because it absorb color. Ex: Cotton.
- **Synthetic:** Use for washed garment, it do not absorb color. Ex: Polyester and Nylon.

Thread Construction:

Spun thread - Cotton or polyester staple fibers are spun into single yarns and then twisted together.

Corespun thread - Spun cotton or polyester staple fibers are wrapped around filament polyester fibers.

Textured thread - Polyester or nylon that has been mechanically textured to make the thread fuzzy and stretchy and woollie-like. Texturing is a procedure used to increase the volume and the elasticity of a filament yarn. The essential properties of textured yarns and the products made from them are softness, fullness, a high degree of elasticity, thermal insulation and moisture-transporting properties.

Filament thread - shiny thread made of strands of polyester, rayon, or nylon.

Monofilament thread - A single nylon or polyester filament. Polyester is highly preferred.

Bonded thread - A strength-enhancing resin is coated on the outside of the thread. This increases the tensile strength and helps reduce friction. Bonded threads are usually meant for upholstery and heavy duty sewing applications.

Purpose:

- Sewing and embroidery

Thread Manufacturer which uses in Pacific Jeans:

- COATS
  - Astra
  - Epic
  - Eloflex
- AMAAN
  - Universal
  - Saba
  - Serafil fine
- A & E

Thread or Yarn Count:

Tex ⇧ = Courser

Tex ⇩ = Finer

Tkt ⇧ = Finer

Tkt ⇩ = Courser

1000m = 1 gm = 1 Tex

9000m = 1 gm =1 denier

9tex = 1 denier

Example:

30 tkt cone = 2000 mtr

50 tkt cone = 3000 mtr

So 1tkt is = 0.015 mtr

Equation 1: $\text{Tkt} = \frac{1000}{\text{tex}} \times 3\ (\text{ply})$

Equation 2: $\text{Tex} = \frac{1000}{\text{tkt}} \times 3\ (\text{ply})$

Example: COATS (Astra)

$50\ \text{Tkt} = \frac{1000}{50} \times 3 = 60\ \text{tex}$

$60\ \text{Tex} = = \frac{1000}{60} \times 3 = 50\ \text{tkt}$

Thread count in sewing:

- For top stitch 30Ticket thread used
- For inner stitch 50 ticket thread used.
- For button hole 10 ticket thread used.

Button and Rivet use in Denim:

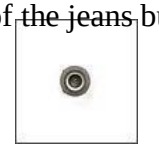
Jeans Button

A Jeans Button is generally used as a method of fastening for denim trousers or denim jackets. On childrenswear garments a Jeans button is also used as a fastening on Dungarees.

A Jeans Button consists of 2 components - The Jeans Button & Jeans Button tack. YKK manufacture various types of jeans buttons.

Jeans Button Tack

A jeans button tack attaches through the fabric and secures into the base of the jeans button.



Jeans Rivet

A Jeans Rivet is commonly used as a method of pocket reinforcement for denim trousers, also as a means of decoration on a garment.

A Jeans Rivet set consists of 2 components - The Jeans Rivet & Jeans rive

Jeans Rivet Tack

A jeans rivet tack attaches through the fabric and secures into the base of the jeans rivet.

Measurement of button:

Measuring a button - When measuring buttons, we generally are referring to the diameter of the button. A one inch diameter is called a 40-ligne, which can also be written as 40 Line or simply 40L.

Button Size Measurement Method in Garments Sector:

To measure the button size, we have to use ligne.

We Know,

1 inch = 25.4 mm = 40L

So, 1L = 0.635 mm

Button Ligne (L) = Button Diameter (mm)/0.635

Example-01:

If the button diameter is 14.20 mm then what will be the size of button?

Solution:

Here,

Button diameter = 14.20 mm,

So, ButtonLigne(L) = Button Diameter (mm)/0.635

= 14.20 / 0.635

= 22 L

Basic button and rivet size use in garments:

Shank button:

- Mens: 21-24 mm
- Ladies: 19-21mm

Ply button:

- Men: 13-14
- Ladies: 13-14

Rivet:

- Men: 7-8 mm
- Ladies: 7-8 mm

Button quantity calculation:

12 pcs = 1 dozen,

12 dozen = 1 gross,

12 gross = 1 GG

1 GG = 1728 pcs (GG means Great Gross)

Suppose:

A shirt has 6 buttons, total order quantity 3456 pcs, find out total button quantity for the order.

Answer: 6 × 3456 ÷ 1728 = 12 GG.

(**Formula:** number of buttons per product × order quantity ÷ 1728)

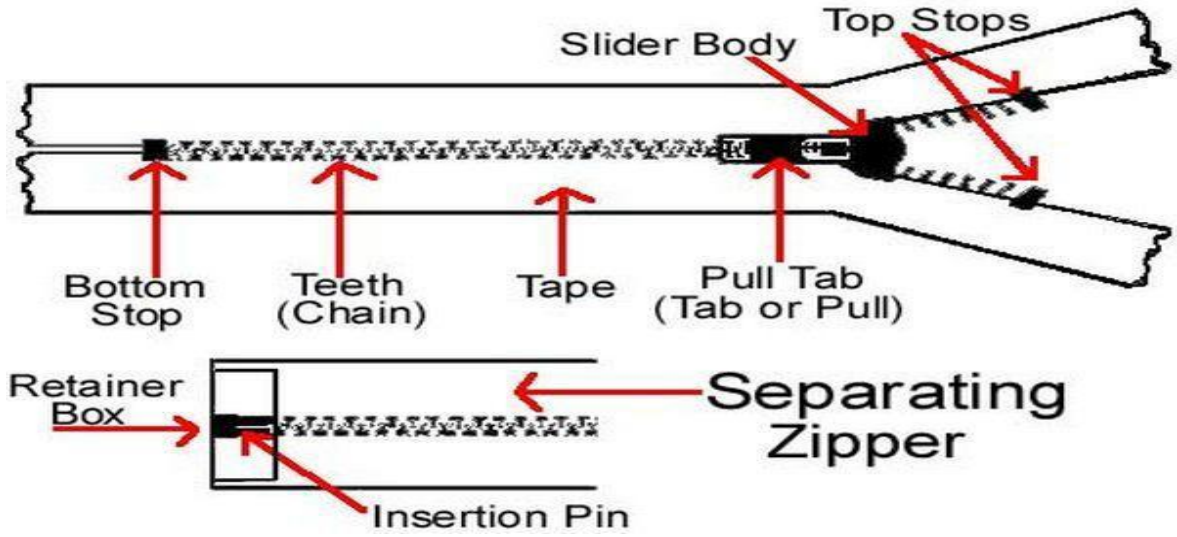
(1 GG = 1728 pcs)

Zipper Use In Denim:

Zipper:

It is a fastening device operated by means of two parallel rows of plastic or metal teeth on either side of a closure that are interlocked by a sliding tab is called zipper. Here, the teeth are carried in two zip fastener tapes which run the length of the zip and which are usually stitched into apparel and other textile products. It is an essential part of garments which is widely used in garments manufacturing sector. It can be used in functional or decorative purposes. It may be different in types and sizes. The function of one zipper is different from another.

Parts of a zipper:



A zipper consists with the below parts:

1. Zipper‘s tape,
2. Teeth or Chain,
3. Slider body,
4. Slider pin or teeth,
5. Stopper.

Types of Zipper Used in Apparel Industry:

1. Concealed zipper

2. Continuous zipper

Color of Zipper:

Pacific ZARA team mostly uses YKK zipper. Here I describe mostly used zipper code and color:

Color Name	Code
1. Antique Silver	YGRTHC-39
2. Antique Brass	YGRKBC-39
3. Antique Copper	YGRTXC-39
4. Dull Silver	YMRDSC-39
5. Shiny Silver	YMRNC-39
6. Antique Gold	YRRC-39
7. Gun Metal	YGRVEC-39

Other Color of Zipper:

Antique Category:

- Dark Antique brass
- Light antique brass

Silver Category:

- Gun metal
- Silver finish
- Dull silver
- Worn silver
- Antique silver
- Light antique silver
- Dark antique silver
- Shiny silver

Copper category:

- Light antique copper
- Dark antique copper
- Antique copper
- Dull copper
- Worn copper

Ultra finishes :

- Shiny golden
- Shiny silver
- Rose golden
- Shiny copper

Mostly Use Tape color of Zipper:

Color Name	Code
Navy Blue	920
Indigo	560
Black	580
Cotton	

Back Patch Use in Denim:

Mainly leather patch use in the back of denim jeans. Paper and metal patch also used.

Chapter: 4

Departments of Pacific Jeans

Store Department

Pacific Jeans has very well established storage department where all the fabric and accessories is stored with identifying manner.

There are two different types of store in pacific jeans:

1. Fabric Store
2. Accessories Store

Fabric Store

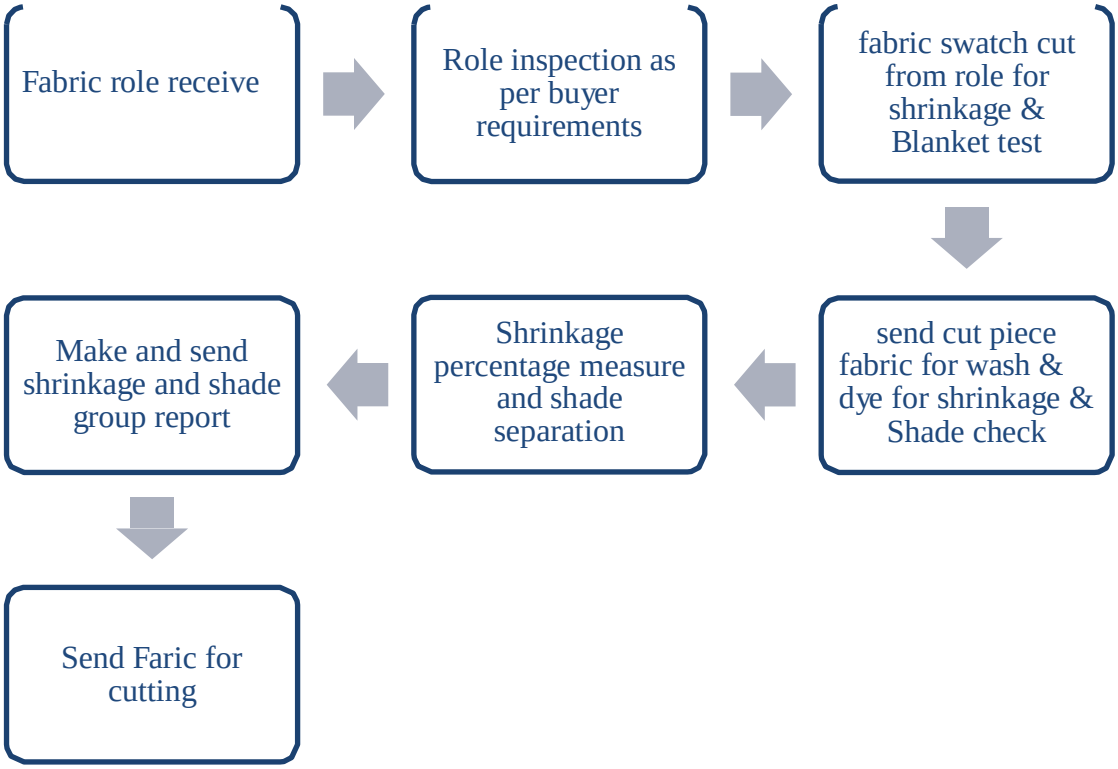
Objective:

- Physical inventory of received goods and data input in Tally software.
- In House fabric Inspection report (4 Point system)
- Shrinkage test and shade checking.
- Store marks with three types of sticker to indicate the condition of the received fabrics.
    - Yellow color sticker for the fabrics that are not inspected.
    - Green color sticker for OK or inspected fabrics.
    - Red color sticker for rejected or defected fabrics.
- Width measurement and swatch cutting for Fabric Inspection Department.
- Receive the inspection report and put it to cutting module system as per shade, shrinkage, rolls no, length and width.
- The inspected fabrics are kept in the rack and a display board is placed there to display information about that particular fabric.
- Finished goods receive & load on van.

Fabric Inspection:

- 20% role inspection from all for UNIQLO Buyer.
- 10% role inspection from all for other Buyer.
- Generally light check inspection machine use.

Working procedure:



Using system for inspection: 4 point System

Length of Defect	Penalty points Allotted
Upto 3 inches	1 Point
3 - 6 inches	2 Points
6 - 9 inches	3 Points
Over 9 inches	4 Points
Holes and Openings (1 inch or less)	2 Points
Holes and Openings (over 1inch)	4 Points

Formula: ~~□□□□ □□yy □□□□□×36″×100~~

FF□□□□ □□□□□□□×FF□□□□ □ □ □□□□

Up to 28% defect acceptable from a single role and more than 28 considered as rejecte

Fabric Shrinkage:

Shrinkage is the process in which a fabric becomes smaller than its original size, usually through the process of laundry. Cotton fabric suffers from two main disadvantages of shrinking and creasing during subsequent washing.

There are two types of shrinkage occurs during washing

1. Length wise
2. Width wise

Working Procedure:

For measuring Shrinkage Percentage a 50‘‘/50‖ fabric sample first need to cut according to pattern. Then the sample is sewn with single needle lock stitch machine by keeping sewing allowance of 2‖ /2‖ and then the edge is over locked. Sample is ready for washing. Simple wash the fabric at 60˚c temp for 90 min. After washing the fabric is taken out. Dry the sample as per any of the method. It can either be Line Dry or Flat Dry or Tumble Dry. To find the dimensional change read the Shrinkage/Stretch on 3 points on the Wrap side and 3 points on Weft Side. Get the mean value of wrap-wise and weft wise readings to get the Accurate Shrinkage or Stretch.

Lengthwise Fabric Shrinkage

Example, $\times 100$

Length of fabric before wash = 48 cm and length of fabric after wash = 45 cm.

Now, Shrinkage % = {(48-45/45} * 100

= 6%

Here, Shrinkage is 6%. Normally shrinkage is acceptable less than 5%. But it can be change in case of buyer requirement.

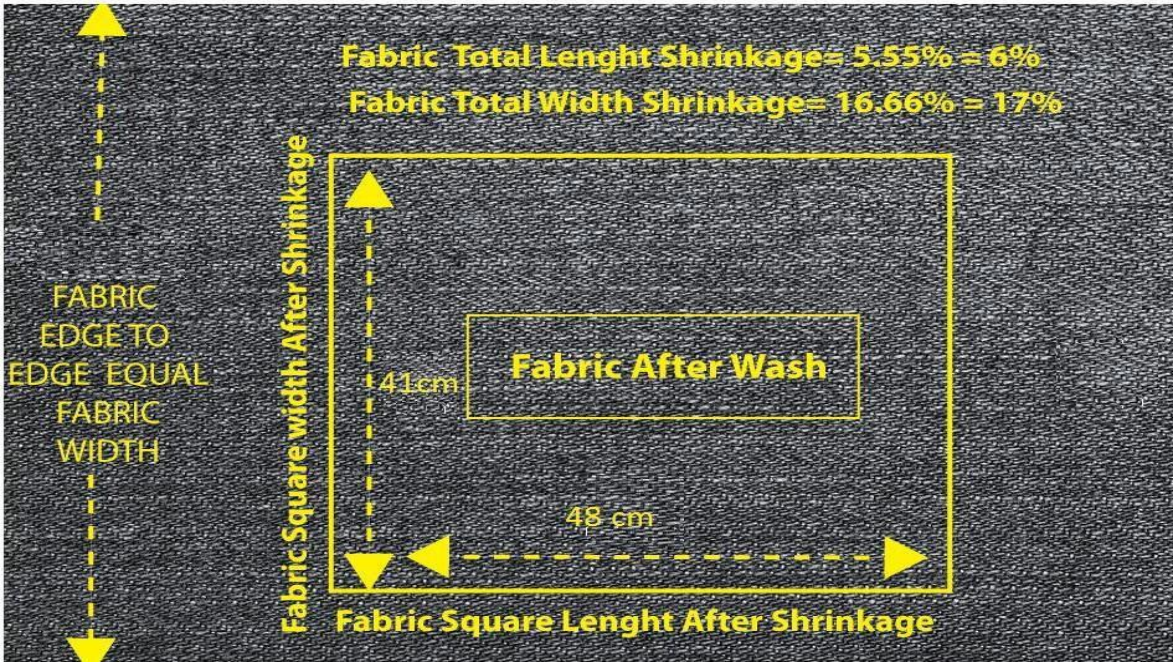
Widthwise Fabric Shrinkage Formula:

Example,

Width of fabric before wash = 48 cm and width of fabric after wash = 40 cm.

Now, Shrinkage % = {(48-41/41} * 100

= 17%



Fabric Defects:

- Hole
- Fly Yarn
- Missing Yarn
- Slub & Knot
- Reed mark
- Coarse yarn
- Spot Mark
- Oil mark
- Broken Yarn
- Neps
- Running shading
- Shade bar
- End to end shade
- Thick or thin end
- Missing end or warp
- broken end or warp
- Missing pick or weft
- Broken pick pr weft
- Foreign yarn
- Double end

Trims & Accessories Storage:

Objective:

- Receive accessories with packing list.
- Inspection accessories as per requirement.
- Data input in Tally software.
- Supply accessories for bulk production.
- Use SR form for data maintenance.
- Prepare style wise Trim Card as per the instructions from Merchandising.
- Prepare accessories card for production line.
- Cut Zipper, Draw cord, Tape etc. for production line as per instructed measurement.
- All incoming accessories must pass through in the Quarantine area.
- Get all kind of approval from the buyer representative.
- Arrange those accessories style wise in the rack.

NOTE: Fabric & Trims and Accessories store Department use **Tally software** by which they manage the inventory of fabric, trims and accessories. In this software fabric and accessories loading date, price, quantity & remaining yards and quantity are mentioned. They update these data from time to time.

Sample & CAD Section

Garment sample section is very important department in apparel manufacturing process. Garment samples are inevitably important and are developed tested before starting the bulk production, because the buyers generally places the order after they are satisfied with the quality of the samples. The samples decide the ability of an exporter. If the samples are of good quality and with reasonable price naturally the buyers will be forced to place the order.

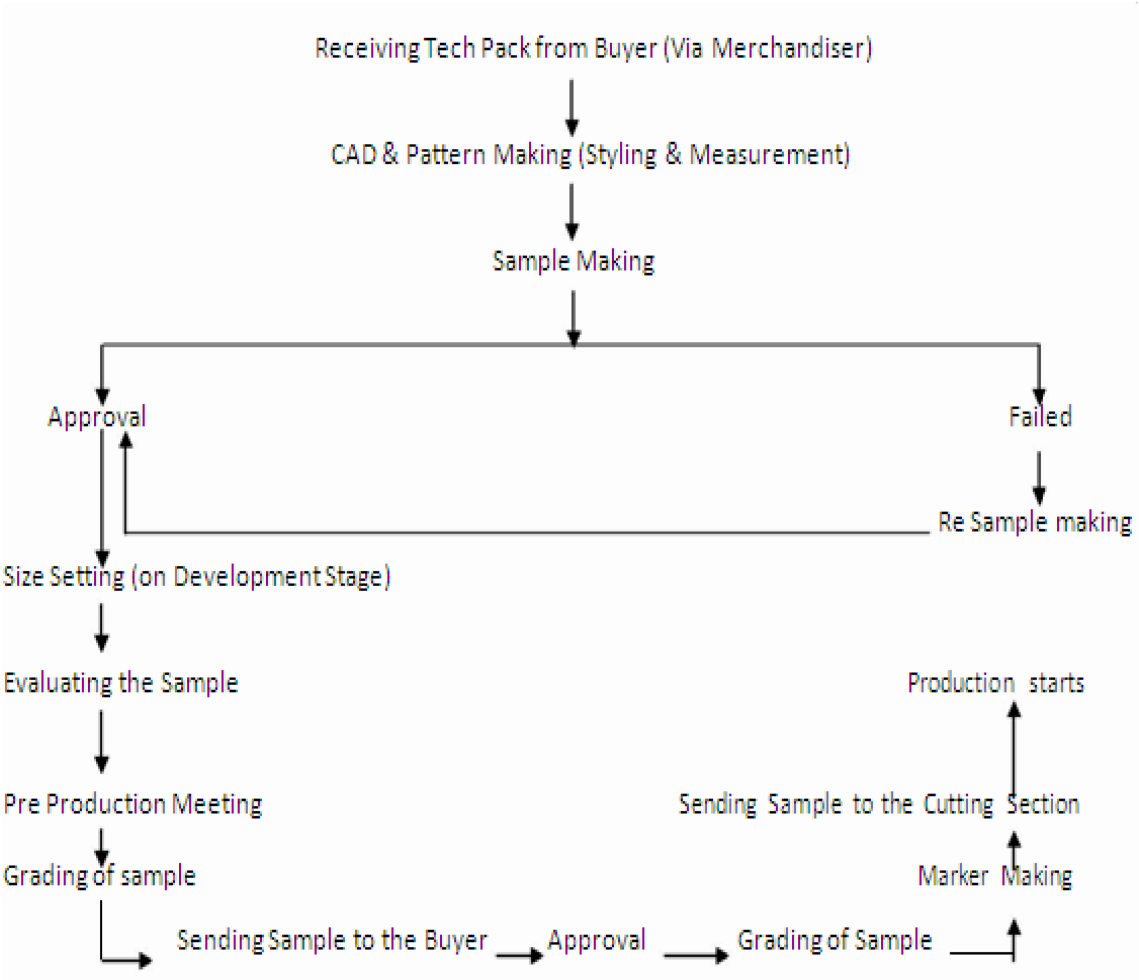


Fig: Process flowchart of sample making

Main Responsibilities of CAD department:

- CAD department made sample pattern with response to buyer requirements.
- Try to fulfill buyer expectation.
- If sample not satisfy buyers requirements then make sample until satisfying buyer.
- When satisfy the buyer then finally handover to production.

Brief Description of the Sampling Processes:

Tech Pack Receiving: This is the first stage of the sampling processes. In this stage Tech Pack or the Technical pack or design pack is received from the buyer, via merchandiser. Tech pack contains all the specifications to produce a garment from fabric details to trims and accessories details. Garments measurement, block, and stitch all the detailing are mentioned in a tech pack.

CAD & Pattern Making: In this stage pattern is made through CAD. Sometimes pattern is made manually, but CAD is more popular and easy, Computer-aided design (CAD) is the use of computer Technology for the design of objects, real or virtual. The design of geometric models for object shapes, in particular, is often called Computer-Aided geometric design (CAGD).However CAD often involves more than just shapes. As in the manual drafting of Technical and engineering drawings, the output of CAD often must convey also symbolic information such as materials, processes, dimensions, and tolerances, according to application-specific conventions. CAD may be used to design curves and figures in two-dimensional ("21") space; or curves, surfaces, or solids in three-dimensional ("3D") objects.

Sewing: After make pattern or manually cut fabrics for sample making, sample is make according to buyer‘s requirements.

Washing: After sewing the garment proceed for required washing according to buyer‘s tech pack or manual. This step is so much important. So, proper measure should be take to achieve the standard.

Finishing: After getting the sample garment from washing it need to done all the finishing. So the garment is again received by the sample room and they do the finishing with button attaching, trimming, ironing etc.

Sample Approval: After making the sample it need to sends to buyer for approval, if buyer does not give approval, sample section has to re-make sample based on corrective comments.

Grading of Sample: After finalizing the sample. Grading is done. There may be several grades of a single design. The grading is done to separate the samples and patterns from each other‘s.

Marker Making: After grading the samples. The design is inputted into the marker software. This software specifies how to set the pattern in the actual fabric. By using the marker software efficiently, fabric can be saved. They use Gerber Garment Technology (GGT) for marker making.

Types of Sample for Different buyer:

There are mainly eight types of sample needed for completing a garment order.

Those are:-

- Development, Pilot or Proto sample,
- Fit sample,
- Wash approve sample,
- Size set sample,
- Shade band Sample,
- Photo shoots sample or Salesman sample (optional),
- Pre-production sample (PPS),
- Production Sample

All the above garments samples are discussed in the below:

- **Development, Pilot or Proto sample,**

It is the very first sample given to the buyer. It is prepared according to the buyer‘s specification. It is a trial sample prepared on product development department. Buyer wants to see here that how its look likes after applying new design on it. For this types of sample 2-3pcs garments should be made, where 1pcs for manufacturer and rest of those are sent to the buyer for correction.

- **Fit sample:**

After approving proto or development sample, fit sample should be made by following buyer provided measurement sheet. It can be made by using similar fabric. In Fit sample, stitching and measurement must be 100% accurate. Here fabrication and color can be changed but no compromise on stitching and measurement. 2-3 garments are used in fit sample where 1pc kept by the manufacturer and rest of those are sent to the buyer.

- **Wash Approve sample:**

This type of sample is based on the wash comments received from the buyer. Supplier makes this sample with actual dry and wet process, base color as per buyer standard and requirements. 2-3 set of garments are used in wash approve sample where 1set kept by the manufacturer and rest of those are sent to the buyer.

- **Size set sample:**

After approving fit sample, based on the patterns of approved sample, all the other sizes samples should be graded here and make pattern for different sizes. After that, make 2-3pcs sample for each size of that order. Manufacturer keep 1pc sample from each size and send 1pc or 2pc samples to the buyer for approval. Here, it should be noted that, without the size set sample approval, bulk cutting should not be started.

- **Photo shoot sample or Salesman sample (optional),**

Salesman sample is used by sales team of buyer to enhance the sales of any garment. Buyer sends the sample by salesman in the market to receive market feedback from the customers. It is done approximately 200-500pcs depending on the customers and season. The main objects of SMS sample are to check market, feedback, Buyer‘s design etc.

- **Shade Band Sample:**

This type of sample make from shade group and from random role of each shade. Supplier makes 5-6 or more shade garment and send for approval. They make two garments from each shade and keep one and other send to the buyer. Supplier also sends half garments to buyer and other half they keep.

- **Pre-production sample (PPS):**

This sample should be made in actual production line by maintaining all actual of an order specification. It is the main stage of a garments order where any sample may be approved or rejected. If the sample will approve then supplier can go for the rest of the process of that order. But if rejected then there will be the revision of previous processes.PPC (Planning production and control) department is also involved in this stage. Ones PPC department is involved then there‘s no way for accepting of any style change. It is the very critical stage than other‘s stage. Extra care must be needed here to confirm an order correctly.

- **production sample or Final Sample:**

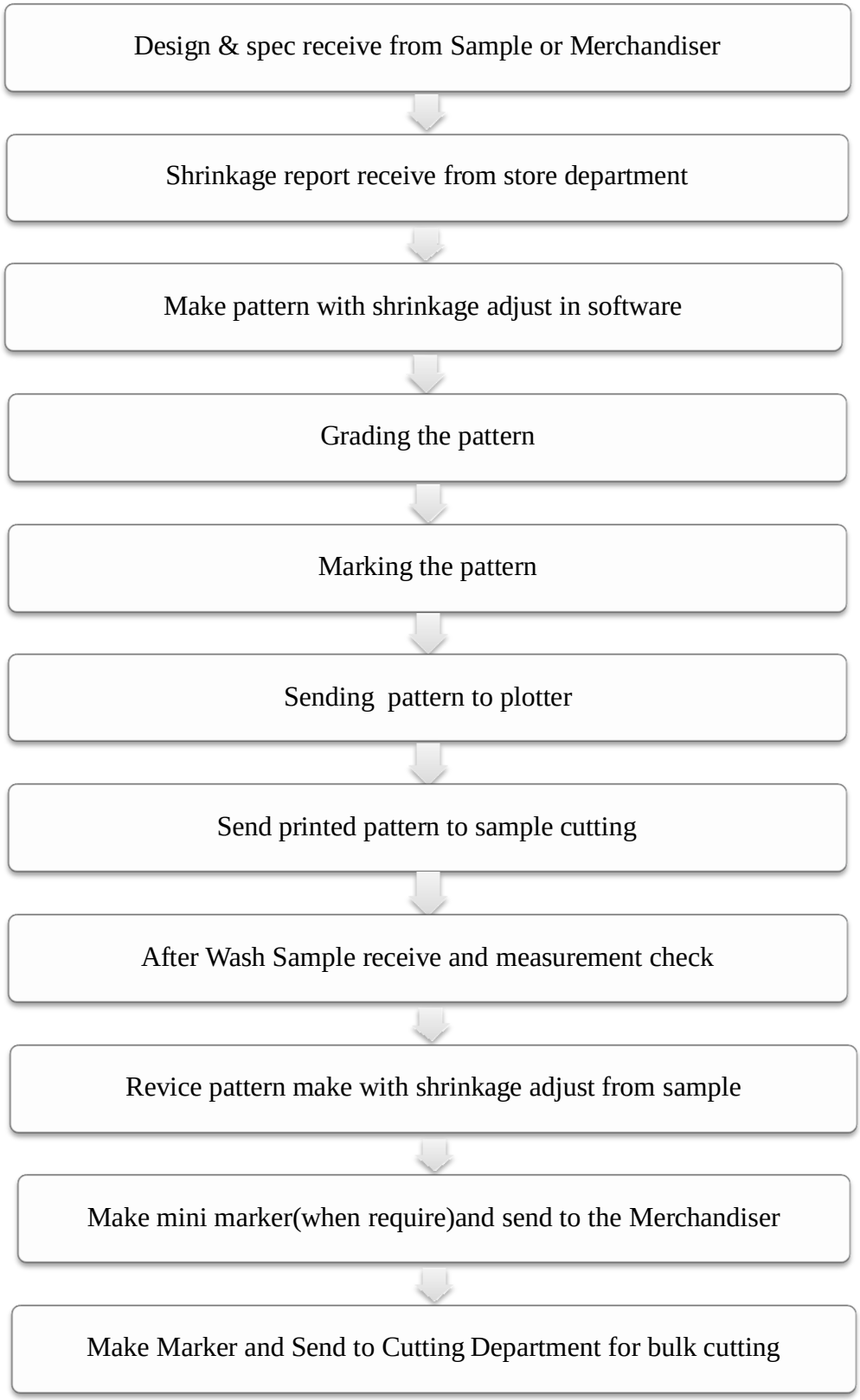
During running an order in production line, a few samples sent to the buyer or buyers Q, C as TOP sample. TOP sample has a great importance in achieving certification of whole order. If TOP sample failed to approve its required quality then whole order will be resumed. Sometimes this sample usually sends when goods are ready for the shipment. It is a sample that reflects what buyers will receive down to Q.C, folding, tagging, bagging, labeling and final packaging included.

Machine Used in Sample Section:

The lists of mostly used machines in sample room are given below with their uses.

Serial no	Types of Machines	Uses
1.	Plain machine/ single needle lock stitch. Stitch class: 300 sub class: 301	For making pocket and coin pocket, Joining Back and Front part.
2.	Chain Stitch Machine. Stitch Class:100 Sub class: 101	For joining waist band & back yoke as buyer require.
2.	Feed of the Arm machine. Stitch class: 400 sub class: 401	For In Seam, Back Yoke, Front & back rise joining.
3.	4 Thread over lock machine. Stitch class:500 sub class: 514	For edge finishing. Especially for Busted seam.
4.	Flat Lock machine. Stitch Class: 400 sub class: 406	For joining the pocketing fabric with the shell fabric or body part.
5.	KANSAI machine Stitch class:400 subclass: 401	For joining waistband, Belt loop.
6.	Bar tack Machine.	For bar tack stitch on require portion.
7.	Button Hole & eyehole machine	For making straight Button Hole and making eyehole.
8.	Button & Rivets attaching machine	For attaching button & rivet.

Working Procedure of CAD Department:



Cutting Department

Generally cutting is the starting point for the production. Production floor, Merchandising, Sample, and Store Department are directly related with the Cutting Department. The fabric moves for the production only when they are properly cut. Normally buyers send the cutting measurement. Fabrics are cut according to those measurements. Before cutting the rolls of the same colors are separated so that the cutting measurement cannot be hampered. They cut fabric for trial, pilot and bulk in cutting department. Maximum 4 shade can use in cut layer and shrinkage group should be same.

Cut plan:

Cut plan work is a beginning work. When buyer asked for different sizes, colors then they made an asking measurement of cutting. The first step is making the layoff of the roll than cut it according to direction.

Ply Height for Cutting Fabric Type	Fabric Ply Requirement
Denim Fabric (less than 08 ounce)	For 5 pocket bottom – 100 ply For jacket- 75 ply
Denim Fabric (08 ounce to 10 ounce)	For 5 pocket bottom – 80 ply For jacket – 60 ply
Denim Fabric (more than 10 ounce)	For 5 pocket bottom – 70 ply For jacket – 50 ply
Twill Fabric	For 5 pocket bottom – 120 ply For jacket – 100 ply

Requirement of cutting:

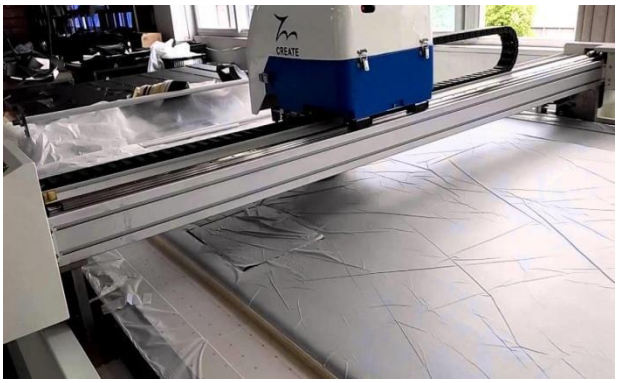
- Precession to cut
- Clean edge
- Infused edge
- Consistency in cutting
- Support of the lay.

Cutting Equipments:

- Cut order planning
- Marker
- Fabric spreading machine
- Fabric cutting Machine,
- Cutting Table,
- Scotch tape
- Metal Hand Gloves

Different types of machines are used in the cutting department:

- Auto Spreader Machine (Auto Layer forming machine): Operator set the direction details in the connected monitor and then operation is done automatically. There are 3 auto spreader machines.



pic: Auto spreader m/c

- **Auto cutter m/c:** This is a auto operated, auto mover fabric cutter machine. In Pacific Jeans they use Tuksodesk machine which is manufactured by German. They use Gerber software for running this machine. Another benefit of this machine is this doesn‘t make shrinkage on the fabric which is happen due to heat by other machine. This is usually use straight knife.

pic: Auto cutter m/c

- **Straight knife Cutter machine:**

In Pacific Jeans they only use straight knife cutter machine in bulk production. There are 21 straight knife machines.

Fig: Straight Knife cutting machine

- End cutter machine
- Numbering (panel) machine.
- Bias machine.
- Fusing machine.
- Piping cutting.
- One side Fusing machine.

Cutting procedure:

Trial cut for shrinkage, sewing and send to washing section.

⇩

Cut order and marker receive from CAD department

⇩

Fabric spreading and marker place on the top

⇩

Make hole on the marker and attach scotch tape to remove air under marker paper and perfectly attach with fabric layer.

⇩

Cut the fabric with cutting machine according to marker

⇩

Numbering and send to again sewing section and finally send to washing section for finishing.

Embroidery Department

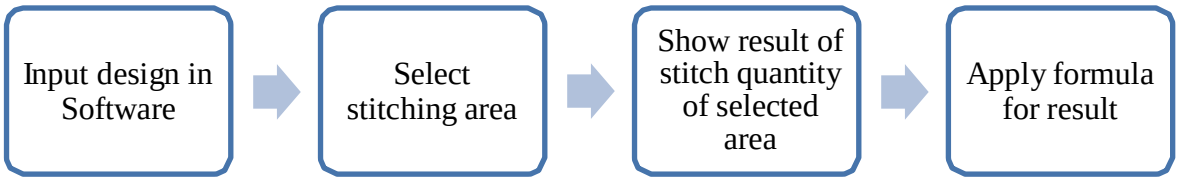
Machine use In Embroidery Department:

- Tajima(Japan)

Machine Details:

- Head-20
- Needle-9 needle per head (Total 180 needle)
- RPM-1100
- Hourly capacity per machine-25000 Stitch
- Color can use- Maximum 9 more can be use by changing thread
- Thread use- epic & eloflex (COATS)

Costing Process:



- Formula : 12000 stitch-25 cent (normal)
  : 12000 stitch- 30 cent (Appliqué)

N: only cut panel can embroidery and difficult in made garment.

Types of embroidery used in Pacific Jeans:

- Single/Run Stitch
- Tripple Run (3 count)
- Tripple Run (5 count)
- Tripple Run (7 count)
- Tripple Run (9 count)
- Tripple Run (11 count)
- Tripple Run (13 count)

- Tripple Run (15 count)
- Circle01 Motif
- Arrow04 Motif
- Arrow07 Motif
- Heart01 Motif
- Cross X Motif
- Circle 2 Motif
- Satin Round Motif
- Satin Low Motif
- Strait 8 Motif
- Strait 9 Motif
- Rope Chain Stitch
- X-6Count Motif
- Box Motif
- 5 Time Arrow Motif
- Chain Motif
- Eyelet Motif
- Noksha Motif
- Star01 Motif
- Star08 Motif
- Cross-X Motif
- QT FL-1 Motif
- QT FL-2 Motif
- Back Stitch-3
- Back Stitch-5
- Stem Stitch

Necessary Steps need to take for Embroidery:

Embroidery is very innovative, critical and sensitive task. Any wrong attempt brings much panic and can destroy your overall performance.

Following steps should be pursued before start embroidery task.

1. Follow color swatch before starting your task.
2. Be sure style number and style name if available.
3. Check embroidery design and approved swatch simultaneously.
4. Check embroidery thread with approved swatch card.
5. Check embroidery pattern with fabric nature.
6. Check pattern size with approved embroidery swatch.
7. Be sure pattern top and bottom

Printing Department

Denim is a strong, durable fabric, once upon a time denim was worn only as working wear. But now it is widely used as a fashion wear. The most common denim is indigo denim, in which the warp thread is dyed, while the weft thread is left white. But giving the most attractive looking to denim wear, different types of printing are done on denim fabric.

In printing, wooden blocks, stencils, engraved plates, rollers, or silk-screens can be used to place colors on the fabric. Colorants used in printing contain dyes thickened to prevent the color from spreading by capillary attraction beyond the limits of the pattern or design.

Chemical Used For Printing:

There are some main essential chemical which is most used in Pacific Jeans for printing. They are:

- AQ. White. SNW.801
- Binder ET-ECO,
- SP-Top-NK-02/Asuprend Patch
- NK Plaster
- SU-125 F
- Luprintolsoft SIG
- Lutexal GP-ECO
- Hel. White Paste
- Rubber Clear-802
- Rubber Clear-202
- SBB Binder
- Aceton
- AQ. Flock FixervSF-103
- Naylon Oxal NF-330
- Anti-Dry-GP
- Lutexal Hit Plus
- Helizarin Binder SFT
- Tubisoft P
- Luprintol Fixing Agent

Different types of print are applied in denim wear on Pacific Jeans Ltd. Some examples are given which I have actually seen:

- Pigment Print
- Rubber Print
- Ambush print
- Crack Print
- Glitter Print
- Foil Print
- Silicon Print
- Flock
- Silver Print
- Water Paste
- Oil Print
- Discharge/PP/Leaser
- Plastisol
- Puff Print

Using Paper for Print dies making:

- Tracing paper
- Film paper

Working Procedure of Printing Department

Tresing Design receive from IT sector

↓

Printing dyse place on the table(Sketch machine)

↓

Mesh fabric spered on printing dyse

↓

Put gum on dyse frame over mesh

↓

Keep an hour for dry

↓

Cut mesh according to dyse

↓

Put Chemical (SP-1300HV) on mesh

↓

Dry dyse

↓

Treasing print adjust in dyse with scotch tape using a light section

↓

Adjust printing place on table according to light section and garment pattern and use iron bar for adjustment

↓

Dyse place on expouse m/c for 90 sec at 120 degree celcius temp.

↓

Dyse hold under water for 5-10 min

↓

Water spray on dyse in visible printing design

↓

Dry dyse with dryer

↓

Put chemical (SP-1300 HV) in frame and for repair

↓

Put chemical AL for design staple

↓

Put chemical DL for outside staple

↓

Fabric/Pattern place on table and marking with masking tape

↓

SP-Top-NK-02 gum paste on table

↓

Make color paste for printing

↓

Fabric pace on table according to masking marking for printing

↓

Scraping on fabric where print apply

↓

Printing dyse place on fabric and put printing paste on it

↓

Pass paste in the fabric with a hand tools

↓

Dry print with a dryer

↓

Hit pressing on print for 20-30 sec at 155-160 degree celcius temp.

Sewing Department

Sewing Section:

In the apparel industry or clothing industry, sewing section is the main department for garments manufacturing. When all the garments are complete to cut in the cutting section, all of these cutting parts are sending to sewing department for making garment. In this section different cutting parts are joining together with the help of different types of sewing machine, threads and needle.

Sewing Machine used in Pacific Jeans:

Both automated and manual machine are used here.
Different types of **manual machine** used in sewing section are given below:

- Single Needle Machine,
- Double Needle Machine,
- Over lock Machine
- Flat Lock Machine,
- Feed of the Arm,
- Kansai Machine,
- Bar Tack Machine,
- Button hole Machine,
- Button Attach Machine,
- Thread Rewinding Machine,
- Steam Iron Elc/Non Elec machine
- Collar Button Cutting machine,
- Cuff Pressing Machine,
- Pocket Creasing Machine,
- Bottom Rolling Machine,

All the sewing machines are programmable machine, beside that they are

following special **automatic machines**:

- VI. BE. Mac automatic feed of the arm machine
- Automatic pocket welt machine from German Durkop Adler machine
- Programmable pattern sewer machine
- Programmable pattern taker machine
- VI. BE. Mac automatic pocket hem machine
- VI. BE. Mac automatic loop attach machine
- VI. BE. Mac automatic J stitch machine
- Automatic Button holler machine
- VI. BE. Mac automatic waist band attach machine
- VI. BE. Mac automatic pocket attach machin

Basic Five Pocket Denim Process Sequence with Machine (Normal Floor): (FRONT)

SL. No.	NAME OF THE PROCESS	MACHINE USED IN THE PROCESS
1	Pocket mark on fabric	Chalk Marker
2	Single ply overlock	O/L
3	Double ply marking + tap attach	2N/L/S + O/L
4	Zipper attach on single ply	2N/L/S
5	Coin pocket marking + Overlock	O/L
6	Coin pocket hem iron	Steam iron
7	Pocket Iron	Steam iron
8	Coin pocket attach with pkt patch	2N/L/S
9	Front pocket facing (top stitch)	S/N/L/S
10	Pkt supporting attach with pkt bag	Flat lock
11	Front pocket bag overlock	O/L
12	Pocket ¼ top stitch	S/N/L/S
13	Wash tuck on pocket bag	S/N/L/S
14	Front rise over lock	O/L
15	Pocket attach with front	S/N/L/S
16	Front pocket opening piping attach	S/N/L/S
17	Top Stitch under piping front area	S/N/L/S
18	Single ply attach and Top stitch	S/N/L/S
19	J-Stitch	2N/L/S
20	Double ply attach	S/N/L/S
21	Zipper attach with double ply	S/N/L/S
22	Zipper top stitch	S/N/L/S
23	Front Rise joining	Feed of the Arm
24	Side tuck	S/N/L/S
25	High seam top stitch	2N/L/S
26	Bartack front part	Bartack m/c
27	Front part side overlock	O/L

Basic Five Pocket Denim Process Sequence With Machine (Normal Floor) :- (Back)

SL. No.	NAME OF THE PROCESS	MACHINE USED IN THE PROCESS
1	Back pocket hem over lock	O/L
2	Hem position mark	Chalk marker
3	Hem iron	Steam iron
4	Pocket shape iron	Steam iron
5	Back yoke attach with back	Feed of the arm
6	Dart mark	Chalk marker
7	Dart sewing	S/N/L/S
8	Back top stitch	S/N/L/S
9	Back rise attach	Feed of the arm
10	Back rise top stitch	S/N/L/S
11	Back pocket position mark	Chalk marker
12	Back pocket attach	S/N/L/S
13	2nd Back pocket stitch mark	Chalk marker
14	2nd Back Pocket stitch	S/N/L/S
15	Back pocket bartack	BARTACK
16	Side overlock	O/L
Assembly (Front & Back)		
18	Inseam	Feed of the arm
19	Side seam	S/N/L/S
20	Safety tuck	S/N/L/S
21	Cord Stitch	S/N/L/S
22	Cord stitch bartack	BARTACK m/c
23	Belt loop make	Kansai machine
24	Belt loop position mark	Chalk marker
25	Belt loop attach in body part	S/N/L/S
26	Waist band fusing	Fusing m/c
27	Waist band position mark	Chalk marker
28	Waist band attach	Kansai (Chain stitch)
29	Removal of tuck stitch or thread cut	Trimmer
30	Mouth close	S/N/L/S
31	Belt loop bartack	Bartack
32	Bottom hemming	S/N/L/S
33	Eyelet hole	Button hole m/c
34	Button attach	Button attach m/c

Work Aids of Sewing Machine

Folder:

A folder is a sewing machine attachment which folds one or more material into the desired configuration for sewing. It may be placed in the middle of the pressure foot or in the front of pressure foot.

- To increase the productivity.
- To maintain/improve quality standard.
- Reduce fatigue of operator.
- Reduce training time of operator.

Different folder use for jeans:

- For making belt loops.
- For closing the inseam.
- For closing side seam.
- For bottom leg hemming.
- For join the rises seam.
- To set the zipper.

Guide Use in Sewing Machine:

Guides are use for correct sewing into pre-determined position or in a determined and proper distance from edge of fabric. It is also use for straight and curved sewing to increase the quality and productivity. Edge guide are use in over edge machine.

Different types of guides are used in sewing machine for 1/16, 1/8, ¼ & ½ inch stitching

Different Sewing Defects:

- Needle damage
- Skip stitches
- Thread breakages
- Broken stitches
- Seam Puckering
- Pleated seam
- Wrong stitch density
- Uneven stitch density
- Staggered stitch
- Improperly stitches.

Production Department

PACIFIC JEANS has a separate production department, which is the vital for that organization. The production department is responsible for:

- Maintaining liaison with the marketing and sales department and to accept the order for specific floor according to the capacity.
- Managing the machine lay out plan of the production floor.
- Study the order/products carefully before start the production
- Arrangement of required raw materials, machine and manpower
- Arrangement of production according to the delivery schedule.
- Take care of the products quality.
- Facing buyer‘s inspection.
- Preparation of the production planning in advance and coordinate with the marketing team to avoid any late delivery, over/less booking
- Taking care of the safety issues like Products Safety, Workers Safety, and Safety of the Industry.

Some data of Production Department:

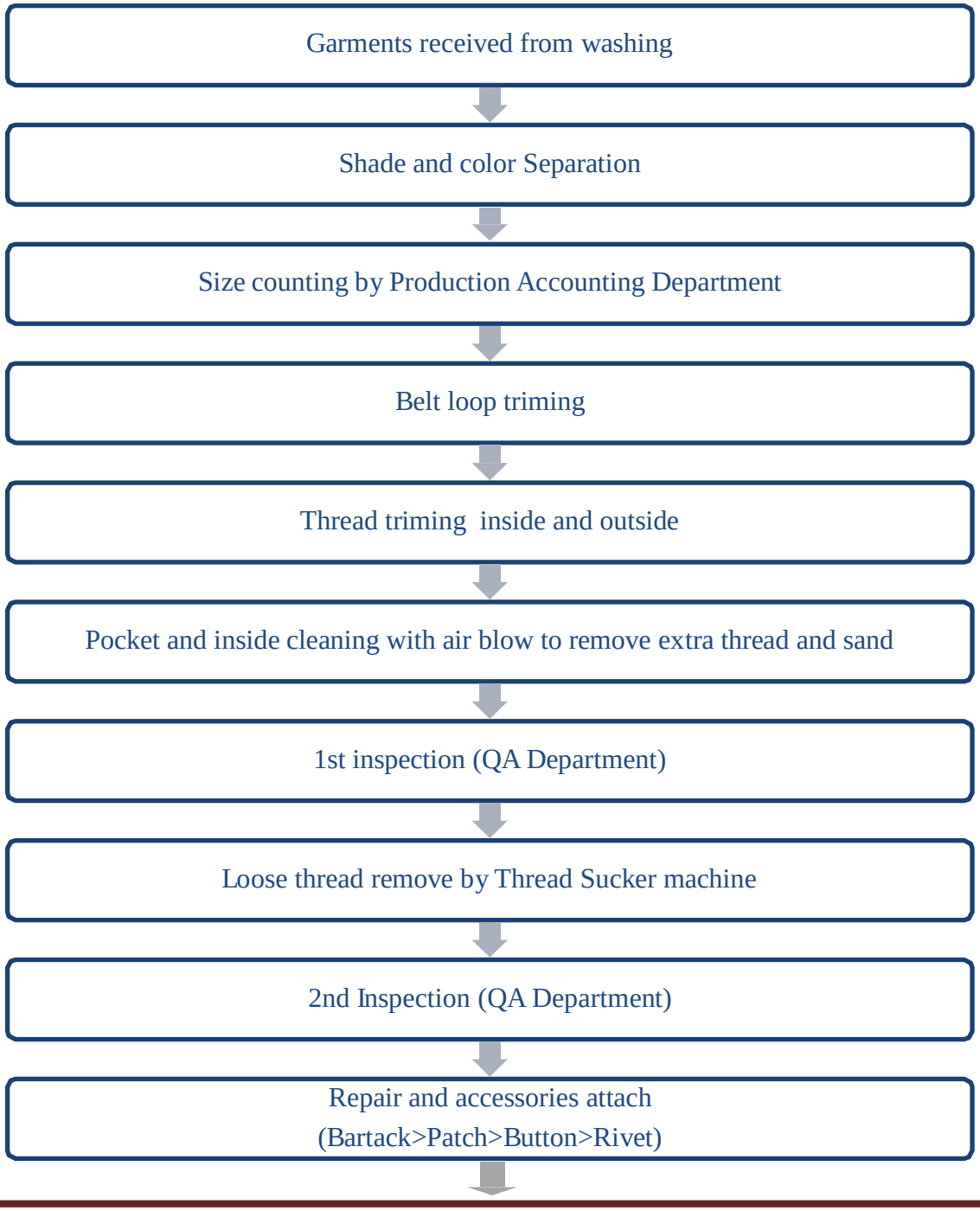
- The production department has capacity to produce 40,000.00 units per day.
- The production system of PACIFIC JEANS is continuous.
- Production procedure is 80% automatic and the rest is manual. The organization‘s total Production is 12.48 Million Per Annum.

Production department give this type of update to the planning department and merchandising department so that they can maintain the schedule according to system.

Finishing Department

Finishing department usually carried out different functions as daily operations and routine job. The finale shipment of the products are vastly depends on the finishing department. The desired quality standard of the products are also depends on this department. So the smoother and efficient operation of the finishing department is very important.

Process flow chart of Finishing Department



Ironing

↓

Measurement Check
(Waist>Inseam>Hip & Thigh>other as per buyer)

↓

Shade Check

↓

Final lot pass
(QA check & QC pass approve)

↓

Attach price ticket

↓

Attach size sticker

↓

Attach over ryder

↓

Metal Detector Cheking

↓

Sequrity Tag attach (For Certain Buyer)

↓

Poly packing

↓

Carton packing as per packing list as per buyer

Carton Making Department

Machine use in carton making department:

- Corrugated machine
- Auto Cutter machine
- Pasting Machine
- Pressing machine
- Rotary Machine
- Slotting Machine

Picture of some machine use in carton Department:

Corrugated and auto cutter machine

Single ply cutter

Pasting Machine

Slotting Machine

Working Procedure

Input paper roll in corrugated machine

↓

Make solution with araut+caustic+boric+water and insert in the machine

↓

one straight ply and one zigzag ply joined together with gum solution in the machine

↓

Duel ply layer cut with machine as per carton size

↓

roll input in single ply cutter machine and single straight ply cut as per carton size

↓

assemble duel and single ply with gum by pasting machine
ex:for 5 ply 2 duel ply+ 1 straight ply

↓

pressing adjusted plyes with pressing machine

↓

input ply in rotary machine for creasing carton folding area

↓

print on carton require data or shipping mark as per order or buyer

↓

input ply in slotting machine for cut top and bottom folding part

↓

join ply for making box with gum or plum stitch as require

↓

Quality check and finishing

Quality Assurance Department

QUALITY:

(QUALITY=Quite, Urgent, Able, Liability, Intelligence, Technique, Youth)

To maintain quality of the finished products is very important. So the production team strictly maintains quality of the garments. Here Statistical Process Control is practiced for maintaining quality. They also have the system of On The Process Quality Checking, which ensures the quality checking at the every steps of the production in each line. These quality checking are divided into these steps –

- Store quality
- Cutting quality
- Sewing quality
- In line process quality inspection
- Finishing quality.

Store quality

- fabric inspection
- shrinkage ratio calculation
- Button, Rivet and Zipper quality check
- Hang tag, price tag over ryder etc quality check
- Main label and care label check
- Thread quality check

Cutting quality

- spreading quality control
- cut number check
- ply height
- table marking
- marker placing
- tension
- counts

Sewing quality

- Check the needle
- Check the sewing thread
- Keep the sewing part properly
- Ensure total sewing quality.
- In line process quality:
- Checking process by process
- Check in input
- Finding major and minor defects

Finishing quality

- Check the measurement
- Check the care label placement
- Check the tag placement
- Check the sticker
- Check all the merchandising packing.

Light check section

In this section garments are inspected under specific light shades.

- D-65: Delta 65degree Kelvin temperature.
- TL-84: Tungsten 85 degree Kelvin temperature.
- TL-86: Tungsten 86 degree Kelvin temperature.
- UV: Ultra violet.
- F-Light: Florescent light.

Design and Development (D&D)

The Design Department develops unique design and concept for attending in global expo. They also develop for buyer meeting for order offering. In this context, Design Department is thought to be sector‘s necessities and aims to gain modern knowledge and skill in denim designing. This department manages by company Design Director and four designers. They also have a team of sample making and development. They create new concept with a team and design studio.

Design and Development department is responsible for every kind of development of special design as requirement like different types of embroidery, pearl, stone, patch, stud ,embellishment ,pacific heat seal label attaching.

D&D department of Pacific Jeans is enriched with modern and new machineries.

- Computerized embroidery machine,
- Pearl attaching machine,
- Stud attaching machine,
- Heat press machine for embellishment and stone fixing.

Objectives:

- Understands the importance of modern technologies in fashion industry with the basic principles in the field of design in denim
- Takes responsibility as an intermediate member in Fashion Designing at Factory, design departments, design studios fashion.
- Takes responsibility about planning, marketing, and product development of the factory
- Comprehends the duties and areas of fashion designer in factory

Testing and laboratory

Pacific Jeans has an in-house fully functional lab which performs more than forty different kinds of Physical test, Chemical tests, Dimensional stability test and Colorfastness tests. All the required tests by the customers are executed in their lab. The lab results are as accurate as well-reputed testing companies because they perform the tests with same equipments as the reputed testing companies and they are conducted by certified lab technicians.

There are two types of lab:

1. In-house lab
2. Third party lab

In house lab:

It means Pacific own lab where they conduct all the testing procedures by their own machines.

- Physical test
- Chemical/analytical test
- color fastness test
- Torque
- Safety
- Promotional claims etc are done in pacific testing lab.

Some of the Physical tests are: **(Fabric and Accessories)**

- Fabric GSM test
- Tear strength test
- Tensile strength test
- Abrasion resistance test
- Pilling propensity
- Air permeability
- Elasticity test
- Seam strength
- Seam slippage
- Belt attachment

Some chemical tests are: (Fabric and Used Chemical in wash)

- PH test
- Formaldehyde
- Fabric content test

Color fastness test

Color fastness to:

- Wash
- Rubbing/ Cracking
- Water
- Perspiration
- Sea-water
- Saliva
- Hot pressing/Sublimation
- Light
- Ozone

Torque test: This test is done for the accessories of the baby items.

Machine Use for In House LAB:

- Light Box
- Pilling Tester
- Lea strength Tester
- Tensile Strength Tester
- Abrasion Tester
- Spectrophotometer
- Light Fastness tester
- R.O Water
- PH Tester

Working Flow Chart

Third party lab:

Pacific send fabric and garments for testing to third party LAB like Bureoveritas, IL, ITS, SGS, Qtech etc as per buyer requirement..Pacific send their samples there and these testing institutions do testing on physical and chemical test of fabric and accessories, zipper strength test, puller strength test, button & rivet nickel test, pull test, bar tack strength test, belt loop strength test etc.

All tests are done in two stages:

Fabric test

Unwashed fabric test will be tear test, tensile test. Blanket fabric or washed fabric test.

Garments test:

Garment test will be done on development sample. All the physical, chemical tests and color fastness tests are done on this sample

Commercial Department

For a hundred percent export oriented organization the responsibility of the commercial department is very important. Actually this deals with all the import activities of raw materials and the export of finished products.

IMPORT ACTIVITIES:

Commercial department is liable for import clearance of all raw materials till bringing those materials to factory in-house. So import clearing of all raw materials is under commercial department.

During this process the commercial department receives the following documents from the supplier of the raw materials.

- Invoice
- Packing list
- Bill of Lading or B/L (This is in the case of shipment via sea).
- Air Way Bill or AWB (Shipment by Air Freight): this air way bill includes Shipper Name, Consignee name etc.

- After receiving above mentioned documents Commercial Department contacts with Bangladesh Export Processing Zone Authority (BEPZA). Then they apply for Import Permission (IP) to the BEPZA.
- The Import permission (IP) is given to concerned Clearing and Forwarding Agent. The Clearing & Forwarding agent people prepare Bill of Entry (BOE) for clearing of all imported goods.
- Based on the information received from Shipping clearing agents and forwarding agents advice the commercial department regarding tentative(TT) arrival date of raw materials under that particular import documents. On the basis of this information Commercial Department updates Fabric Accessories arrival date to factory.

Here one thing need to notify that, Import of all the raw material in BEPZA area is excluded any kind of tax from government.

EXPORT PROCEDURE:

Every week Commercial Department receives weekly shipment schedule from the planning department. After receiving weekly shipment plan commercial department takes preparation for the export of finished products. Commercial department needs to prepare the following documents for this purpose.

- **Customs Invoice**: this is require to apply for Export Permission (EP) to BEPZA and Customs
- **Shipping bill**: After receiving EP from BEPZA commercial department handed over the documents to Clearing and Forwarding agent for completion of necessary customs and port formalities. Clearing & Forwarding agent people prepare shipping bill.

In the meantime the commercial department booked necessary containers for the export garments. The container booking is done following the export schedule of planning department. The container loads by the finishing department and informs to the commercial department that the container is ready for shipment.Commercial Department arrange for Prime Mover to send the container to the port depending on above information.

The following finale shipping documents are needed to be prepared by the commercial department for onwards sending to the Buyer.

- Final Invoice
- Packing List
- Bill of Exchange
- Certificate of Origin
- Export License
- Bill of lading or Air Way Bill by the shipping agent.

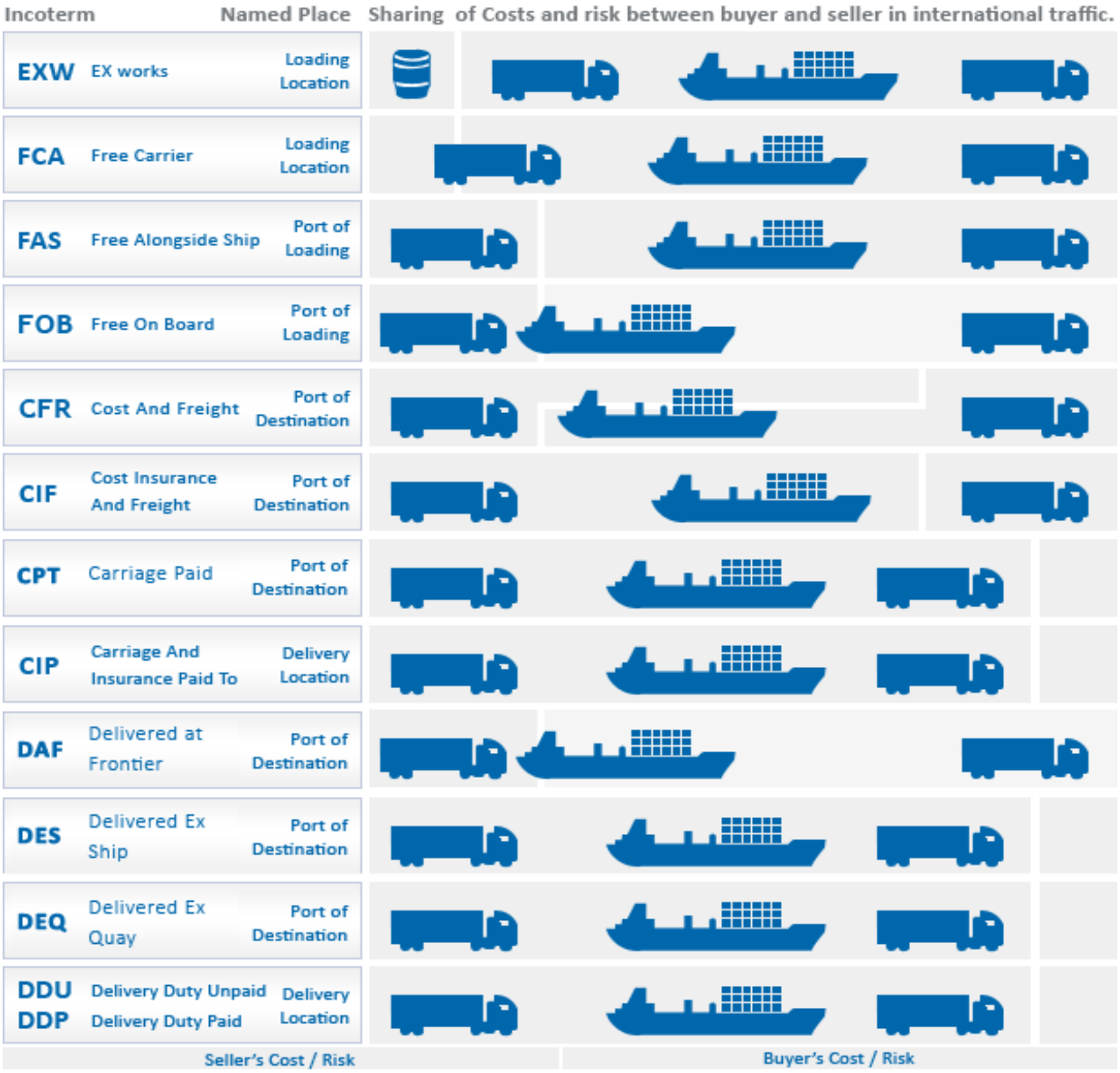
The original sets of these Documents are sends to the Buyer. Another set of documents is submitted to Bank for remittance for collection of export proceeds from Buyer under that particular export.

Commercial department is liable to submit all import and export statement to the Customs Authority. They are also responsible to prepare consumption report against each export invoices

and submit to the customs authority for the necessary adjustment of imported raw materials with Customs Bond Book.

Software called AS400 is used by the commercial department to keep the records of all documents and they always keep updating all documents to this.

Incoterms of export import business: (mostly follow FOB)



Payment Term:

- 30 days
- 60 days
- 90 days (mostly follow)
- At Sight (between 2 weeks after delivery)

ICT department

Information and Communication Technology department has mainly 4 working objective:

- Networking
- Software Management
- Graphics Design
- Print Shop

Networking:

Use of E-mail:

- E-mail account will be created according to department Head‘s recommendation.
- Director/CEO should be copied into all outside E-mail.
- Pacific E-mail account should not be used for personal E-mail.

Password:

- E-mail and computer password will be changed in every month.
- Password should not be shared with others without prior permission.

Browsing:

- Browsing facility has to be approved from Director/CEO through department head.

Confidentiality of Organization Data:

- User is not allowed to copy any data into personal pen drive.
- Internal information should not be shared with outsider without prior permission.

Loading of Non organizational Software:

- User is not allowed to install any software which is not required by organizational work.

Organization’s Right to Inspect Computers:

- At any time management can inspect user‘s PC.

Web Portal:

- They maintain two well develop web site where they give company profile, department detail, extracurricular activities, product design etc.

Web addresses are:

- http://web.pacificjeans.com
- http://www.pacificjeans.com

Software Management:

- ERP System
- IP call
- Tally
- HR payroll
- SCN (Supply Chain)
- SPM (Uniqlo)
- PF management

Graphics Design:

- Development garment photo shoot and edit.
- Banner & News design.
- Garment wash design for LEASER.
- Design for printing department.
- Magazine design
- ID card design
- Visiting Card design

Print Shop:

- Carton label sticker design

Industrial Engineering Department

IE department is very important department now. As worker wages and salary range increased without IE it‘s difficult to ran and maintain a garment factory.

IE work mainly with 2 departments:

- Production IE
- Finishing IE

Responsibilities of IE:

Though the time study and motion study are the most common function of Industrial engineer, the some other responsibilities are:

1. Planning layouts
2. Monitoring Production flow system
3. Deicide the machines and attachments for all style
4. Pay system
5. Monitoring and improve the operator performance
6. Operator training
7. Production control system
8. Quality control
9. Others

Main task of IE department:

- Work study
- Operation breakdown
- Capacity Study
- Time Study
- Motion Study
- SMV calculation
- Line layout
- Machine layout
- Manpower select
- CM calculation
- Thread Consumption

- Efficiency Calculation
- Target setup
- Production Report
- Co-ordination

Work Study:

First they make to research for any new style and improve working method for that and calculation its operations and ability of the company to do that on time.

Operation Breakdown:

They study on new style and calculate the operation need for making that style. It depends on design of the style or garments. Normally 5 pocket denim contains 45-50 operation.
This is the combination of the following works-

- Sequencing of Works
- Machine Types
- Standard Minute Time
- Requirements

Capacity Study:

The measure their production capacity for the new style .They also measure the capacity of production line and individual worker.

Time Study:

They calculate the average time with allowance of making a garment with time study method. They use stop watch for manual method and video capturing method for software or computerized method.

Motion Study:

They observe workers motion of work for capacity and time study. They use video motion capture system for motion study. They mainly do this for calculate allowance time of work.

SMV Calculation:

This is one of the most important tasks of IE department. They calculate SMV after work, motion, and time study.

The basic formula of SMV = Basic Time + Allowance

Normal SMV of 5 PKT denim is 15 min on average.

SMV calculation mainly depends on time study and some factors:

- Type of garments
- Types of fabrics
- Garments size
- Garments design
- Difficulty of the processes
- Types of machine
- Types of technology

Line Layout:

They decide line quantity and type for line layout. They select how many line need for certain style and type like single, U shape, REMEC.

Machine Layout:

They manage and select require machine for new style. They systematically set up machine sequence for getting more output in hour.

Manpower Select:

They make category of worker in grading system. They select worker as per grading for new style. They select manpower as per operation SMV.

CM calculation:

IE department mainly calculate the CM of a style or garments. Though company MD or Director include with CM calculation.

Formula of Cost of making (CM) per pcs:

$$CM = \frac{\text{Factory total expenditure/month} \times \text{Total number of machines required to complete an item}}{\text{Total machines} \times \text{Total working day/month} \times \text{Total working hrs/day} \times \text{Targeted production/hr}}$$

Thread Consumption:

IE make consumption of thread of every new style. They use Seam Works software for thread consumption. They measure the length of stitch with allowance and identify the stitch class and input them in the software and it gives the result of thread consumption. They include thread Brand and Tex or TKT NO. Of thread and shade code for consumption. Normally a 5 pkt denim need 350-400 MTR thread.

Efficiency Calculation:

IE department calculate the efficiency of individual worker, line and floor too.

Formula of efficiency calculation:

$$\text{Efficiency \%} = \frac{\text{SMV} \times \text{Number of Production}}{\text{Number of Operators} \times \text{Working Minutes}} \times 100$$

Target Setup:

IE department calculate the hourly average output of a individual worker. They set up hourly target of worker and line.

Formula of target set up:

$$\text{Target Setup} = \frac{\text{Number of Operators} \times \text{Working Minutes} \times \text{Efficiency \%}}{\text{SMV}}$$

Production Report:

IE department make hourly, daily, monthly and yearly production report. They submit daily production report to planning department.

Co-Ordination:

IE department do some immediate action on:

- Worker absence
- Decrease of efficiency
- Needle broken or any machine defect

Some important formula use in IE department:

- Standard Pitch Time (S.P.T) = Basic Pitch Time (B.P.T) + Allowances (%).
- $\text{Target} = \frac{\text{Total manpower per line} * \text{Total working minute pewr day}}{\text{S.A.M}} * 100\%.$
- $\text{Theoretical Manpower} = \frac{\text{Target per houre}}{\text{Process capacity per houre}}.$
- $\text{Line Labour Productivity} = \frac{\text{Total number of output per day per line.}}{\text{Number of worker worked}}.$
- $\text{Line Machine Productivity} = \frac{\text{Total number of output per day per line}}{\text{Number of machines used}}.$
- $\text{Line Efficiency} = \frac{\text{Total output per day per line} * \text{SAM}}{\text{Total manpwer per line} * \text{total working minutes per day}} * 100\%.$
- GSD.
  GSD = (Man power * Work hour) / Target.
- SMV.
  SMV = Basic time + (Basic time * Allowance).
- Basic time.
  Basic time = Observed time * Rating.
- Observed time.
  Observed time = Total Cycle time / No of cycle.
- Rating.
  Rating = (Observed Rating * Standard rating) / Standard rating.
- Efficiency.
  Efficiency = (Earn minute * Available minute) * 100.
- Earn minute.
  Earn minute = No of Pc's (Production) * Garments SMV.
- Available minute.
  Available minute = Work hour * Manpower.
- Organization Efficiency.
  Organization Efficiency = (Basic pies time / Bottle neck time) * 100.

Planning Department

Planning is very much important in each and every aspects of life. Specially, in rmg sector where lead time is a vital factor here planning department plays a very important role. Planning department starts their work when merchandising department get any quantity projection from buyer. Merchandising department then asked planning department to give a projection garments delivery based on fabric and all the accessories in-house date. Now the planning department of pacific jeans is working with ‘‘fast react evolution software ―which is making the planning department more flexible, more efficient.

Pacific Jeans planning department specially give projection and maintain four modules:

- Sewing
- Finishing
- Merchandising
- Washing

Some important functions of planning department are mentioned below:

Line Plan

Whenever a new style is introduced planning department workout a line plan to precede the production work. If any band in the floor is free they use that, otherwise they search for gap in the line and draw a line plan. If not succeed they reduce production of target achieved style to start the new style.

Capacity Plan

Planning department collect the information about production capacity of the floor from the work- study department by standard hour. That means how many garments can be prepared in an hour. According to this planning department make capacity plan to achieve the target.

Weekly Requirements

Shipments are held in weekly basis. So planning department make a plan on weekly shipment schedule based on buyer‘s requirement. Planning department distributes the plan among the entire relevant department and also follow-up so that work done in the schedule time.

PP Meeting:

After getting the order confirmation from the merchandiser with the order quantity of a particular style planning department arrange a PP Meeting (Pre-Production Meeting) with store, cutting, production, finishing, fabric inspection and washing plant department to achieve the target and explain and discuss with their plan to all others how and when the production is scheduled to complete.

Cutting plan and Ratio

After in-house all the fabric and trims planning department makes a cutting plan with the ratio of how much also what amount of each color of the style should be layered to cut and pass the information cutting, production, finishing and washing department (if there is any wash garments) thus everybody is prepared to do their part to ensure the shipment in time.

Shipment plan

Planning department makes a shipment plan also the ratio of shipment about what will be the quantity of each style and also each color in that particular week. And forward it every department related to production and to complete the style in time, merchandiser to correspond with the buyer about the shipment and commercial to take necessary step for shipment the product.

These planning are very carefully and tightly workout and should be implemented to gain the target and shipment the product on due date. Otherwise buyer may want shipment by air for which the company loses huge amount of extra money. So, if planning department noticed that the target cannot be achieved before due date they immediately inform the merchandiser to take necessary steps by corresponding with the buyer and to manage a few more days to achieve the target. If merchandiser cannot able to manage the buyer, planning department re-work with their plan and search if they can use more line in production floor or some extra hour to make the shipment possible thus the company should not lose any extra money or image.

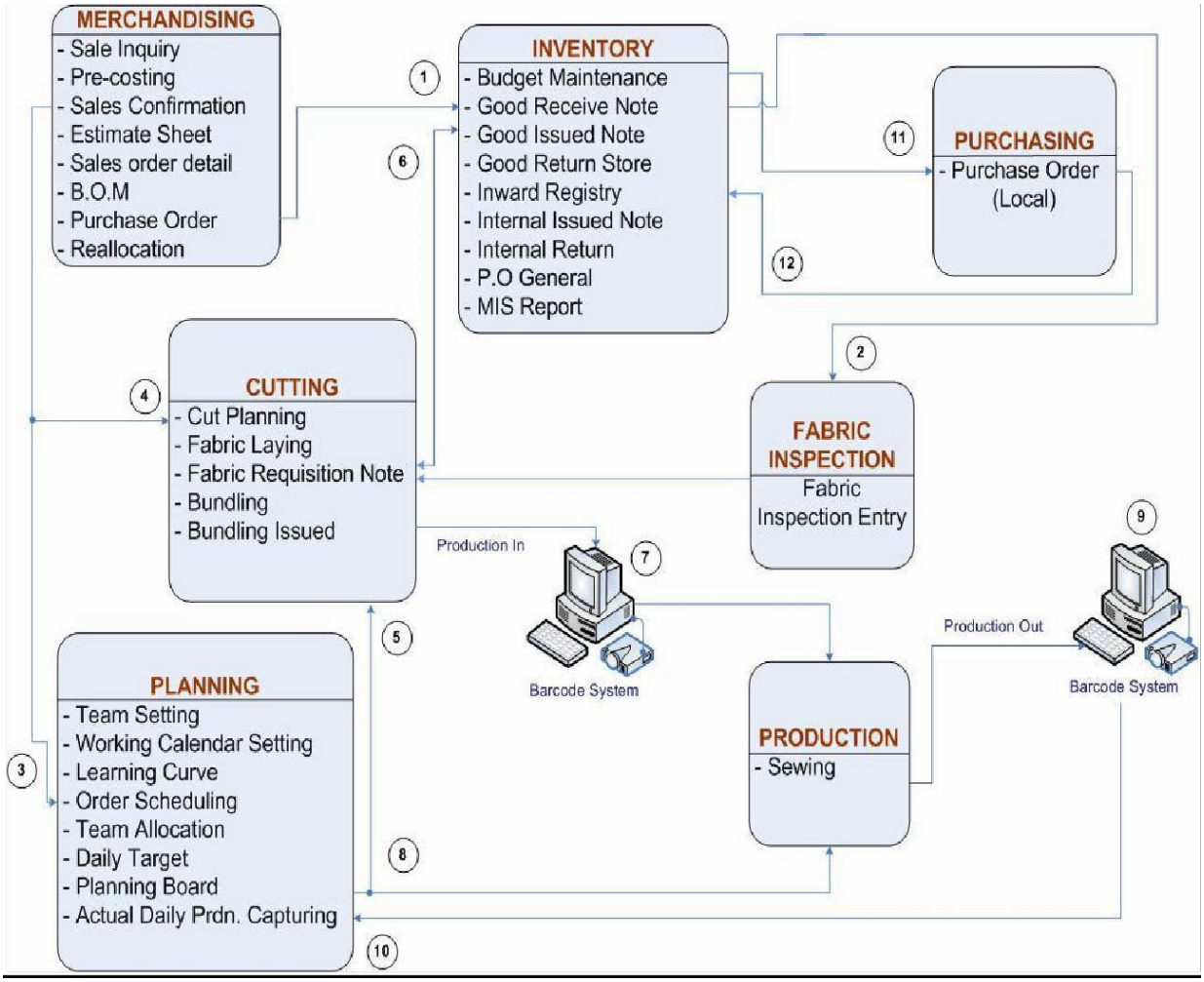
Enterprise Resource Planning

(ERP) is a software system designed to support and automate the business processes of medium and large businesses. This may include manufacturing, distribution, personnel, project management, payroll, and financials. By this ERP system any one can get any kind of data or necessary information from each and every section as well as give necessary data to someone

else simultaneously so that everyone can get the correct data at right time which helps the production to be increased and time and hassle to be diminished.

ERP Manual – Module wise

At Pacific, basically ERP is running well with 5 modules integrated: Merchandising, Inventory Cutting, Critical Path and AD system. However other modules like Planning, Washing still going on checking and take over.



Above identified number refers as such:

1. Good Receive Note is raised base on Purchase Order from Merchandising
2. Fabric Inspection after GRN Process
3. Planning Process is based on Order In Hand from Merchandising
4. Cut Plan is raised base on Order Detail from Merchandising
5. Allocation plan cut date to Cutting / Following Planning Board
6. Good Issued Note is raised after receiving Fabric Requisition from Cutting
7. Bundling issued (Production In)
8. Allocation daily target from Planning / Following Planning Board
9. Production Out
10. Update Actual Daily Production
11. Following up Local Purchasing base on Budget Maintenance
12. Inward Registry is raised base on Local Purchasing

Supply Chain Department

If we denote supply chain as, it is a system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer. A supply chain is actually a complex and dynamic supply and demand network. Main purpose of supply chain is to satisfy customer needs and generate business profits.

Supply Chain Management is the integration of key business processes from end user to original suppliers that provides products, services, and information that add value for customers and other stakeholders. In apparel supply chain every organization starting from initial fiber supplier to consumer purchasing apparel products for final consumption.

Areas of supply chain in apparel industry for raw materials are below:

1) Material Management

I) Sourcing

II) Purchase & Procurement

2) IE, Planning, Production

3) Commercial

I) Import

Il) Logistic

Ill) CNF

4) Warehouse

Supply Chain Operation Model in terms of Raw Material

The RMG industry is highly dependent on imported raw material. About 90% of woven fabrics and 60% of knit fabrics are imported to make garments for export. That‘s why this industry has taken maximum lead time to process an order [8]. In Bangladesh, the lead time for apparel export varies between 90-120 days.

Raw Materials:

1. Fabric Item:

2. Non-Fabric Accessories:

Material Management*:* the entire working process of material management consists of raw material Sourcing and Purchase & Procurement team. Sourcing is started from the sampling or

development stages. In these stages the sourcing team has to do following activities as per proposed model. They are:

- Receive RM Requirements from Development / Sample team
- Receive buyer approved Artwork/physical sample/ technical pack whatever available at Merchandiser/ Sales & Distribution team.
- Sourcing Supplier (multiple 2or 3)
- Place sample order booking
- Collect & submit sample to MC/SD/Buyer whatever require
- Collect approval from MC/SD
- Select supplier
- Confirm price, lead time and business terms & condition.

In Bulk stages, Purchase & Procurement team do the following activities:

- Receive details order sheet/Check list/Budget sheet from Merchandiser
- Take consumption from related department (CAD, IE, Pattern)
- Check consumption with merchandiser provided BOM (ERP or, Checklist)
- Check current stock status of RM with warehouse or, ERP system
- Prepare booking (System generated or Manual) & proceed to selected supplier
- Receive PI from supplier with expected RM Delivery date
- Collect garments delivery date from MC and Production plan from Planning Team
- Update material Plan to Planning, Merchandising, warehouse team
- Create ERP or Other‘s system PO against PI and take PI approval from Head of SC or, authorized person
- PI pass with PO to commercial (import) team to proceed payment (LC, TT as per policy)
- Payment proved (LC, TT draft) pass to supplier
- Follow up ETD with supplier and collect necessary shipping documents
- Pass shipping documents to commercial (Logistic, CNF)
- Follow up with commercial (Logistic, CNF) until RM in-house
- Check RM receive and Inventory status with warehouse
- Take trims card from warehouse and check quality report
- Check RM transaction (Issue, Transfer) with warehouse
- Take RM stock or, closing balance from warehouse after garments deliver to Buyer/Retailer

- Assess supplier half yearly or, yearly basis and take business facilities from supplier
- Analyze RM stock and report to Head of Supply Chain with appropriate reason and recommendation.

IE, Planning, Production

The activities of IE team as per proposed operation model of raw materials are to provide consumption of accessories like: Sewing thread, Elastic, Different type of tapes etc.

Planning & Production team provide their production plan to material management so that they can plan a better raw material plan which will helps to meet garments delivery date as per buyer.

Commercial*:*

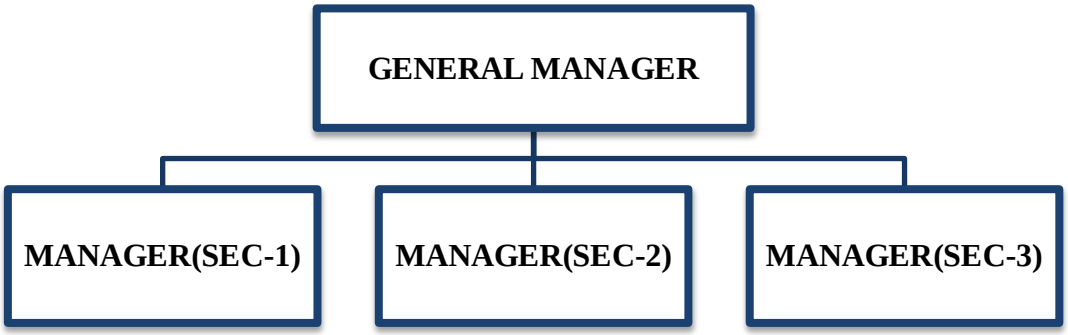
The activities of commercial team as per proposed operation model of raw materials are to proceed payment and confirm it to material management, Logistic and CNF support so that raw materials in-house on time.

Warehouse*:*

In this model warehouse activities is most import because they have to provide stock report to material management before placed booking to raw material suppliers, properly maintain stock label, on time Inventory, raw materials receive, quality check by warehouse quality team, submit trims card to material management.

Human Resource Department

In Pacific Jeans LTD, Human Resources Department is the most essential department. Human beings are the prime assets of the company, so proper management of the work force is very important for any organization and the same is true with the company. HR is the concerned department who are responsible for arranging and managing the right work force at the right time. In my visit I know that there is a separate HRD or personnel department in the company. There are about 3 Human Resource Managers in PACIFIC JEANS Ltd. The basic Organ gram of the Human Resource Department is as follows:



The main functions of this department are:

- Recruitment of worker and employee
- Daily attendance report
- Daily overtime report
- Discipline & Discharge
- Counseling the rights and responsibilities among the workers
- Conducting motivational programs
- Food & Canteen management
- Arrange Training & Development
- Security management
- Transportation management
- Taking care of in-house cleanliness, health and safety
- Maintain all types of rules and regulations, meeting, general notice, circular, decision related to the workers and employee of the whole factory.
- Maintain Recruitment, punishment, penalty, termination, dismiss, general leave, maternity leave, yearly increment, and promotion of the employee.

- Maintain the attendance, attendance bonus, workers personal file, transfer, arrival. Salary advice & report card & register for all staff & worker
- Maintain the relationship with IR department of BEPZA and other industries.
- Solve the workers problem in the factory and maintain the labor law.
- HRD provides the working schedule to the workers.
- This department solves industrial problems.

Main functions of HR department are explained below:

Recruitment

It is the most important and sensible work of this department. Selecting a right person to the right position depends on the recruiting process conducted by the HR department. HR publishes the circulation in the newspaper, banner, internet and personal source for the employment opportunity in the various departments.

Daily attendance report

HR department is maintaining the daily attendance and absenteeism report. As the department is closely related and works with the Finance department to prepare salary sheet. To maintain the attendance system they conduct the following process The Company has automated system for the attendance recording. All the employees hold unique Identity card and everybody has to swap their finger as per the factory timing.

Discipline & Discharge:

HR has to formulate the list of necessary rules together with some actions like: verbally warning, warning letter, demotion, suspension, dismissal etc.

Food & Canteen management:

Canteen management is one of the most important functions of HR department. Food management for such a large workforce is really a tough job and has to maintain very carefully. There are different time slots fixed for different department and different section for breakfast and lunch.

Training & Development:

HR department arranges orientation and training program to familiarize the company and the responsibilities of the job to the new comer. These are especially for office staff. After completing the orientation and training program they have to submit the orientation report to the HR Department.HR also arranges Fire Training & Health Training programs to prevent the accidents.

Transportation:

This is another important function undertaken by the HR department. Management of the vehicles for total workforce is to reach them to the factory in time. So that there would not be any delay in reaching the factory plant and can maintain the work time schedule accordingly.

Health service:

There is a medical services provided by the company for the immediate medicinal services needed for the employees. If there are any health problems of any workers they can directly consult with the medical section. HR department is directly associated with that and looking after all the medical services.

After introducing with the HR team, I can say that it is the most essential team of this company. Without the HR department it is not possible for a company to achieve their target.

Facilities & Benefits:

Each confirmed worker gets every sort of job related benefits and here some distinction is prevailing like workers who are getting salary and wages and those who are getting only salary. Recreational plans, group insurance, JCC (Joint Consultative Committee), recreational programs, legal assistance, statistics and records are maintained by HR.

Human resource department basically work for smoothly run the factory by maintaining all compliances, facilities to each & every employee is minimizing the problem rising & solving by department wise. So HR is committed to keep the factory environment Peace full, workable, clean, Hygienic, reliable, helpful to each other. HR department ensures safe environment for them.

So the company gains smooth productivity through HR department activity in order to meet the commitment with customers.

Motivational Works:

To motivate workers & staffs HR arranges some activities like Employee of the Month, _0‘ Day & _1‘ Day Award, 3 Years Award, Job well done, Worker‘s Day & Staff Party.

Miscellaneous Services:

HR arranges Security, Travelling, and Company Transport etc. HR also arranges the VISA and Work permit for the expatriates and ensures expatriates residence and transport facilities

HR also maintains Locker for the workers. After joining, HR provides lockers for the workers & also maintains locker register.

HR provides ID card & Bus card to the workers. They have to maintain a register for these purposes.

Contents of a Recruitment File

- Bio- data or curriculum vitae (C.V.)
- Application for employment
- Nationality/ Chairman‘s Certificate
- Blood Group Report
- Experience Certificate
- Educational Certificate
- Recruitment form supplied by HRD
- Age Certificate
- Appointment letter
- copies of passport size photo
- copies of stamp size photo

Levels of Management

- Senior Management
- Junior Management
- Staff
- Work force

The Senior Management comprises of:

- Assistant Manager
- Deputy Manager
- Manager
- Senior Manager
- Assistant General Manager
- Deputy General Manager
- General Manager

The Junior Management comprises of:

- Officer/executive
- Telephone operator
- Receptionist
- Medical officer
- Staff nurse

The Staff comprises of:

- Leader
- Supervisor
- Issue girl/boy
- Production recorder
- Store assistant, etc.

Accounts and Finance Department

This department plays a great role to run the operation smoothly of Pacific Jeans Limited. Their responsibilities are:

- Banking
- Cash
- Fixed assets registry
- Internal Audit reporting & documentation

The activities are explained below:

Banking:

The department has dial up connection with the Bank (HSBC) through the software. With the help of software called HSBC.net all the operations of this section are done. The company gets some other benefits from the bank such as:

- Auto Pay System
- Fund Utilization
- Bill Discounting etc.

Cash:

The department maintains various kinds of cash transactions. Some of them mentioned here under:

1. **Production incentives**: All the workers related to the production are subject to the production incentives. Production incentives are depends on the given production targets and achievements for the day. Those who achieve Minimum 80% of the target get the production incentives.
2. **Present Bonus**: The present bonus is paid on basis of the attendance of the workers during the month. To get the Present Bonus a worker has to be present all the working days. If any worker remains absent for more than one day he/she is not subject to Present Bonus.
3. **Salary**: To calculate Salary the department uses software named BARCODE. HR department is closely related to prepare salary sheet. Salary period is 26th to 25th of a month and has to be paid by 4th or 5th of the next month.
4. **Daily Transaction**: The department also handles many kinds of daily transactions.

Fixed asset register:

To register fixed assets of the company Finance department uses software named Fixed Assets Register. Using this particular software they can provide information about

- Total asset of the factory
- Location of every asset in the factory
- Cost price of the asset
- Depreciation rate
- Lifetime/Validity
- Date of purchase
- Present value of the assets
- Supplier‘s details etc.

Internal & External auditor:

Internal: The key responsibility of the audit team is to deal the Income tax of Foreign and local employee and audit Provident fund account. In addition to this they are also assigned for various audits as required by the management.

External: The key responsibilities of the audit team are to audit the financial reports. They are also assigned to deal with the Company Income tax of the company. We need to co-ordinate with the audit team at time of audit period.

Reporting and documentation:

The finance department usually prepares various kinds of reports.

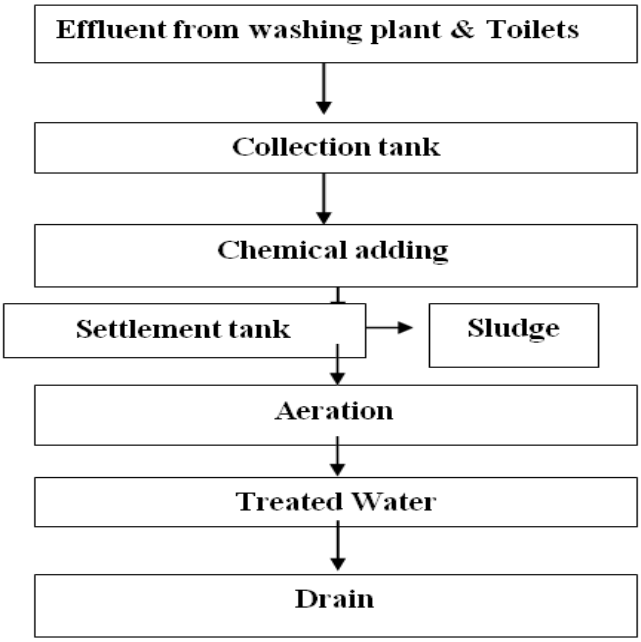
1. **Performance Report**: performance reports of each month are done and these are to be completed by the 4th or 5th of the month. It includes.
    - Cash Flow
    - Fund Flow
    - Cut ship Ratio.
    - Labor Report etc.
2. **Financial Statements:** All the financial statements are completed by the 10th of the month. The followings are reflects in this report.
    - Company‘s profit & Loss
    - Assets & Liabilities

Yearly audit is prepared on the basis of this Financial Reports. Maintaining and following the rules and regulations Finance department helps the company to achieve its goal.

ETP and Waste water Plant

Effluent Treatment Plant:

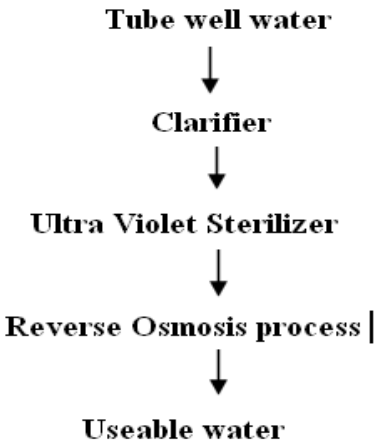
Effluent Treatment Plant is here to treat the wasted water from the washing plant. The procedure is:



This sludge is used in the garden as fertilizer.

Raw Water Treatment Plant:

Here is a Raw Water Treatment Plant, which gives good quality water to the whole factory including the washing plant. The process of this plant is as follows:



Chapter 5

Merchandising Department

(Buyer ZARA)

Merchandising is the methods, practices, and operations used to promote and sustain certain categories of commercial activity.

In retail commerce, visual display merchandising means maximizing merchandise sales using product design, selection, packaging, pricing, and display that stimulate consumers to spend more. This includes disciplines in pricing and discounting, physical presentation of products and displays, and the decisions about which products should be presented to which customers at what time.

For a garment manufacturing company merchandising department is most important section. The main part of this department is to communicate with the buyer and as well as inside the factory.

Qualities of a Good Merchandiser:

To be a successful merchandiser it is required to have several qualities and this requirement depends on what type of merchandising job a person is involved with. For every type of merchandising job a person should have the following characteristics and qualities:

- Ability to Create Halo Effect or ability to create positive impression
- Good English writing, Speaking and listening skill
- Basic Computer Skills of Office Applications
- Ability to Calculate Fast and Accurate
- Quick decision Making
- Business Communication Skill
- Ability to Convince Buyers
- Ability to Work with Team Members
- Good Analytical Capability
- Honest and Sincere
- Enough Knowledge of Garments Industry
- Hard Worker and Self Motivation
- Ability to take high mental pressure
- Good textile knowledge

- Good at costing and consumption
- Good fabric and accessories knowledge
- Good knowledge in sample and CAD
- Good knowledge in washing and dyeing
- Excellent Knowledge of the World Market
- Good behavior
- Good knowledge in industrial engineering

Main responsibilities of merchandisers:

An apparel merchandiser should follow the below responsibilities:

- Internal & external communication,
- Sampling,
- Getting approval of sample,
- Preparing internal order sheets,
- Accessories & trims in-housing,
- Getting approval of trims and accessories,
- Preparing purchase orders,
- Getting approvals on lab dips,
- Testing of fabric and garments and getting approval,
- Advising and assisting production and quality department,
- Production follow up,
- Give washing instruction and follow up,
- Taking responsibility for inspections,
- Giving shipping instructions and following shipment.

Basic Flow sequence of merchandising section:

Talk to Buyer (Tack pack receive)

↓

Development Sample making and get approval from buyer

↓

Costing and Consumption of material

↓

Price negotiation with buyer.

↓

Order received (P.O. received) P.O. = Purchase Order

↓

Back to back L/C opening for purchasing Fabrics & Accessories.

↓

Get trims and accessories approval from buyer

↓

PP Sample approving

↓

Related work to production planning.

↓

Start bulk production.

↓

Line inspection

↓

Final inspection by buyer or buyer representative

↓

Shipment to buyer

↓

Sending document to buyer for payment

↓

Payment receives from bank.

ZARA Profile in short:

- ZARA is a Spanish fashion retailer
- It founded in 1975 by Amancio Ortega and Rosalia Mera
- CEO: Pablo Isla (Current Chairman)
- It is the main brand of the Inditex group
- Inditex founded in 1985
- Headquarters: Arteixo (A coruna), Spain
- Total employees: 162450 (Inditex)
- ZARA has more than 2200 store in 96 countries
- Revenue: US$ 9 billion annually
- Former name: ZOBRA (named after classic film Zobra the Greek)
- Website: zara.com
- Started international expansion in 1988 through Portugal
- Opened online boutique in 2010
- In 20111 started manufactured non toxic product
- Produces over 450 million items per year
- Launches around 12000 new design each year
- They have a policy of zero advertising
- ZARA follow JIT system
- In 2015 ranked 30 on international list of best global brands
- On Forbes list:#46 world‘s most valuable Brands
- Mostly manufactured from Spain, Portugal, Turkey and Morocco
- They keep product in store less than 4 weeks which encourages ZARA fans to make repeat visit on store
- ZARA vendor code of Pacific jeans: 8228
- ZARA merchandising Manager in Pacific Jeans: A.B.M Mamunur Rahman

Pacific ZARA team work for 4 buyers:

- **ZARA**
- **Tesco**
- **Next**

- **Mango**

TESCO profile in short:

- British Retailer Company.
- 3rd largest retailer on the basis on gross revenue.
- 9th largest retailer on the basis on revenue.
- Founded in 1924, Hackney, London, England
- Founder : Jack Cohen (Poland)
- Total shop: 6553 (2017)
- Non-Executive Chairman : John Allan
- Group CEO: Dave Lewis
- Revenue: £55.9 billion
- Operating income: £1280 million
- Net income: £54 million
- Total employees: 476000
- Named from: Thomas Edward Stockwell (TES)
  Jack Cohen (CO)
- Website : www.tescopic.com

NEXT profile in short:

- British Retailer Company
- Founded in 1864 and first retail shop opened in 1982
- Founder: Joseph Hepworth
- Former name: J Hepworth & Son
- Total Store: 538
- Current Chairman: Michanel Roney
- CEO: Simon Wolfson
- Total employees: 49033
- Revenue: $4.097 billion
- Net Income: €635.3
- Website: www.next.co.uk

MANGO profile in short:

- Spanish clothing design company
- Founded in: 1984,catalonia,Spain
- Mango Men
- Founder: Isak Andic, Nathman Andic
- Online store open in 2000
- Total employees: 16000
- First website: 1995
- Zinedine Zidane: New face of the MANGO MAN campaign.
- Revenue: 2.26 billion euro (2015)
- Net income: 170 million euro (2015)
- Website: shop-mango.com

  Shop.mango.cpm

Meaning of MERCHANDISER

M = Managerial capacity

E = Efficient in English

R = Regular in all aspect

C = Confident

H = Honest

A = Attitude (positive)

N = Not to argue with buyer

D = Devoted to work

I = Intelligence quality

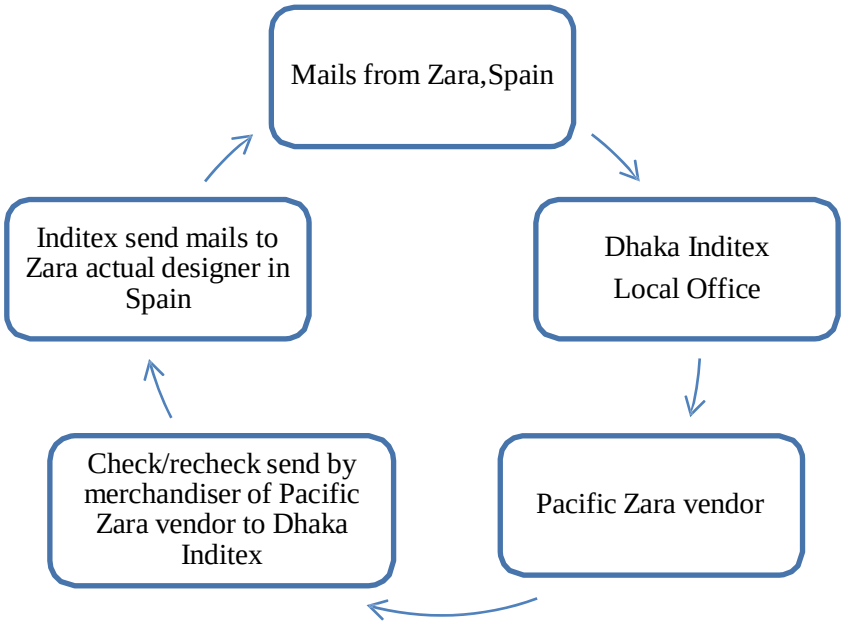
S = Sincere

E = Enthusiastic in nature

R = Regular correspondence

Activities of merchandising department (ZARA):

Zara Working procedure in Pacific



In Pacific Jeans the Merchandising Department is divided into two divisions. Here I can especially mention about ZARA as I work with ZARA team.

- One is Developing Merchandiser
- Second one is Bulk Merchandiser

Their task and responsibilities is divided as follow:

Developing Merchandiser:

- Communicate With Buyer About the Fabric & Accessories
- Sampling procedure
- Lab dip approval
- Consumption and costing
- Preparation of Purchase Order
- Taking Approval
- Pricing (CM,C&F,CIF,FOB)
- Maintain Testing Requirement

Bulk Merchandiser

- Arranging raw material for bulk production
- Sourcing
- Order follow up and execution
- Arranging final inspection
- Ensuring on time shipment

Supplier of ZARA:

Buyer nominated Fabric Suppliers

- Real tex (Turkey)
- US denim (Turkey)
- WinWin (China)
- Rijby (Pakistan)
- Navena-(Pakistan)
- Kassim (Pakistan)
- Orta (Turkey)
- Raymond (India)
- Arvind (India)

- Atlantic Mills
- Soorti (Pakistan)
- Cone Denim (USA)
- Kurabo (Japanese)
- N-Tex (Pakistan)
- Sister Denim (Bangladesh)
- Shasha Denim(Bangladesh)
- Pioneer
- DNM Textile
- Absolute Denim
- Artistic Millionaire (Pakistan)
- LNJ

Buyer nominated Trims & Accessories Suppliers

Button:

- Red Button
- Team and Tempo
- Trim Factory
- Priym
- Union

Zipper:

- YKK
- Tex

Thread:

- COATS
- AMAAN

Patch:

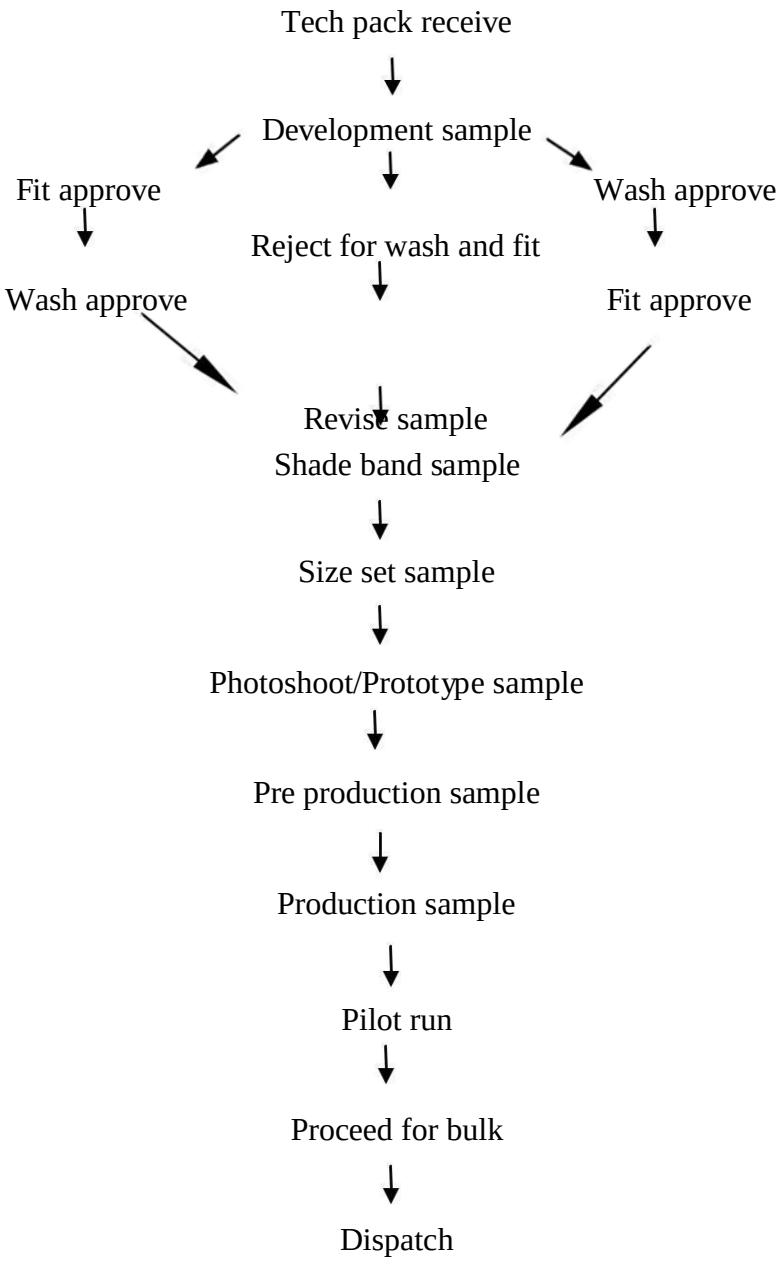
- Kassif Leather
- Tartex
- Dri Desen

Decorative motif and abolishment:

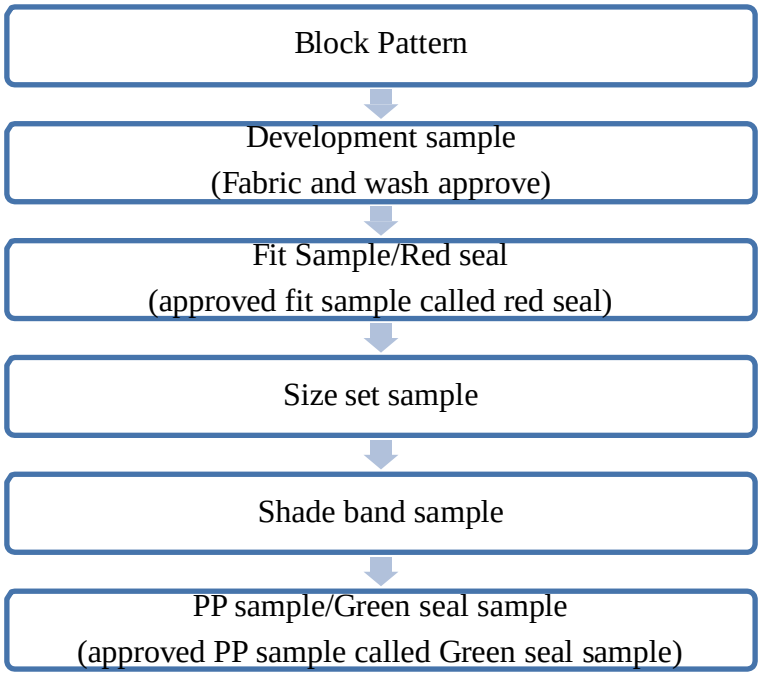
- Outsstone

Sampling Procedure of ZARA:

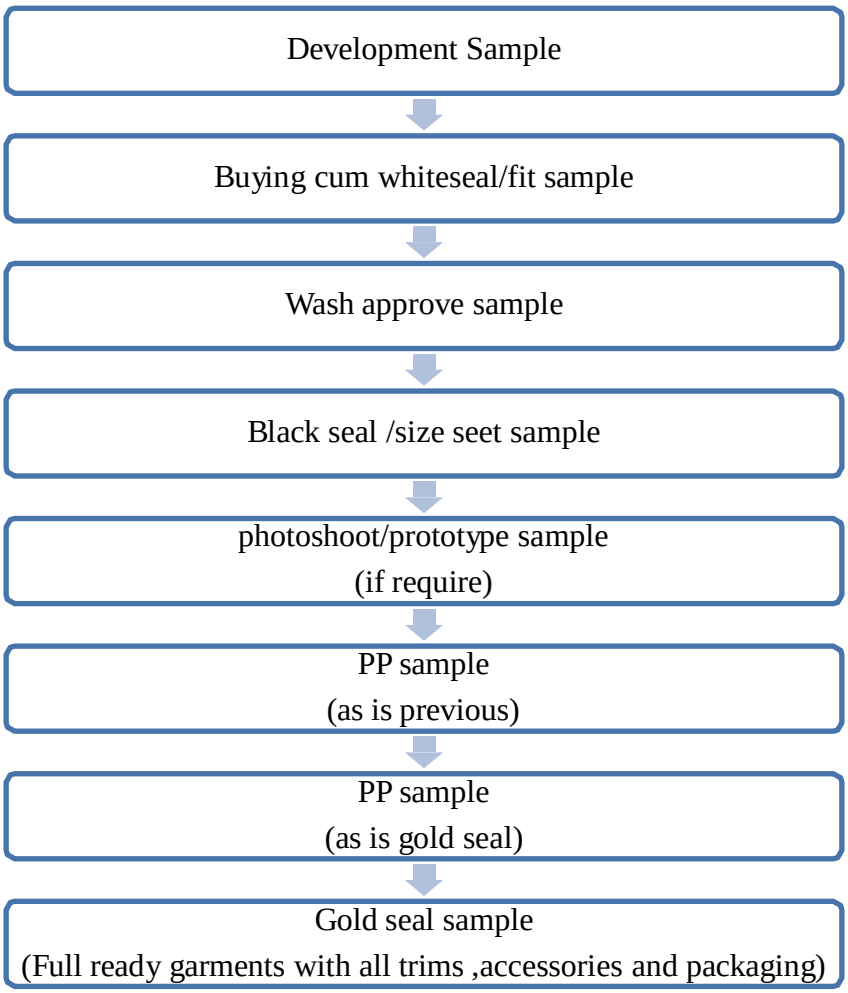
Sampling procedure described in detail in sample department. Here is sampling procedure of ZARA:



Sampling Procedure of TESCO:



Sampling Procedure of NEXT:



Some Abbreviations and short word use in Merchandising Department:

- CPS= internal data sheet
- TNA= Time and Action
- TRF= Test Requisition form
- HS code= A unique code use for every product to identify product in shipping process.
- SOP= Standard Operating Procedure
- GT= Garment Technician
- PF= Pacific File
- PJL= Use for listing of personal sourcing of fabric
- PLM= Buyer website from where tack pack and other data are downloaded
- EPI=Ends Per Inch (Warp)
- PPI= Picks Per Inch (Weft)
- TT= Telegraphic Transfer
- CC card= A swatch card of fabric shade where raw and washed swatches attach and send for buyer approve.
- Data sheet= A half garment send to buyer for approval of button, rivet, zipper and pocketing fabric.
- GSM= Gram per Square Meter.
- LC= Letter of Credit
- AQL= Acceptance Quality Level.
- PI= Proforma Invoice
- PO= Purchase Order
- POM= Point of Measure
- BOM= Bill of Material
- SKU= Stock Keeping Unit
- ASAP= As soon as possible
- BSI= Better Cotton Initiative
- EIM= Environmental Impact Measuring
- FPT= Fabric Package Testing
- GPT= Garment Package Testing

Some Important data of ZARA, TESCO, NEXT and MANGO of team ZARA:

Garment Design for:

- ZARA : Women
- TESCO : Women
- NEXT : Women
- MANGO : Men

Garment Type:

ZARA **:** Denim full, Denim Short, Skirt

TESCO **:** Denim full, Denim short, Skirt, Jacket

NEXT **:** Denim full

MANGO **:** Denim full

Season follows by buyer:

ZARA:

- AW- Autumn/Winter
- SS-Spring/Summer

TESCO:

- AW- Autumn/Winter
- SS-Spring/Summer

NEXT:

- Summer :November- January
- Spring : February- April
- Fall : May- July
- Holiday : August-October

MANGO:

- AW- Autumn/Winter
- SS-Spring/Summer
- Winter
- Summer

Some important activities of merchandiser:

Communicate With Buyer

It is the vital responsibility of a merchandiser to communicate with buyers. By the same way, internal communication is also very much valuable. As the other departments will follow the instructions given by the merchandising department, they have very high value. Other departments don't know the buyer's instructions; they know only the merchandising department's instructions. So it is the sole responsibility of merchandising department to instruct other departments the specifications and instructions of buyer's orders clearly. The merchandiser need to daily correspondent by mail with the buyer, supplier, hub merchandiser about all the order requirement for taking order to shipment.

Tack pack collection and review the packages

An order starts from the costing. Initially buyer provides packages of the product (which contains – Garments description, a sketch of garment, a measurement sheet, trims and accessories chart, wash/finish types). After receiving the packages from buyer The merchandisers of Pacific Jeans starts to review the packages to find out the following things to proceed for costing.

- What kind of fabrics need for the product. What is the cut width of fabric?
- What type of fabric will be used? What type of wash is required?
- What is the order volume?
- What is the target price from buyer?

Consumption & Costing

As soon as the development sample is proceed to the buyer the concerned merchandiser need to do the consumption and costing of the sample with all specified requirement. There are two ways to calculate the consumption of a garment:

1. Basic Formula system
2. Mini marker.

Basically merchandiser follow the mini marker for calculate consumption.

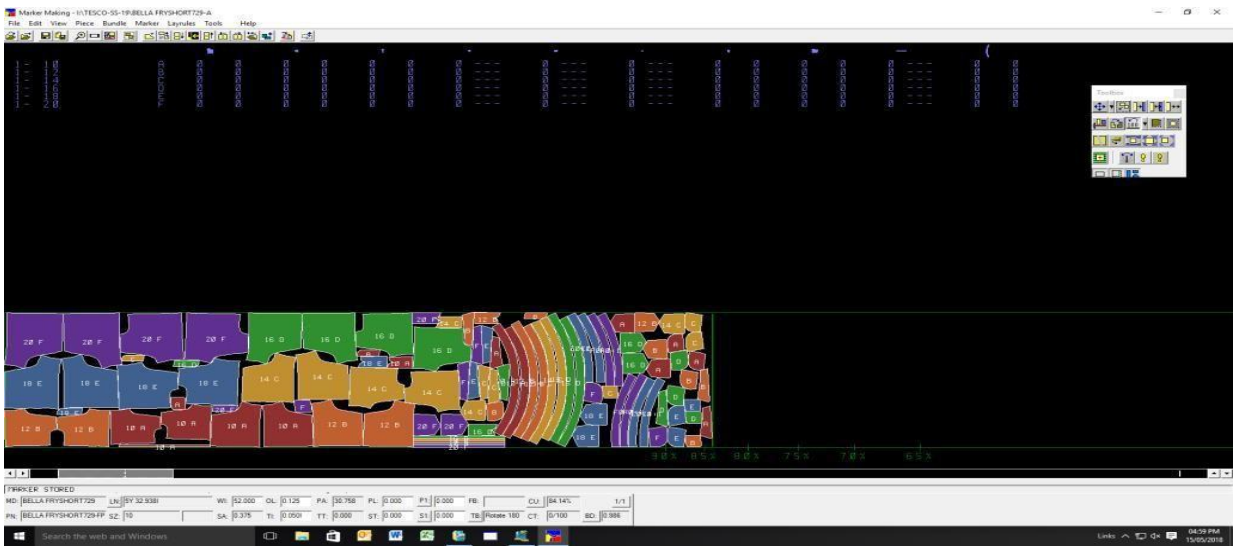
Formula For basic pant consumption is given below

Here, Body length=Bottom hem+ Inseam+ Back rise+ Waist band Width+ Allowance Body Width=1/2 thigh width+ allowance

Consumption make from mini marker:

The pattern department will provide a mini marker after the sample is prepared and washed. There will be summation of consumption for minimum 6 jumping size of a garment. For example- 6,8,10,12,14,16. From that merchandiser will calculate the consumption for a single piece of garment.

Here a example of a mini marker of TESCO‘s running development.



DATE	: 15-05-2018
BUYER	: TESCO (LADIE‘S)
STYLE	: BELLA FRAY SHORT (729YMZMZPFGD)
BLOCK	: BKTR-214
FABRIC	: 729YMZMZPFGD
FABRIC WIDTH	: 52 INCH
SHRINKAGE	: L-5%, W-25%
MARKER LENTH	: 5YDS, 32.938 INCH
SIZERATIO	: 10/1, 12/1, 14/1, 16/1, 18/1, 20/1=06 PCS
UTILIZATION	: 84.14%

Per pcs garments require = 212.938/6

=35.49 inch = 0.99 yds

Length wise shrinkage = - 5%

NOW, yds per garments is = 0.99+ 5%

=1.03 yds or o.95 mtr

Normally fabric require for garments:

- Normal 5 pocket: 1.75 yds
- Skinny: 1.50 yds
- Boot cut: 2 yds

Costing of garments:

If over is assigned then it may not be accepted by buyers. On the other hand the current prices of fabric and accessories need to update. Actually assigning price depends on style or fashion of garments. The most critical fact is analysis of cost and which is a variable factor as market is not stable. It is very sensitive. The more the garments caries fashion the more price. However, after collected potentials buyers the duty starts for merchandiser is to submit pricing of garments to buyers. In this context if the buyer is not satisfied with the given at that time it needs to communicate with buyers frequently by merchandiser If necessary merchandisers go for price negotiation. That means the first and foremost duty at that time for merchandiser is to convince buyers anyhow though it is a continuous process.

PACIFIC JEANS LTD. garments industries ltd quote its best price for its customers desired products based on the following items

Fabric price (consumption yds/ meter of x fabric's unit price per pcs)	XXX
Trims and Accessories price/ pcs	**XXX**
Finance cost / pcs	**XXX**
Cost of washing / pcs	**XXX**
Cost of Embroidery and printing / pcs	**XXX**
Cost of manufacture / pcs	**XXX**
Buying house commission / pcs	**XXX**
Total Price / pcs	**XXX**

Price Negotiation & Confirmation of order:

After making a quotation for a order that means CM calculation merchandiser will submit the pricing to the buyer for their approval. If any deviation arises then they go for negotiation. Throughout negotiation they reach to a decision. That is why it is most important. Then by finishing negotiation regards costing the confirmation of the order will be given by the buyer. For TESCO buyer as soon as the order confirmed the buyer will give a OC or order confirmation letter. All types of information except the size wise quantity is mentioned in a OC. After getting the OC merchandiser can go for preparation of bulk. After the order is confirmed from then the responsibilities of a bulk merchandiser is start. In the mean time the development merchandiser will send the required sample as Fit, PP etc.

Time and Action planning:

To gain the productivity planning is the key to attain so. Success is the factor of time. As we know planning is the first function of management. Each and every activity will be carried based on planning. Here also no exception. A plan is designed for performing actions with respect to bounded time to achieve the ultimate target.

Testing of Fabric and send to buyer:

The merchandiser will need to send the sample fabric for testing to nominated testing lab or service which is Intertek Textile Service (ITS) for TESCO. After testing they will give the testing report of sample fabric and then it need to submit the buyer and confirm the approval. Testing of fabric include: Tearing, Tensile, Durability test Color fastness test,Dry rub testing etc Here is a Test Requisition Form or TRF is attached which is submitted by my senior during my instance

Sourcing for raw material:

For the costing, merchandisers source the raw materials at lower cost in best quality from the reliable suppliers. Now a day‘s costing is very much competitive due to open market. So, during the sourcing period merchandisers provide his best attention and apply his/her best effort. Merchandisers of Pacific Jeans Follow the same techniques or process in sourcing management.

Fabric booking:

First and foremost duty is to give booking for the bulk fabric which can be buyer nominated or factory sourcing. The fabric we can order before receiving PO if the buyer is confirm that. The booking date of fabric is called ―Griege Date‖ . The fabric supplier will give PI against our order. It can take 50-60 days for in housing the bulk fabric cause it need time to manufacture the fabric according to our requirement.

Trims and Accessories booking:

Button ,rivet, label, zipper etc merchandiser can inhouse easily because of their delivery time It maximum take 2-3 weeks for arrival after booking. So these will be booking after receiving PO.

Thread , Lining, Interlining booking:

In Pacific Jeans the thread, lining and interlining is ordered by supply chain. Merchandiser need to give them the required quantity or consumption.

Receiving PO from Buyer:

In the mean time buyer will provide the Purchase Order or PO to the concerned merchandiser. In a PO all Buyer specification, Supplier Details, Size Breakdown, Terms & condition, Transit, Product description, Shipment details that means overall everything about a order is mentioned.

Trim card making and approval:

A card that is prepared by merchandiser and sent it to buyer for his approval regarding fabric, accessories, thread, print etc. The major objective of using this card is to be clear and to inform merchandiser that I have such types of accessories, fabrics, embroidery and so on. If these meet your requirements then tell me as to production or bulk. There is a question phase in this regard that if you have any query or rectification it must be informed in written form that where to rectify and what to do for color.

Arrange PP meeting:

Pre production meeting is a very important for execution of a order. This is also called ―Risk Analysis‖ meeting. If a PP meeting goes properly with all of the requirements surely everyone will feel happy as soon as bulk is finished. No one will have the opportunities to blame other if error goes during bulk production because things are discussed with everyone.

Importance of a pp meeting:

- Everyone understands about production process.
- Misunderstanding on product or any other issue can be clarified.
- Critical path is communicated and explained
- Liaison between buying and factory people
- Group discussion
- Strong relationship can be built up.

The person who attend the PP meeting:

- Supplier merchandiser
- Supplier Technologist
- Factory manager
- Cutting in-charge
- Sewing in-charge
- Finishing in-charge

Master L/C checking procedure & important items should be included in Master L/C

A documentary Master L/C is an orderly payment security instrument offering high quality payment security to a business transaction for both parties the seller and buyer. The seller will receive payment for his goods if he meets all conditions prescribed by the letter of credit. Without Master L/C opening the order won‟ t be confirmed. So its carry more value than other documents in export and import business. Master L/C ,Check list items and those items must be included in this L/C.

- Types of L/C.
- Issue date.
- Expiry date.
- Issuing bank details.
- Master.L/C must be declared by UCP version

Start Bulk Production:

When all the raw material is in housed, risk are properly analyzed, then go for bulk production. Prior that, trial cutting and pilot runs is mandatory to fulfill and the pilot sample need to send to the buyer. Merchandising department monitor the garment preparation procedure such as cutting, sewing, washing, if washed garment, finishing and make sure that the shipment will be on time. If any problem arise for which the shipment could be delay merchandising department mail it to the buyer and try to convince them otherwise the factory has to pay some extra money, which is not expected.

Bulk Shade Band:

In the meantime after wash blanket process where the color groups within bulk rolls are determined need to be submitted for each color group for approval to Hub fabric technologist.Washed legs are showing the main, lightest and darkest color variation of bulk fabric. Each shade has to include the information how many pieces it is representing.

Order follow-up and execution:

They do it during running the production. As a result if any fault occurring it rectified in the primary stage.

Packing List Approval:

Merchandiser need to collect packing list from finishing department, then send it to buyer and get approval as their mentioned requirement.

Arranging final inspection:

After completion the garment making merchandiser arrange final inspection date with quality department. Inspection is also depending on the wishes of buyer.

Ensuring on time shipment:

Once the inspection is done and the goods found ok for shipment, then the goods handed over to the clearing and forwarding agent for on time shipment.

Chapter: 6

Research and Development Department (R&D)

R&D Department in Pacific jeans

Introduction:

Research & Product development department is an important department for any textile industry. This plays a direct role on developing a product. Pacific jeans Ltd. has also a Research & Development (R&D) department with modern amenities which correlates very well with the upcoming new product. Continuous research programmed is carried-on here, which is completed by product development.

The R&D department is independent and equipped to promptly invent new designs for new fashion and develop buyer‘s requirements timely. This department keeps all documents from dyeing recipe to fabric construction and keeps master roll to keep shade in same consistent even over a longer discontinuity. Pacific always researches to develop new fashion as per the world requirement as well as to maintain comfort & durability.

Most often this department creates new product on the basis of new design & structure by their own creativity according to the current market demand and then give it to the buyer. If this design is approved by the buyer then it is stored. They already developed over 4500 samples.

When an order comes from buyer in form of washed sample. The technical person determines theshade percentage, amount and type of washing to that fabric to get the appearance like the sample. So it is very important to wash the sample fabric to justify his assumption. For this purpose a small washing unit is established in the factory.

Every order firstly comes into R&D department via marketing peoples by mail or swatch. The R&D experts analyze these samples and match it with their developed samples. If they find similar sample then this is sent to buyers for approve. If buyers approve it then the R&D section goes for production.

In Pacific Jeans LTD. R&D department has two parts:

1. Garments Dyeing
2. Garments Washing

Garments Dyeing:

The process of dyeing fully made apparel product like t-shirts , pants , trousers , shirts , jackets, tops, pullovers , dresses and bottoms is called garments dyeing. In Conventional method, Garments are made with pre-dyed fabrics and then cutting and sewing. But now grey fabrics are dyed in required color after manufacturing. It has become popular in recent days due to cost saving and fashion trends. Also it is capable to react much closer to actual market demand if the apparel is post dyed which reduces lead time and increases forecasting accuracy.

Advantages of garments dyeing:

1. Lower cost needed
2. Less time needed
3. Less shade variations occurs
4. Flexible lot size
5. Old garments can be re-dyed
6. Lower initial investment
7. Lower liquor ratio
8. Desizing , Scouring , Bleaching can be done in same machine
9. Capable to react with fast changing market trends
10. Fancy effects can be obtained
11. Lower inventory
12. omparatively lower rejection rate

Disadvantages of garments dyeing:

1. High cost of processing
2. More material handling
3. Special care for selection of interlining
4. Higher seconds rate in production
5. Labor intensive process
6. Requires full checking of all pieces

Types of garment dyeing:

1. Reactive dye
2. Direct dye
3. Vat dye
4. Sulfur dye
5. Pigment dye

Working Flow Chart of Garments Dyeing:

Batching Pre-treatment
⇩
Dyeing
⇩
Sample check
⇩
Hydro Extraction
⇩
Drying
⇩
Quality Control
⇩
Storage

Garments Dyeing Using Different Dyes:

Reactive dye:

Reactive dye is only dye that reacts with the textile fibre & makes covalent with fibre. Under the suitable condition it reacts with –OH or $–NH_2$ fibre & form covalent dye substrate linkage.

$DYE\text{-}SO_2\text{-}CH_2\text{-}OSO_3Na + HO\text{-}Cell \text{——} D\text{-}SO_2\text{-}CH_2\text{-}CH_2\text{-}O\text{-}Cell + NaHSO_3$

This is mostly used in garments dyeing. To produce light shade on garments , Dye added to the solution first then salt is added but if dark shade needed then salt is added first then dye added into the solution.If 5% or more dye is used into the solution then caustic is added into the solution.

Process flow chart of reactive dyeing:

Raw garments loading

⇩

Water added (M:L = 1:40)

⇩

Desizing (detergent 1 g/L) 60^{o}c , 10 min

⇩

Rinse 1X

⇩

Adding sequestering agent (1 g/L) Room temp. , 5min

⇩

Adding leveling agent (1 g/L) Room temp. , 5min

⇩

Adding globar salt (45 g/L) Room temp. , 5min

⇩

Adding Reactive dye

⇩

(reactoband orange .60% , Reactoband black 8%) 60^{o}c , 5 min

⇩

Adding soda ash (20 g/L) 60^{o}c ,10 min

⇩

Adding caustic soda (.5 g/L) 60^{o}c , 50 min

⇩

Rinse 1X

⇩

Neutralization (Citric Acid 1 g/L)

⇩

Rinse 1X

⇩

Adding Fixing agent (5 g/L)

⇩

Drain

⇩

Acid Enzyme wash

⇩

(Ph 4.5 , acetic acid .5 g/L , 45^{o}c, 15 min)

⇩

Rinse 2x

⇩

Softening (10 g/L) 10 min

⇩

Hydroextraction

⇩

Drying

Direct dye:

Direct dye is mosly used because it reacts directly with the fibre and it can be done on both hot and cool process. Washfastness of those color is less that why is done when washing is done after dyeing.

Process flow chart of reactive dyeing:

Raw garments loading

⇩

Water added (M:L = 1:40)

⇩

Desizing (detergent 1 g/L) 60^{o}c , 10 min

⇩

Rinse 1X

⇩

Acid Enzyme wash

⇩

(Ph 4.5 , acetic acid .5 g/L , 45^{o}c, 15 min)

⇩

Rinse 2X

⇩

Adding Direct dye ,60^{o}c , 5 min

⇩

Adding Globar salt (10 g/L) 60^{o}c ,10 min

⇩

Rinse 2X

⇩

Adding Fixing agent (5 g/L)

⇩

Drain

⇩

Softening (10 g/L) 5 min

⇩

Hydro-extraction

⇩

Drying

Sulfur Dye:

Sulfur dyes are complex heterocyclic molecules or mixtures formed by melting or boiling organic compounds containing amino or nitro groups with Na-polysulphide and Sulpher. Sulpher dyes are so called as they all contain Sulpher linkage within their molecules. Sulpher dyes are highly coloured, water insoluble compounds and have to be converted in to water soluble substantive forms (lucoforms) before application to the textile materials.

Process flow chart of Sufur dyeing:

Raw garments loading

⇩

Water added (M:L = 1:40)

⇩

Desizing (detergent 1 g/L) 60^{o}c, 10 min

⇩

Rinse 2X

⇩

Adding Na-supplied, 100^{0}c, 10 min

⇩

Adding global salt (45 g/L) 20 min

⇩

Adding Sulfur black, 100^{o}c, 10 min

⇩

Rinse 2X

⇩

Adding Fixing agent (H_2O_2 + Acetic acid 1g/L)

⇩

Rinse 2x

⇩

Softening (10 g/L) 50^{o}c, 5 min

⇩

Hydro extraction

⇩

Drying

Pigment dye:

Pigment dyeing is not dyeing in the real sense as the pigment sticks on the fabric because of the binders. The pigments are insoluble in the water. It create very bright shades on the garments.

Process flow chart of Pigment dyeing:

Raw garments loading

⇩

Water added (M: L = 1:40)

⇩

Desizing (detergent 1 g/L) 60^{o}c, 10 min

⇩

Rinse 1X

⇩

Cationization

⇩

(Caustic soda 2 g/L, 50^{o}c, 10 min, ph = 8.5, catanizer 4% – prefix k, 10, min)

⇩

Rinse 2X

⇩

Adding Pigment dye ,65^{o}c , 30 min

⇩

(Orange 1% , Red 3%)

⇩

Adding Binder (3 g/L) 60^{o}c ,5 min

⇩

Rinse 1X

⇩

Hydro extraction

⇩

Drying

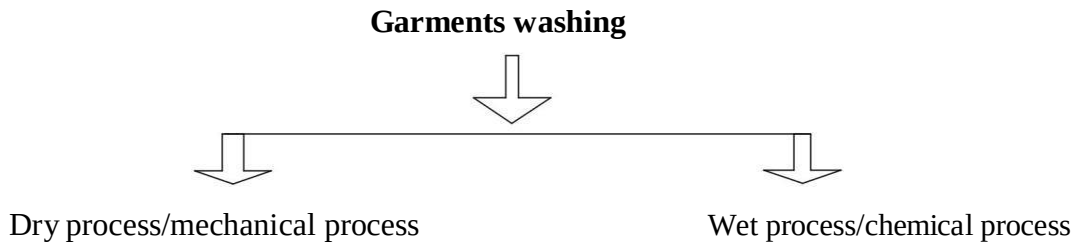
Garment Washing:

Washing is a method of cleaning, usually with water and often some kind of chemical. Generally it is limited to short household activates i.e. cleaning. But in textile world it carries a wide meaning. The technology which is used to modify the appearance, outlook comfortable and fashion of the garments is called garment washing**.** So, now- a-days washing plays a vital role in the textile sector. Washing is aesthetic finish given to the fabric to enhance the demand and to provide strength. It is the process which makes the garments more attractive and unique look. Depending on garments construction different types of washing process can be done.

- Twill / canvas/ knitted - Normal, pigment, caustic, Silicon wash.
- Denim /jeans/gabardine - Enzyme / stone / bleach /acid wash.
- Grey fabric - Super white wash.

Types of garments washing:

Denim (garments) washing consists of two types-



Dry process:

This is a process which is introduced at the dry condition of the denim garments, is called **Dry** process. It is a decorative process; some steps of this process are done before washing and some others after washing. Now-a-days some of the Dry processes are applied on the TWILL garments also.

Application process can be done classified in two ways:

- MANUAL (Example: Whisker, Scraping, etc)
- Using Machine (Example: Laser Whisker).

Different types of dry process:

The scope of denim dry process is very broad. Only innovative products will be able to open up new markets and new horizons for denim industry. To achieve this it is essential to invest in further research and development. The sequences are flexible according to the process accomplishment idea.

- Whisker
- Scraping /Hand sand
- Busted seam/ Fusing
- blow out
- Grinding
- Destroy
- Tagging / Tacking
- 3DWrinkle
- Potassium per menganate spray (p.p. spray)
- PP sponging
- Resin sponging
- Pocket marking
- Center Crease
- Pigment spray /tint spray
- P.p. spot
- Resin spot
- Heat pressing
- Master seam
- Seam marking
- Tie effect
- Patch and repairs along with bleach etc.

Details of Dry Process:

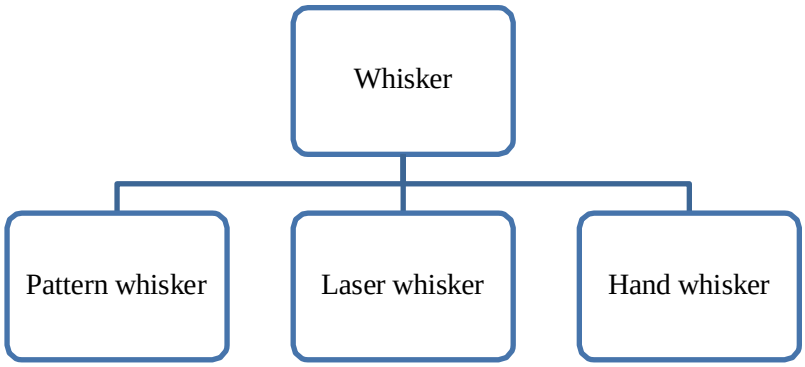
Whisker / Moustaches:

This is the most important decorative process for denim garments. This is usually done for looking denim older due to rough uses. Whiskering or Hige refers to thin fading lines formed from creases that are usually found on the front pocket area of jeans.

The parts can be described as following:

- Moustaches
- Chevron
- Knee Star
- Back Side Knee Which

Whiskering Process can be done by three ways:



The adoption of the process is very on the buyer requirement, design, cost, composition of the garments, and flexibility of accomplishment. Although there is no fixed recommendations in case of giving whisker effect on garment body at where and which parts should get whiskers.

The pickings up % of drying material or fibers as well as shade % are completely supervised with the human eyes. There are no recommend machines in testing it.

Pattern whisker:

The Whiskering effect which is given by pattern on the garment is called Pattern Whisker. This process is very tricky and less time consuming process than Hand Whiskering.

Required Equipment:

1. Whisker Machine(2 Legs)
2. Abrasive Paper / Emery Paper (320P)
3. Pattern(Made of Rubber)
4. Tap

The approved design of the whisker is taken on a paper with skill pattern designer, and then the design is transferred to the pattern. The pattern is then set on the whisker pattern machine carefully measuring according to the require place on the garment. Then the denim body is put on the pattern, with the abrasive paper rubbing is done carefully on the specific area. As the pattern is designed with some high and some low places, the Whiskering effect is visible due to high places of pattern. So in description, when the abrasive paper is used, the high places get rubbed and that area becomes light. But the lower places did not receive rubbing effect. A chronological light-deep shade occurred, so it is called whisker.

- At this operation, the seam much be protected by taping
- The 320P Abrasive Paper must be used
- Applied force on the body must be done carefully
- GSM, Composition of the garment must be keep in mind

Hand whisker:

The whisker effect is imposed on the denim garment with help of hand, so this is called HAND Whisker.

Required Equipment:

- Whisker Machine
- Wood Stick
- Emery paper rolled on fine wood stick

Scraping:

This is the most important dry process which applied on the garment surface with help of specific abrasive paper. The process at which garment's surface is rubbed at different parts with help of Abrasive / Emery paper is called SCRAPING.

Required Equipment:

- Bladder/ Dummy
- Scraping Paper/Abrasive paper/ Emery Paper
- Chalk

The scraping process begins with marking according to desire design, then the garment place on the bladder/ dummy. Skilled worker rubes the surface carefully according to the design under supervision which is completely manages by keeping knowledge in specification of garment, GSM, and composition. The main purpose of this process is bringing natural fading effect. Technical side is that denim garments are produced from rugged cotton and also have more twisted yarn. So indigo or sulphur dyes can‘t enter into the inner portion of the yarn and rather attached on the surface of the yarn. Due to scraping, only remove the color from specific rubbed area to bring fading effect.

Classification of scraping effect based on following criteria:

1. Types of slub require
2. Types of fabric
3. Strength of the fabric
4. Require productivity
5. Intensity of blasting area etc

Fig: Marked Scraping Area

Locations can be front thigh & back seat or its can be overall / global application as per Standard. Hand scraping must be started from intense part and feathering out on less intense part gradually. Maximum rubbing effect is given at the central portion and the medium is given beside the maximum light area, and then the dark area.

Abrasive Paper:

There are different types of abrasive papers based on abrasion power. This paper is made by SILICON CARBIDE and the grading is done based on hardness.

Lower the Grade, Higher the Hardness.

Abrasive paper	Hardness	Appropriate fabric
220 paper	Maximum hard paper	
320 paper	Less harder than 220 paper	Hard fabric
400 paper 1. 400 harsh 2. 400 smooth	Less harder than 320 paper	Medium hard
500 paper	Soft paper than 400	Soft fabric
800+1000	Maximum soft paper	Subtle blasting

LASER Scraping:

Scraping effect also can be given using laser machine, according to design the scraping effect can be impose on the garment surface. But it does not give natural worn out look and moisture content property also decreases.

- The strength of the garments also become low
- Do not give natural worn out look.

Busted seam/ Fusing:

Due to two plies (Front & Back Side), when attached with each other by stitching, after washing the parts can be fluctuated and can create problem of wearing.

Required Equipment:

- Busted Machine
- Fusing paper(Non-woven Fabric)

At first, the garments are reverse and the inner side of the Side seam is ironed presses. A fusing paper is place on the inner portion of Side seam then using busted machine; the steam pressure is given at 130^{o}C temperature for 8 to 10 seconds. After washing, the fusing paper is removed and inner side remains plain with Side seam.

Blow out:

Blowout is a process which is done by pen blow out m/c for decorative purposes. In this process pattern of different design is made. Then this pattern is marking on the grinding areas in the garments with the help of chalk. By doing all these the grinding area on the garment is become visible .then slightly attached this machine with the garments and slowly remove surface yarn.

Required equipments:

- Pen Grinding Machine

Process of blow out:

At first, the garments need to give make at which grinding effects are required, with slightly attaching pen grinding machine only blowout little amount of fibers, but do not tear off any yarns completely. That‘s means affected only color warp yarns.

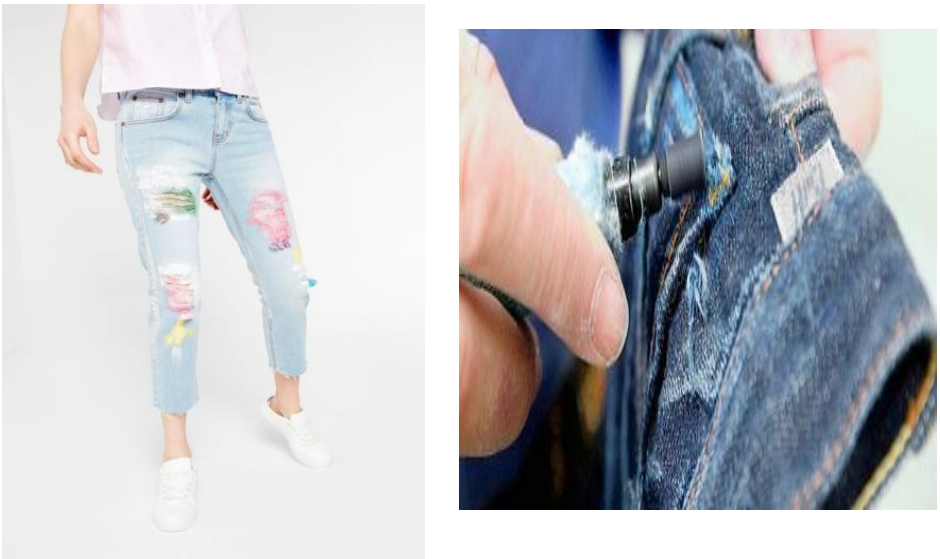


Fig: blow out machine

Destruction:

One of the most popular distressing effects currently, _Destruction‘ is an art which make denim look unique & used. This process is helped to create a worn out look only destroying and removing blue/ colored warp yarn without damaging colorless/white weft yarns. It can be achieved by cutting it through knife the warp yarns & keep the weft yarn as is to show white thread. Holes also can be made by cutting weft & warp yarns. These are all manual processes & every garment will look unique & different than others.

Required equipments -

- Destruction machine
- Emery Cloth.
- Hacksaw Blade.
- Needle.
- Knife etc.
- Air Die Grinder

Fig: destruction process

Heat pressing:

Heat pressing is used to give permanents pleats of the garments.

Required chemicals & equipments:

- Resin solution
- Spray machine
- Iron

At specific area resin spray on it, the pressing operation is done by the heat press. As a result subjected garments receive a permanent pleats area.

Tagging /Tacking:

Tacking or more commonly tag pinning is a very in fashion style in denim garment in these days. In this process the effect is created by swift tag machines with the help of plastic or nylon tag pins in rigid form of garment to get contrast.

Usually tag pin machines are used to attach tag pins to garment. The procedure is very simple and proceeds as; garment is folded on required area and tacked through folds. Number of folds can be two to four or five in regular in tacking. These tag guns are not especially designed for heavy folds like we do in tacking so durability of the gun is a consistent problem. Also broken needles of tag gun are issue for both operator and consumer. Automated tacking machines are used more successfully in some units. These machines are bit expensive but are far more efficient and secure than tag guns.

Picture: Tacking or Tag Pinning

Garment is folded on specified areas and the fold is locked by tag pins. Now the garment is processed in washer and a permanent fold appears after removal of tag pin. This is important that tag pin is removed when the garment is dried completely. The inner of the fold is dark in shade due to less exposure to mechanical rubbing and chemicals. Variation is provided by using different lengths of tag pins varying from 05 mm to 15 mm. This range of length is more commonly used in industry.

It is recommended some time to pull off the tag pins before softening process. This help to prevent the pin holes but by doing so garment loses the folding effect after drying and only contrast remains. If folding effect is also required along with shade contrast then pins must remain attached till garment is dried off.

Purpose of process:

- Very heavy contrast get at:
  1. Waistband,
  2. Bottom hems,
  3. Back pocket &
  4. Front pocket corners
  5. Out seam etc
- A good light-deep effect appears

Wrinkle/ 3D/Baking:

Wrinkle is another type of dry process. It is same as crinkle but the basic technical is that in 3D, the specific area are crinkle by clip after resin spray and done curing at 150c at oven. So, that there is no uneven shade or mark under the crinkle. But in wrinkle, the crinkles are done chronologically by layers and give heat press by iron. When it is cured in oven, then the covered place under the crinkle does not heated. So, that specific area, color remains dark and show black mark through the crinkle.

Overall wrinkle process:

Generally overall wrinkle is doing on garment after all types of wet process and dry process .It is done on the garment made from all types of fabric like Denim, Twill, Canvas, Poplin, Polyester, Viscose and Nylon etc.

Working procedure:

- First tie the whole garment in tight position by thread.
- For overall wrinkle, we are used resin in washing machine with water and run tied garments for 5 to 10 minutes at 50° C temperatures.
- Then unload the garments from washing machine sent to hydro-extractor .
- Open the tie or cut the thread.
- Now hang the garments in to the hanger trolley.
- Then put it inside the industrial oven.
- Set temperature 140C to 160C, time 50-70 minutes.
- After heating time over garments with hanger will stay 10 minutes for cold in oven.

Permanent wrinkle process:

Permanent wrinkle is doing on garments after all types of wet process wash in dry position. This process is done on the garments made from all types of fabrics like, Denim, Twill, Canvas, Poplin, Corduroy, knit and Polyester etc.

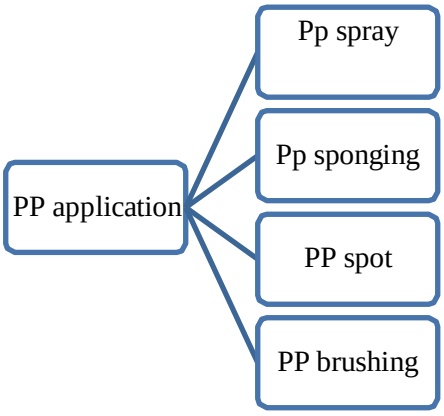
Fig: permanent wrinkle

Working procedure:

- For permanent wrinkle we are use resin which is spray on garments particular/ specific area by nozzle.
- Resin is diluted with water which is recommended by chemical supplier, generally 20% resin and 80% water.
- After resin spray on respective area , then fold by buyer demand and clip attached upon the folding area.
- Now hangers the garment in to the hanger trolley.
- Then trolley with resin treatment garments put inside the industrial oven.
- Set temperature 140C to 160C, time 20-40 minutes .
- After heating time over garments with hangers will stay 10 minutes for cold in oven.

Pp application:

Full meaning of PP is Potassium Permanganate. The application of PP is vast and here Engineering is hidden. It is used on fabrics to give bright effect on the scraping area.



Pp spray:

Required equipments:

- SPRAY booths with rubber dummies
- PP SPRAY gun

Before PP Spray process, the garment must be rubbed (Scraping) where PP solution is required to apply. This process is added to increase the effect of Hand Scraping. The garments are put on the dummies which is located in Spray Booth. With the PP Spray Gun, the PP solution is applied on the scraped areas. The intensity of the lightness or shade controlled with the percentage (%) of solution and amount of solution. Due to application of PP, the applied portions become pink in color.

PP solution formula:

Pp solution= $KMnO_4$+ H_3PO_4+H_2O

Example:

1% pp stock solution= (H_2O=4L) + ($KMnO_4$=40gm) + (H_3PO_4=40gm)

2% pp stock solution= (H_2O=4L) + ($KMnO_4$=80gm) + (H_3PO_4=80gm)

3% pp stock solution= (H_2O=4L) + ($KMnO_4$=120gm) + (H_3PO_4=120gm)

So, 1% solution=10 gm pp+ 10ml H_3PO_4+ 1 L H_2O

2% solution=20 gm pp+ 20ml H_3PO_4+1 L H_2O

3% solution=30 gm pp+ 30ml H_3PO_4+1 L H_2O

Some variables in PP spray process are following:

1. Distance between SPRAY gun to Garments:

More Distance	Mild and Merged effect
Less Distance	Defined and Sharp effect
Distance range from	1 feet to 2.5 feet

2. Concentration of PP solution:

If concentration of pp solution or % is less, then have to spray heavily and more number of spray required.

3. Air to Water ratio of gun:

High Air pressure	Less brightening effect, due to less $KMNO_4$ drops
Low Air Pressure	Bright white effect, due to more $KMNO_4$ drops

4. Dyes materials:

For indigo dyed fabric requires low concentration PP solution

For Black Sulphur dyed fabric requires high concentration PP solution and multiple spray operations require.

Picture: Before PP Spray and After PP Spray Denim

Neutralization:

Sodium Meta bi carbonate () is mostly used neutralizer

PP sponging:

Required equipments:

- Dummies / bladders
- Towel/ Fabric pcs/ Foam

PP SPONGING is done manually, foam / towel/ Fabric Pcs is wetted with pp solution and applied on the hand scraping area/ blasted area of the garment by hand. Due to pp solution the applied area become pink and after neutralization fading affect appears. At the application time, dark area, feathering area and light area should be done carefully so that the garment looks naturally worn out.

PP spot:

The PP solution is make some spots on the garment according to the design or desire areas, the applied pp spots become pink but after neutralizing the spots become white.

PP brush:

Required equipments:

- Paint Brush
- Dummies/ bladders

Before using the paint brushes, according to the required style or producing new style brushes hairs cut off in different shapes. Then the Hand scraped / blasted area is brushed with PP solution.

- With this PP application process, a different looks appear such as smoky effect, foggy effect with dark washed I contrast.
- Must be neutralized after PP brushing Process.

Seam marking:

Side seam marking is done to get the seam marking effect at side seam point by scraping .this effect we found after wash complete a marking is come at side seam and looking nice. Care should be taken .so that there is no crease mark on fabric and no sewing thread damage

Pigment spray and tint spray:

Pigment spray is the process by which we will get uneven color look at garments surface. First, we complete the wash process according to recipe. Then we spray the pigment or the garments surface. We make the pigment solution by pigment dye, binder &liquid. After spray, the garments will sent to over for curing. After over, this color will fix and we get a good look. Pigment should be sprayed carefully. On the other hand, tint spray is done for another purpose. Tint is a direct dye which is used for partial dyeing. Sometimes, there is a cast problem or blasting problem. When wash problem occur, then cast become light. That time tint is sprayed to get the desired cast according to sample. Sometimes, the blasting area faces problem. When the intensity of blasting area is more, then tint is sprayed to reduce the blasting intensity.

Resin application:

Resin is highly efficient chemical which is found in liquid form of polymer. It is based on etherified Dimethylol glyoxal monoureine urea. It is used in denim for the creation of semi permanent creases in denim & other cellolosic fabric.

Types of Resin:

1. Pre-catalyst Resin
2. Post-catalyst Resin

1. Pre-catalyst Resin:

- Can apply directly on the garments
- No needs of Binder or Catalyst
- At 150 ^{o}C the reaction process is taken place in amorphous resign of cellulose.
- Resins being cures in acidic P^{H}.
- The process is done in 3D-machine, Spraying

Uses:

- To make wrinkles & creases to look natural vintage this stays after multiple home laundries.

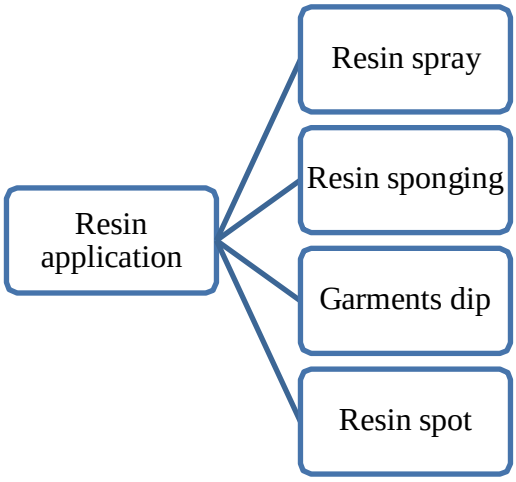
2. Post-catalyst Resin:

- Can apply directly on the garments

- Needs mixture of Binder and Catalyst
- The process is applied in washing machine

Uses:

- To increase fabric weight
- It is used for making 3D wrinkle
- To hard the fabric and to control shrinkage



Resin spray:

This Resin Spraying process can be done in two ways

1. Tumble machine (Enclose Rotational Machine)
2. Spray Booth

Resin Spraying is done in controlling ways, so the amount of Resin spray is measured by microprocessor. This device controls

- Rotational Time
- Wet Pick-up%
- Spray rate
- Process time

Resin spot:

The process at which spot in found according to design on the garment.

Objective:

- Gives an unique look

Chemicals used for resin spot:

- Resin
- Binder
- Water

The unwashed garments are taken and according to design fall resin spot on the garment surface. Then the garments sent to oven in purpose of curing, after washing process is done.

Tie effect

This process is simple but the results to marvelous looks. Garments are wrapped around in a definite fold and tied by cotton strips and washed with stones. The exposed portion gets faded effect and a pattern of dark light patches appear on garments. More beauty is added when the edges made by this to get prominent in form of white lines made by mechanical rubbing offered by wash. Tie dye are three types. They ere

1. Net tie
2. Rope tie
3. Twist tie

Center Crease

Centre crease is the dry process which shows the crease mark at middle side of front and back .this process is done by putting a pattern inside the garments .then making the crease by abrasive paper .After wash, we can see this special mark .pattern should be placed carefully. Otherwise, straight line effect will not come**.**

Pocket marking

Pocket mark is done by scraping to the inside lining visible. By this process we can follow when you wear garments .It means that you used this garments so many times and for that reason we can see the pocket lining mark but this is happened by hand scraping .The technical part of this process is that the shade inside the pocket and the upper part of the same portion should be same and it should be done with care .So that there is no grinding on pocket edge and no damage of sewing thread.

Wet process:

The process which is done on the wet condition of garments with the help of chemicals and machines is called wet process. It is a play of chemical reaction and the main function of wet process is to focus the beauty denim and make the garments more attractive. Different types of chemical are used to bring out the desired shade. Without wet process dry process does not make denim attractive. So it is very important process for denim.

Some wet processing in Denim Washing:

- Pre treatment (Desizing)
- Enzyme / Stone wash /enzyme stone wash.
- Bio-polishing
- Bleaching
- Neutralization
- Tinting / Over Dyeing
- Softening & Much more.

Pre treatment:

Pretreatment is the first wet process treatment done on denim wash. Good Pre treatments avoid streaking, stiffness & color loss. This process removes impurities, starch & stains during handling of fabric. This step is also called desizing (removal of size material).There are many types of sizes available in the market but they can be divided in two major groups.

1. Water Soluble (CMC or PVA based sizes)
2. Dissolvable sizes in water (Starch based). Starch based sizes are most commonly used due to cheap prices & readily availability.

Desizing:

The process by which the sizing material (starch) are removed from textile material is known as desizing . During weaving the warp yarns are subjected to considerable stress and strain due to fast moving reed and other machine parts. In order to prevent the end breakages, the warp yarns are coated with a film of starch There are various methods of desizing. Traditional desizing is carried out with acid, alkali or oxidative desizing agents. However, these chemicals having some limitations and disadvantages. The cellulose material may be damaged and loses strength with

these chemical treatments. With the introduction of desizing with enzymes (amylases), the limitation of traditional desizing process has been removed. Conventional desizing degrades the cellulose which is not occur in case of enzymatic desizing. Which is carried out a biological degradation process of starch, transforming it into soluble by products which can be then eliminated by washing.

Some common problem occurs during desizing:

- Incomplete desizing
- Uneven desizind in width ways
- Uneven desizing in length ways
- Uneven desizing in random

Enzyme:

Enzymes are naturally occurring proteins capable of catalyzing specific chemical reaction and facilitating the reaction without being consumed. It is kind of protein that is obtained from fermentations method from naturally existing bacteria & fungi. The structure of Enzyme is a biological polymer and it can be found in every cell. Generally called as Cellulase & it works on cotton (Cellulosic fiber) only.

Enzymes are living organisms which will attack a specific molecular group.During enzyme wash, it hydrolysis the cellulose, at first it attacks the having projecting fibre and hydrolyzed them. Than it attack the yarn portion inside fabric and partly hydrolyzed the yarn portion and fadded affect is produced. Any Cellulase used in process must be cleaned/killed after the process completion by simply disturbing the parameters ie. By raising high temp. Or raising pH to alkaline where no Cellulase withstands

Enzymes are very sensitive with parameters in washing cycle i.e, pH, Temperature & time. If any of these parameters are not up to the mark, result will not be accurate. The reaction of enzyme can be easily controlled, its biodegradable products, so they eco friendly.Bio Polishing Cellulase are being used to have protruded fiber removal from denim & oven fabric. This is also widely known as Anti pilling enzyme. . After enzyme washing we get these change: Color, GSM decrease, Softness, Strength etc.

Object of using Enzyme:

Enzyme wash is required for the following reasons**:**

- To achieve the high low abrasion (Stone affect) on garment and same abrasion in sewing area.
- For soft feeling to wear the garment.
- To increase the color fastness & rubbing fastener.
- Especially develop the ―Bio-Polishing‖ affect of cotton / denim.
- Enzyme improves the anti-pilling properties.
- Enzyme attacks more the surface of the fabrics and gives every smooth surface.

Acid enzyme:

Acid enzyme works in acidic medium and comparatively at low temperature. We have to control this enzyme activity by checking pH of the washing bath by adding acid and base. In washing bath we select the enzyme based on the shade. It is available in liquid form. Acidic cellulase gives faster results but with too heavy back staining & cuts down the indigo color. These enzymes are less expensive than Neutral Enzyme and Bio-polishing Enzymes. Ex: iglamize PJ-88.

- Acid enzyme color is slightly brown
- P^{H} range is 4.5 to 5.5
- Temperature 60^{o} C
- Time required 20 to 25 mins.
- Enzyme affects come within short time
- Staining / Bleeding occurs more in garments
- Production high

Neutral enzyme:

This type of enzyme works at neutral condition and comparatively at high temperature. Neutral enzyme gives better salt & pepper effect with very less back staining & its generally comes in powder form & also retains better strength of fabric than acidic Cellulose. For Stone washing Neutral celluloses are the most commonly used? For mild action attack on cotton (cellulose)

fiber it attacks indigo ring dyed cotton fibers on surface of jean which causes surface fibers to break and detach fibers on surface dyed with indigo therefore removed reducing indigo.

- Enzyme is slightly white powder form
- P^H range is 6.5 to 7.5
- Temperature 50^o C
- Time required 45 to 50 min.
- Enzyme affects come slowly
- Less Staining / Bleeding on garments
- With pumic stone comes good affect / abrasion on garments

Now a day‘s laundry people needs faster results in less time & money hence chemical suppliers combined Neutral & acid cellulose in such way that it works faster & with better results than acid cellulose with cost effectiveness & known as **Hybrid enzyme.**

Factors affecting enzyme activity:

- **Substrate concentration** - the rate of enzyme activity increases with substrate concentration at lowers level up to a certain point and then slows down.
- **P^H value** - the amino acids and other ion stable groups in enzyme may get ionized at lower or higher pH affecting its activity.
- **Temperature** - with increase in temperature, the reaction rate increases due to "thermal energy", but with further increase in temperature, the rate decreases due to thermal denaturation.
- **Activators** - presence of specific bivalent metal cat-ion can activate enzyme reaction. Such metal ions
- **Inhibitors** - certain alkalis, acids and antiseptic tend to inhibit enzyme activity.

Main application:

- De-sizing
- Bio-polishing
- Bio-scouring
- peroxide killing
- garments washing

Enzyme wash

The process y which garments are treated with enzyme is called enzyme wash. In order to minimize the adverse effect of stone-washing, the denim garments is washed with enzymes. Enzyme hydrolysis the cellulose fibers of the denim fabric .at first it attacks the fibers hydrolyzed them .then it attack the yarn portion inside the fabric. Enzyme washing is ecologically friendly due to the natural origins of enzymes.

Objectives of enzyme wash:

- To remove the starch presents on the garments fabrics.
- To achieve the high/low abrasion (stone affect) on garment and seam abrasion in area.
- For soft feeling to wear the garments i.e. to improve softness.
- To achieve the buyer reference sample/washing standard.
- To increase the color fastness and rubbing fastness.
- Especially develop the ―Bio-Polishing‖ affect of cotton/denim.
- Enzyme improves the anti-pilling properties.

Enzyme stone wash:

Stone wash is applied on the garments to gives ―Used‖ or ―Vintage‖ look. The traditional stone washing of denim garments normally carried out with pumice stones to achieve a soft hand and desirable look. The degree of wash effect depends on stone size, stone ratio, liquor ratio, duration of treatment, amount of garments loaded, garments GSM, etc. The washing time may vary from 40 - 120 min. The process is quite expensive and requires high capital investment. The variations in shape, composition, hardness and porosity gives different washing effect in the denim fabric. Pumice stones give the additional effect of a faded or worn look as it abrades the surface of the jeans like sandpaper, removing some dye particles from the surfaces of the yarn. . Due to ring dyeing of denim fabric and heavy abrasion during stone washing, the fading is more apparent but less uniform Stone-washing also helps to increase the softness and flexibility of otherwise stiff and rigid fabrics such as canvas and denim. Sometimes the degree of abrasion may vary in different parts of a garment such as trouser leg, button slay and seaming parts, a number of neutral patterns can be formed.

Objects of Enzyme stone Wash:

- To create irregular fading affect on old looking affect on garments.
- To remove dust, dart, oil spot, impurities from the garments.
- For soft feeling to wear the garments i.e. to improve softness.
- To achieve the buyer washing standard.
- To remove the size materials from the garments.

Selection of Stone:

The pumice stones having oval and round shape with a rough surface, work as an abradant in washing cycle. In order to get the desired washed effect, the stone should be of proper hardness, shape, and size.

FIG: Pumic Stone

Pumice is a natural volcanic stone used for stone washing garments. It is crystallized with substantive pores. Pumice is mostly used for stone washing due to its durability to chemicals treatment, its strength and light weight. Major pumice stones supplier countries are USA, Turkey, Italy, Iceland, New Zealand, Japan, Indonesia and Philippines. Turkish stones are preferred for their porosity and cleanliness or stones from Sicily, but their supply is limited. Stone should be selected of the proper hardness, shape, and size for the particular end product. Smaller, softer stones would be used for light weight fabrics and more delicate items. . Stone size varies from 1 cm diameter to 7 cm

Stone wt. /fabric wt. = 0.5 to 3 /1

It depends on the degree of abrasion needed to achieve the desired result.

Limitations of pumice stone usage:

Stone washing of denim fabric with pumice stones has some disadvantages and limitations, Such as:

- For instance stones could cause wear and tear of the fabric.

- Damage to wash machineries and garment due to stone.
- Increase in labor to remove dust from finished garments
- The process of stonewashing also harms the big expensive laundry machines.
- It may also create the problem of environmental disposition of waste of the grit produced by the stones.
- The stone washing process may cause back staining and re-deposition.

Bio stoning washing:

During stone washing garments are subjected to a wash treatment to give them a slightly worn look. In the traditional stonewashing process, the blue denim was faded by the abrasive action of pumice stones on the garment surface. Nowadays, denim finishers are using a special cellulose. Cellulase works by loosening the indigo dye on the denim in a process known as 'Bio - Stonewashing'. A small dose of enzyme can replace several kilograms of pumice stones. The use of less pumice stones results in less damage to garment, machine and less pumice dust in the laundry Environment.

Objects of Stone Enzyme Wash:

- To create irregular fading affect on old looking affect on garments.
- To remove dust, dart, oil spot, impurities from the garments.
- For soft feeling to wear the garments i.e. to improve softness.
- To achieve the buyer washing standard.
- To remove the size materials from the garments.
- To improve anti-pilling properties.

Process cycle of Bio-stoning:

Garment loading

⇩

Desizing

⇩

Hot wash/ hot rinse

⇩

Enzyme stoning /Bio-stoning

⇩

Pumice

⇩

Rinse

⇩

De-stoning

⇩

Cleaning

⇩

Hydrostractor

⇩

Drying

Bio-polishing:

Cotton and other natural fibers based on cellulose can be improved by an enzymatic treatment known as Bio-Polishing. This treatment gives the fabric a smoother and glossier appearance. The treatment is used to remove 'fuzz' - the tiny strands of fiber that protrude from the surface of yarn. A ball of fuzz is called a 'pill' in the textile trade. After BioPolishing, the fuzz and pilling are reduced. The other benefits of removing fuzz are a softer and smoother handle, and superior color brightness. In bio polishing there is buffer solution which keeps the pH same.. Ex: hydros ted.

Objectives of Bio-polishing:

- Hairiness fulfills or pills are removed.
- Improve handle.
- Achievement of surface smoothness.
- Improve lusture or rubbing fastness.

Processing of bio-polishing of garments

- Fill the machine with water
- Add nonionic wetting agents (0.2 to 0.3 gpl)
- Adjust pH 4.5 to 5.5 with acetic acid
- Add 2 gpl lubricant (non-ionic)
- Load the garment in the machine and run the machine for 30 minutes at 45 - 50 0C
- Remove one garment from the machine and compare with the unwashed garment to see the effect of bio-polishing
- If bio-polishing is satisfactory, raise the temperature gradually to 85 0C and maintain the temperature for 10 minutes to deactivate the enzyme
- Drain the liquor

- Cold rinse for 5 - 10 minutes followed by hydro extraction and tumble dry.

Bleaching:

The process by which the natural colors (nitrogenous substance) are removed from the textile material with the help of oxidizing or reducing agent is called **bleaching** .Bleaching effect and de-coloration usually depends on strength of the bleach liquor, liquor quantity, and temp and treatment time. The bleached fabric should be properly neutralized to reduce the yellowing of denim fabric. It is preferable to have strong bleach with short treatment time. Bleaching can be carried out with or without the addition of stone.

This in one an important step in washing denim & can be done by various bleaching agents:

- Chlorine Bleach
- Sulfur Bleach
- Calcium hypo chlorite
- Sodium hypo chlorite
- Hydrogen peroxide
- Potassium permanganate

Some bleaching wash use in Pacific Jeans LTD:

- Towel Bleach
    - Acid Bleach
- Gel Bleach

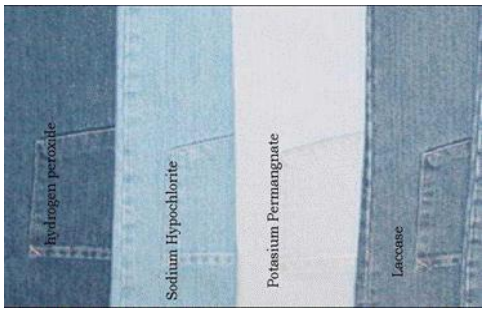


Fig: Bleach Denim

$Ca(OCl)_2$ and NaOCl are commonly being used for every medium to vintage look. H_2O_2 is rarely used as bleaching agent when very less color loss required or if fabric is sulphur top. As it takes longer time to give desired effect. For super vintage & light shade $KMnO_4$ bleach is used to cut the color faster till half way .$KMnO_4$ bleach is also being used on 100% sulphur black denim fabric for bleaching/ reducing agent to get unique effects. This process helps to get Greyer cast & also protects the lycra/spandex, retain elasticity. As it‘s not production friendly

till laundry has very expertise team to handle this program. Laccase is bio bleaching agent & alternative for conventional bleaching agents. This impart greyer cast to blue denim & enhances salt & pepper effect. But due to high cost & low self life, laundries do not prefer it.

The process flow and the process have given bellow:

Desize
⇩
Rinse
⇩
Bleaching
⇩
Neutralizing
⇩
Rinse
⇩
Hydrostractor
⇩
Dry

Type of bleaching agent:

- OXIDIZING AGENT
- REDUCING AGENT

Some example of two types of bleaching agent

Oxidizing Bleaching Agent	Reducing Bleaching Agent
Hypochlorite (NaOCl) ($CaOCl_2$)	Zinc Dust
Bleaching Powder	Stannous Chloride ($SnCl_2$)
Hydrogen Peroxide	Sulfur Di.Oxide (SO_2)
Potassium Dichromate	Ferrous Sulphate ($FeSO_4$)
Sodium Chloride (NaCl)	Sodium Hydrosulphate ($NaHSO_4$)
Ozone (O_3)	Hydrogen Sulphite H_2S
Potassium Per Manganet K_2MnO_4	

Objective of Bleaching:

- to make the fabric pure and permanent white
- To increase the absorbency capacity of textile materile.

- To get fading effect on garments.
- To produce white finishes

Limitations of bleaching:

There are some limitations of bleaching, such as:

- The same level of bleaching is very difficult to achieve in repeated runs.
- Bleaching treatment sometimes damage to cellulose resulting in strength losses and or pinholes at the seam, pocket, etc.
- Bleaching liquor is harmful to human health. This may also causes corrosion to the machine parts.
- Bleaching treatment needs antichlor treatment in order to eliminate the subsequent Yellowness to the fabric.

Neutralization process:

Problem of yellowing is very frequent due to residual chlorine. Chlorinated organic substances occur as abundant products in bleaching and pass into the effluent where they cause severe environmental pollution.

Over dye:

Over-dyeing of denim is an additional dyeing treatment which is normally carried out on jeans after sewn

- Dyeing over the fabric or jeans to add another tone of color
- Most often used is a 'yellowy' over dye to create a 'dirty' look
- Also can be applied with spray gun or paintbrush for local coloring there are many variations. Blue and black can be overdyed with bright contrasting colors to obtain special effects. The most current and successful forms of over dyeing consist of dyeing washed out indigo jeans with luminous colors. In this process direct dye is applied into already Indigo dyed garment. It takes 10 pieces of garment and put into the washing machine and adds direct dye with all its auxiliaries and run it for 15 mins and check the shade then rinse.

Tinting:

Tinting is a process where very less amount of tint is involved & mainly direct dye is being used to do this process. This is being done to change hue/cast/tone of indigo. As soon as quantity of tint color increases & it cover up indigo, reaches the level of dyeing. Tinting being used to give garments a used / vintage & muddy look. This process takes from 5 minutes to 15 minutes time for better results followed by dye fixing & cleans up of superficial dye.

- The garment has been lightly colored in order to give the final denim appearance
- The techniques involve the addition of the colorant in the stone washing cycle.
- Because of this it must be insured that dyes and cellulose are compatible

Softening Process:

Softening is a critical process which is used to soft the garments. As denim is very heavy in compare with other fabrics hence its needs softening. Different types of softener used for industrial purposes. They are –

- Cationic Softeners (for color garments)
- Nonionic Softeners(for white garments)
- Amphoteric softener

For fabrics with a high content of synthetic fibres it may be necessary to add small amounts of cationic surfactants that can neutralize the charges of anionic surfactants and thus prevent static electricity. Using non-ionic or amphoteric surfactants normally makes such additions unnecessary.

Purpose of adding softner:

- To neutralise the very small amounts of detergents left in the textiles and thus prevent static electricity.

Problem caused due to softening process:

During this process there is a big problem -the discoloration of denim i.e change in shade or loss of whiteness, giving a yellow tint is commonly known as yellowing. By using normal softener will lead to ozone problem. Indigo dyed fabric are even more prone to yellowing.

Remedy:

It‘s Impossible to eliminate yellowing but it is possible to prolong & reduce the conditions which causes classical yellowing:

- Ensure bleaching neutralization & rinsing is proper
- Minimize back staining
- Avoid use of chemicals which cause yellowing
- Avoid leaving garment in open air for longer time
- Control drying & curing temperatures
- Using right Antiozonate softener with right pH

Some Common Denim Washing:

When an order comes from buyer in form of washed sample the technical person determine the shade percentage, amount and type of washing to that fabric to get the appearance like the sample. So it is very important to wash the sample fabric to justify his assumption.

Different types wash based on chemicals:

- Rinse wash
- Resin wash
- Sand wash
- Enzyme wash
- Stone wash
- Enzyme bleach wash
- Acid wash
- Tie wash
- Softer silicon wash
- Ozone fading
- Snow wash
- Salt water denim
- Flat finish
- Over dye
- Sun washing

Common denim washes in detail:

Rinse wash:

Rinse wash denim is done by water with a small amount of detergent and anti back staining agent. Wash at about 50℃in a bath. Sometimes softener is used to soften the fabric.

Objective of rinse wash:

- To remove dust, oil spot, impurities from the garments.
- To remove size materials from the garments.
- To remove starch presents on the garment fabrics.
- To remove adhering or unfixed dyes from fabrics or garments.
- To increase the softness of the garments.
- To control the shrinkage of garments.

Fig: Rinse Wash

Super Stone wash:

It is type of wash treatment of denim garments in which the denim garments is subjected to prolonged stonewash treatment for more than six hours. Soda ash and soap are used for hard wash. Steam is used up to 60-80 0C for one hour to finish the washing process. It is followed by acetic acid wash treatment, and then the garments are neutralized and rinsed.

Fig: Super Stone Wash

Acid wash:

Acid wash was a chemical wash process on denim which stripped the top layer of color and makes a white surface while the color remained in the lower layers of the material, giving it a faded look. Acid was of denim garment normally carried out by tumbling the garments with pumice stones presoaked in a solution which contains sodium hypochlorite (5 to 10%) or potassium permanganate (3 to 6%). This cause localized bleaching which produce non uniform sharp blue/white contrast. So it is recommended to use two separate washing machines for Acid Washing & Neutralization etc .In this wash addition of water is not required. The color contrast can be increased by optical brightening treatment.

Fig : *Acid Washed Denim Garments*

Limitation of acid washing

- Acid washed, indigo dyed denim has a tendency to yellow after wet processing.
- The major cause is residual manganese due to incomplete neutralization, washing or rinsing.

Flow chart of acid wash has given bellow:

Garments loading

⇩

Desizing

⇩

Conditioning the garments

⇩

Stone preparation with chemical solution

⇩

Acid wash

⇩

Neutralizing agent

⇩

Rinse

⇩

Softening agent

⇩

Hydrostractor

⇩

Drying

Silicon Wash:

Silicon wash is an important and common wash in garment washing. It is also popular washing process. Silicone wash can be applied on all types of fabrics such as Knit, Corduroy, Denim, Canvas, Twill etc. This wash gives elastic handle, durable softness of garments. It helps to tear resistance, anti-pilling affects, and dimensional stability of fabric. It also helps to fabrics to be cut and sewn more easily.

Fig: Silicon wash

Objective of Silicon wash:

1. It gives durable softness, elastic handle,
2. It helps to antipilling affects, dimensional stability, and tear resistance.
3. It helps to fabrics to be cut and sewn more easily allows and improving wears and easy care properties.

The process cycle has given bellow:

BATCHING
↓
LOADING
↓
DESIZING (IF NECESSARY)
↓
SILICON WASH
↓
FINISHING/SOFTENING
↓
Hydrostractor
↓
Dry

Sustainable wash:

Sustainable wash is a process which is done by saving water, energy, manpower and chemicals. In sustainable wash, environment impact is the main issue such as water and energy.

Comparison between sustainable wash and conversional wash:

Category	conventional	Sustainable	save	percentage
Water per garments	98liter	21liter	77.4 liter	78.65%
Heat per kg garments.	461kg	105kg	356kg	77.22%
ETP for waste water.	67.1m3/hr	14.32m3/hr	52.78m3/hr	78.66%

The impacts of sustainable wash regarding water and energy have given bellow:

Water

- We can reduce the combining two wash process in a same bath such as: Desizing and enzyme stone wash in same bath by using special type of chemicals.
- We can reduce water by spraying the enzyme in machine instead of the conventional way.
- We can reduce water by doing bleaching and neutralize in same bath.

Energy

- We can use cold enzyme for desizing, enzyme stone, and bio-polishing. It saves almost 15to 25˚c in enzyme wash process.
- We can use low curing temperature resin for3D wrinkle. It needs 100˚c to 120˚c for curing earlier required 140˚c almost saves 20-40˚c temperature.

Basic requirements of sustainable wash have given bellow:

- A crystal clear commitment to save the environment at any cost for suture generation.
- Need to develop infrastructure like: Specialized machines, chemicals and instruments etc.
- Increase sustainable wash capacity.
- Develop sample in sustainable way by R&D.

Commitment about sustainable wash:

- Committed to save our environment at any cost for future generation by saving natural resources.
- Use low temperature and low formaldehyde free resin.
- Update ozone wash technology.
- To develop sample in sustainable way and move forward to give the best effort in sustainable wash.
- Need to develop infrastructure like: Specialized machines, chemicals and instruments etc.

Functions of various chemicals and auxiliaries used in washing:

Wetting agent:

The agents/ chemicals which increase the wet property of the garment, is called wetting agent.

Example: lissapol N, Invatex CRA, Ferol IPC.

- To wet the fabric.
- To reduce the surface tension of the water as if it allows the chemicals for into fiber.
- Emulsify oil, fats, waxes and remove oil-borne stains.

Detergent:

It is a surface acting agent with cleaning properties in dilute solutions.

Types of Detergent:

1. An-ionic Detergent
2. Cat-ionic Detergent
3. Non-ionic Detergent
    - Detergents are similar to soap.
    - More solubility in hard water.

Desizing Agent:

The chemicals/agents which are used to remove the siz materials from the warp yarn of woven fabric are called Desizing Agent.

- To remove size materials from fabric

Stabilizing Agent:

The chemicals/agents which are used to prevent strength losing of hydrogen peroxide is called stabilizing Stabilizing Agent.

- Prevent the strength of H_2O_2
- Helps to prevent the generations of O_2
- Acts as buffers maintaining ph.

Antifoaming agent:

The chemicals/agents which are used in denim washing to prevent or reduce foam is called Anti-foaming agent. Anti-foaming agents are one sort of surfactants.

- This agent helps to prevent the foam formation.
- Used to protect liquor from foaming. Thus they help in regular dyeing washing.

Anti-back staining Agent:

The chemicals/agents which are used to prevent of back-staining of detached indigo on fabric surface is called Anti-back staining Agent.

- To remove the contrast effect
- To remove fading effect
- Prevent the reposition of dyes molecules on fabric surface such as pocket, waistband etc,.
- Coagulates with anionic indigo dye, and also keep it in dispersion state during washing.

Anti-creasing agent:

The chemicals/agents which are used in denim washing/dyeing to prevent creasing of garments is called Anti-creasing agent.

- To prevent Creasing of garments/fabrics.

Bleaching agent:

The chemicals/agents which are used to remove color from the fabric that‘s means make fabric white or colorless are called bleaching Agent.

- It removes the natural color from the fabric.
- It increases the whiteness of the fabric.

Types of bleaching agents:

1. chlorine bleach
2. non- chlorine bleach

Sequestering agent:

The chemicals/agents which are helped to remove metal ion from a solution system by a complex ion that does not have the chemical reactions of the ion that is remove, is called Sequestering Agent

- Helps to remove/ eliminate water hardness
- Helps to remove heavy metals such as iron & copper.

Neutralizing Agent:

The chemicals/agents which are used in denim washing to eliminate residues of bleaching agents is called neutralizing agent. In this stage $KMnO_4$ and H_3PO_4 reacts with each other and gives Oxygen which oxidize the color. Here a byproduct MnO_2 is produced which should be neutralized.

Oil & Water Repellent Agent:

The chemicals/agents which are used to imparts oil and water repellency as well as stain release during laundering and maintaining the original qualities of treated substrates are called Oil & Water Repellent Agent.

Example: oleophobol 7713

- to imparts oil and water repellency.
- helps the treated substrates same after laundering.

Cross-Linking Agent:

The chemicals/agents which are used that join the adjacent chains of a protein/ polymer by creating chemical bond are created by cross-linking is called Cross-Linking Agent.

- To create cross linking

Caustic Soda:

It is a strong alkali substance and chemical formula is NaOH.

- To remove color & cleaning
- Acts as a desizing agent
- It gives blue tone
- Also play role in bleach technique
- Old/ fading affect come rapidly.

Soda Ash:

It is an alkali type chemical and chemical formula is Na_2CO_3.

- To remove color
- Acts as cleaning, scouring and desizing agent
- It gives reddish tone
- In alkaline medium breakdown of pigment dye
- Also acts as a color fixing agent in dye bath

Dye staff:

- It used to dye the fabric evenly.

Stain Remover:

The chemicals/agents which are used to remove stain from the fabric/garments surface are called Stain Remover.

- To remove staining .

Oil removal:

- It removes the oil from the fabric surface.

Dispersing agent:

The chemicals/agents which are used to distribute/disperse the dye molecules in the vat dyeing bath are called Dispersing Agent.

- To spread dye molecules into the fiber.
- It assists the process of particle size reduction of the dye.
- To assist dye penetration.
- To increase solubility of the dyes.

Resin:

Resin is used to hard the fabric .resin react with fiber and making bond with cellulose at high temperature.

- It is used for making 3D wrinkle
- To control shrinkage
- Controlling dimensional stability
- To create coating on the fabric.

Whitening Agent:

The chemicals which help to increase more whiteness is called whitening Agent. It is generally used after scouring and bleaching.

- After using chemicals at washing process, the molecules are attached on the garments.
- Increase whiteness of the garment
- The molecules help the visible light and UV light to disperse in the visible region.

Fixing agent:

The agent which is used to fix the dyes with fabric during over dyed process is called fixing agent.

- It helps to fix the color in the fabric.
- Enhance wet fastness for heavy shade but usually reduce light fastness.
- To improve the color fastness to wash
- To improve the color fastness to crocking .

Finishing agent:

- It helps to fix the color in the fabric.
- Enhance the wet fastness and usually reduce light fastness.

Acetic Acid:

It is one kid of acid and have vast using sphere at washing industry.

Example: CH_3COOH (Acetic Acid)

- To control P^H
- Cleaning functions of the garment.

Phosphoric Acid:

It is one kid of acid and the purpose of it activates oxidizer.

- Acts as an activator for oxidizer like PP (Potassium Permanganate)
- Use with potash
- Activity of pp increase due to Phosphoric acid.

Leveling agent:

- It spread the color evenly through the whole of the place of the fabric.

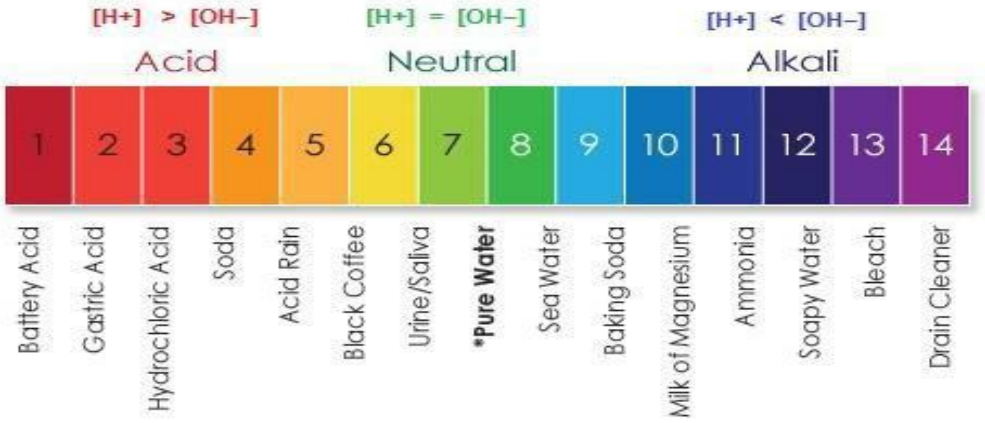
P^H:

Meaning of P^H is Puissance of Hydrogen. It is the negative logarithm of Hydrogen ion in any Solution and can be expressed by following equation:

$P^H = - \log [H^+]$

P^H Scale likes following:

0 – < 7	Acidic Medium
7	Neutral
>7 – 14	Base Medium



Different types of wash faults:

1. Color shade variation.
2. Crease marks.
3. After wash hole.
4. Very dark and light.
5. Bleach spot.
6. Bottom hem and crease edge destroy.
7. Over blast or low blast.
8. Over grinding or low grinding.
9. Bad smell due to poor neutralization.
10. Poor hand feel.
11. High hairiness.
12. Poor brightness.
13. Spot on garments.
14. Out of range.
15. PH failure.
16. Tearing.
17. Rubbing.

Machine Use in R&D Department:

Washing Machine:

- Mambo 56, AUNTEC, Italy (mini)
- Tonello 70L1, Italy
- Tonello 4220 LD1, Italy
- Tonello 70W1, Italy
- Tonello G1 330

Dyeing Machine:

- Tonello G1,16 HD
- Tonello G330

Ozone Machine:

- Ozone Bleach Machine
- Oxidizing Bleach

Sustainable Machine:

- TOLKAR

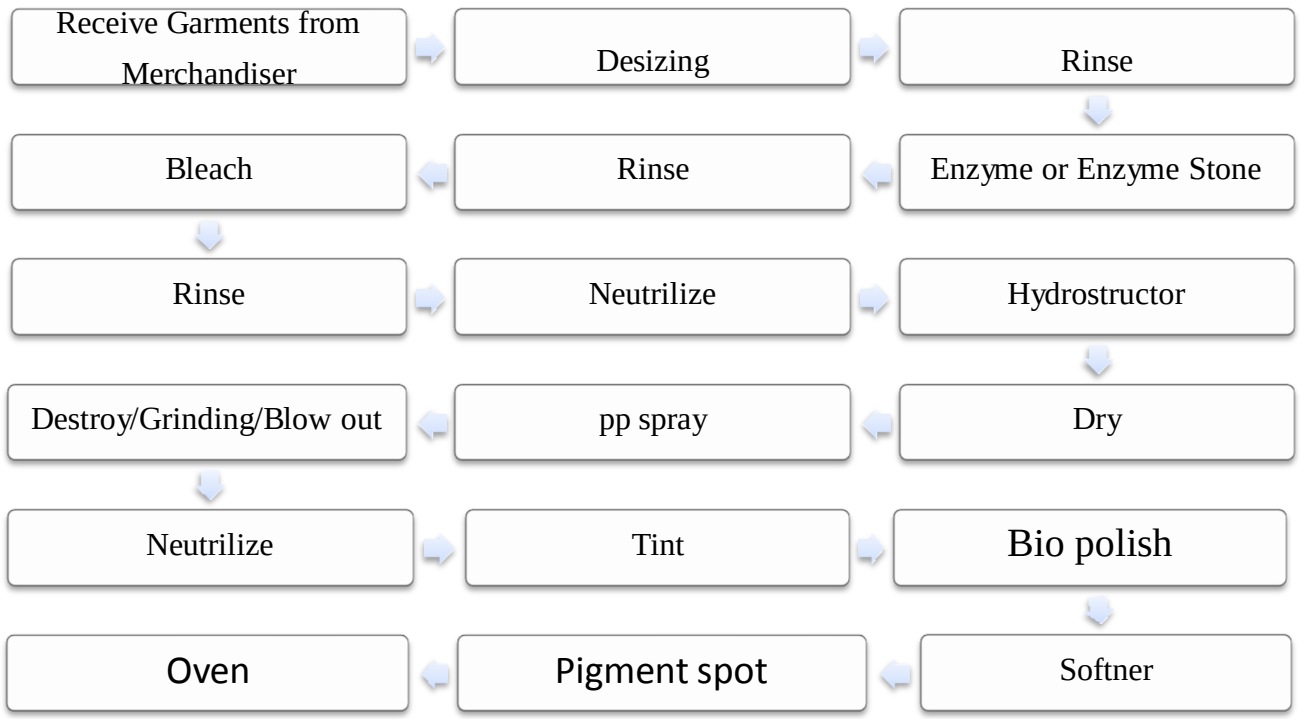
Hydro Extractor machine:

- SHE-30,45 kg capacity,380 voltage

Drying Machine:

- TONGXIN, China

Basic Flow chart Follow by Pacific R&D:



Chapter: 7

SWOT Analysis

From the SWOT Analysis, it would be easy to figure out the ongoing scenario of the Pacific Jeans Group. It is Possible to find out the strength, weakness, opportunities, and threats of company. So to have a better view of the present business practices of Pacific Jeans Group, SWOT analysis is done.

SWOT analysis of Pacific Jeans LTD:

Strength

- Encouraging working environment
- Use strong and smooth communication systems
- Efficient and effective inventory management systems
- Adequate labor supply at relatively competitive wages
- Trustworthy and renowned buyer
- Strong backward and forward linkage.

Weakness

- Lack of motivational activities for the employees
- Technological obsolescence and lower efficiencies
- Employee turnover rate is high and lack of labor at different departments.
- Fabric wastage percentage in cutting, sampling is so high.

Opportunities

- High demand in international market
- Expansion of production line
- New setup units of Pacific Jeans Group
- Growing domestic market

Threats

- Recent global recession
- Political fluidity in Bangladesh
- Unavailability of low priced substitute raw materials
- Increasing range of minimum wages

SWOT Analysis for R&D:

Strength:

- Skilled and experienced manpower.
- Work with Modern machine and equipments.
- Uninterrupted power supply and sufficient water supply.
- Have some foreign expert Technician.
- Working condition is flexible and friendly.
- Applying most modern washing technique like Ozone, Leaser, Sustainable wash.
- 100 % compliance oriented R&D.
- They have environment friendly washing technique.

Weakness:

- Lack of computerized process control.
- Lack of emergency open system on machine.
- Unwanted Fabric and chemical defects.
- Difficulties of matching shade.
- Calibration problem in the machine.
- Communication gap between R&D and merchandising department due to distance of work station.
- Uneducated manpower.
- Lack of Safety tools and equipment and their uses.

Opportunities:

- Eco-friendly and sustainable machine import for saving water and environment.
- They will add dry washing process where they can wash garments with only one glass water.
- Denim will use for safety and other clothing purpose which increase denim market worldwide.
- Wastage or damaged denim can use to produce different type of product like hand bag, back pack, sandal, shoes, doll, show piece etc.
- Robot will use in R&D sector to increase efficiency of work.
- Chemical uses will improve to reduce harmfulness for human body and also make eco-friendly.

Threats:

- Uses of hazarded chemical can bring great harm to environment.
- Automatic robot can increase unemployment problem in our country in future.
- Worker of R&D department can affect by serious diseases because of working with chemical for a long time.
- Our competitor country like India, Vietnam is more upgraded in design section and improving day by day than us.

Chapter: 8

Findings and Recommendation

Some Findings and Problems of R&D:

- As most of the workers are not well educated, they face problems to understand machine command.
- As there is manual working system in most of the process it is difficult for R&D workers to adjust wash look according to sample.
- Comparing with the modern technology, there is not sufficient technological equipment.
- Most of the time workers won‘t feel comfortable while working, as there isn‘t enough space in R&D floor.
- They usually input chemicals manually and it‘s difficult to input accurate quantity of chemicals.
- There are some difficulties to understand critical design of buyer.

Some Possible Recommendations for R&D:

- To operate the machines and avoiding problems, company should appoint minimum educated people.
- They can search for graphical software where they can adjust actual look of washing according to sample which also indicate the wash need to and also give recipe of it.
- For increasing the production, Technological equipments should have to increase in R&D; they can search for modern machine and useful software for R&D.
- For meeting the production demand, the capacity should have to increase.
- They can search for a modern machine where they can input chemical in computerized system.
- They can hire some expert people from local or abroad who have a very good experience in R&D and modern fashion and design.

Conclusion

I have completed my industrial attachment successfully by the grace of Allah. I also want to thank Pacific Jeans LTD. who gives the golden opportunity of our internship program. Pacific Jeans is like a school of learning for a Merchandising or Textile student. Internship in a factory is an important and essential part of education as through this I learn all the implementation of the process which I have studied theoretically. It gives me the opportunity to compare theoretical knowledge with practical facts and thus develop my knowledge and skills. Beside Now-a-days Textile field becomes very competitive & the buyer wants 100% quality product. For this reason it is very important to know about the latest technologies in textile sector. To produce a quality product, as a student of Apparel Manufacture and Technology I must have a vast knowledge about the production parameters & how to produce a high quality product. I think without an internship program a hon‘s degree is not enough. In my training period I have observed that Pacific Jeans Ltd. produces high quality garments and fulfills the special requirements from the different types of buyers by following different internationally recommended standard method. In this training period I have learned how the desired product is made ready for shipment from the starting to the end i.e. from merchandising to the packaging. In this training period I have got an idea about the responsibility of different departments of the factory. So I think my experience of internship program in Pacific Jeans LTD will help me a lot in future.

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