



Daffodil
International
University

Faculty of Engineering
Department of Textile Engineering

REPORT ON

Industrial Attachment
AT

Denimach Washing Ltd.

Sreepur, Gazipur

Course Title: Industrial Attachment

Course Code: TE 431

Submitted by:

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This report presented in partial fulfillment of the requirements for the degree of
Bachelor of Science in Textile Engineering.

Advance in Apparel Manufacturing Technology

Duration: From September 15th, 2018 to November 10th, 2018.

LETTER OF APPROVAL

Date: December 12, 2018

To

The Head

Department of Textile Engineering

Daffodil International University

102, Shukrabad, Mirpur Road, Dhaka 1207

Subject: **Approval of Industrial Attachment Report of B. Sc in TE Program.**

Dear Sir,

I am just writing to let you know that this Industrial Attachment in “**Denimach Washing Ltd.**” has been prepared by the student bearing ID: **151-23-4183** completed for final evaluation. The whole report is prepared based on the proper investigation and information in Denimach Washing Ltd. The student was directly involved in their industrial attachment report activities.

Therefore it will highly be appreciated if you kindly accept this industrial attachment report and consider it for final evaluation.

Yours Sincerely,

.....

Mr. Md. Mominur Rahman

Assistant Professor,

Department of Textile Engineering

Daffodil International University

ACKNOWLEDGEMENT

At first my gratefulness goes to the Almighty “**ALLAH**” for giving me strength and ability to complete the industrial attachment report at **Denimach Washing Ltd.** Successfully.

I also grateful to my supervisor Mr. Md. Mominur Rahman, Assistant Professor, Department of Textile Engineering, Faculty of Engineering, Daffodil international University. His endless patience, scholarly guidance, continual encouragement, energetic supervision, constructive criticism, valuable advice, reading many inferior draft and correcting these at all stages have made it possible to complete this attachment. I would like to give special thanks to the managements, supervisors, technicians, operators and all other staffs of **Denimach Washing Ltd.** who were most cordial and helpful to us during internship.

I also thankful to my all teachers, lab assistant, registrar sir, coordinators and all the employees of Daffodil International University. I am highly delighted to express my regards & gratitude to Honorable Head **Prof. Dr. Md. Mahbubul Haque** for providing his best support to us.

Finally, I would like to express a sense of gratitude to my beloved parents and friends for their mental support, strength and assistance throughout completing industrial attachment.

DECLARATION

I hereby declare that the work which is being presented in this report entitled, “Industrial Attachment at Denimach Washing Ltd. ” Is original work of my own, has not been presented for a degree of any other university and all the resources of collected information for this report have been duly acknowledged.

.....

Md. Redwanul Islam

ID: 151-23-4183

Department of Textile Engineering

Faculty of Engineering

Daffodil International University

DEDICATION

I dedicate this attachment to Almighty **ALLAH** my creator, my strong pillar, my source of inspiration, wisdom, knowledge and understanding. He has been the source of my strength throughout this program and on His wings only have I soared. I also dedicate this work to my loving parents whose prays, affection & support are always a source of encouragement for me to reach at this destination and a humble icon for others in future. My parent and teachers who give me real eyes that help me to lead myself to my destination. I wish them long life.

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1. Executive Summery

1.1 Executive Summary

The internationally recognized buyers are looking for those countries for producing their apparel products where different types of mills have established as a non-stop source for the global apparel market, satisfy and meet customer expectations by developing and providing products and services on time, which offer value in terms of quality, price, safety & environmental impact. And also assure complete compliance with the international quality standards and also to provide the employees internationally acceptable working conditions. In Bangladesh there are different types of textile industries that are producing high quality textile and apparel products. **Denimach Washing Ltd.** is one of them. They have different types of dry process and wet process related machines like 3D, crinkle, laser, oven, washing machine, hydro-extractor, dryer etc. supplied by mostly Japan, USA, China, Italy, Belgium, Spain, Turkey, India etc. which are very latest. It has a high production rate finished garments are produced per day. The production is controlled by skilled persons. The entire decision maker of the production sector in **Denimach Washing Ltd.** is not a textile graduate. Finishing is well branded. They produce their product for their buyer and client those are coming from international markets like America, China, Spain, Italy, and Canada. They follow all the systems for their machines maintenance so that production cannot be hampered.

In this report, I tried to give some information about **Denimach Washing Ltd.** and I observed that this washing plant produces high quality products and fulfill the special requirements from the different types of buyers according to different internationally recommended standard methods.

2. Information about Factory

2.1 Basic Information

2.2.1 Company Name & Address:

Denimach Washing Ltd.

Kewa Mouja, Ward # 5, Gorgoria Masterbari,
Sreepur, Gazipur, Bangladesh.

Tel: +88-06825-52700/01

2.1.2 Head Office Address:

Armana Group Ltd.

House no. 26, Road no. 71

Gulshan 2, Dhaka 1212

Bangladesh.

Phone: +88 02 9898456

Email: info@armanagroup.com

2.1.3 Year of Establishment: 2005.

2.1.4 Founder & Directors:



Mr. Pavan Kumar Soni
Chairman, Armana Group



Mr. Zakaria Taher (Shuman)
Managing Director, Armana Group



Lal Udagedara
Director- HR, Admin & Compliances



Syed Asad Ali
Director-Business



Chetan Chopra
Director-Business



Arup Ratan Choudhary
Director-Laundry Divisions



Sandeep H Golam
Director- Operations



Ramnish Kumar Verma
Director- Creative & Design



Kushal Kumar Das
Director- HR, Admin

Fig 2. 1: Founder & Directors of Armana Group.

2.1.5 History of the Industry:

Established in 2005, Denimach has grown over the years, not only in size but also in reputation as some of the world's trusted names in retail like Levi's, GAP, Benetton, and H&M amongst others have placed their trust in our production capabilities. The Accord and Alliance certification for the architecture is a proof of the desire for perfection.

2.1.6 Compliance Certifications:

- Accord
- Alliance

2.1.7 Sister Concerns:

- ✓ Denitex Ltd.
- ✓ Armana Fashions Ltd.
- ✓ Zyta Apparels Ltd.
- ✓ Clotex-Labelon (BD) Ltd.
- ✓ Armach Logistics LLC

2.1.8 Export Growth:

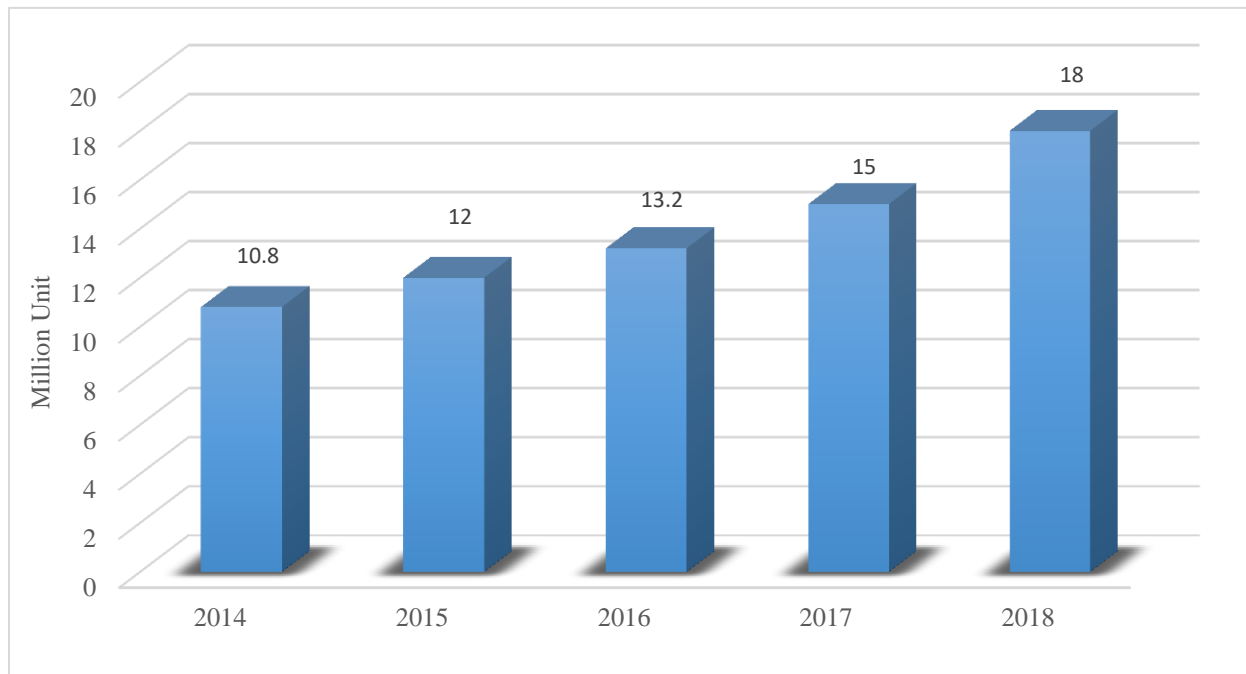


Fig 2. 2: Export Growth Graph.

2.2 General Information:

2.2.1 Total Area:

- 8.25 acre

2.2.2 Total Building:

- 4






2.2.3 Production Capacity:

- 15,00,000 units per month.

2.2.4 Transport Facility:

- Microbus – 12
- Staff bus – 2
- Cargo van - 8

2.2.5 Major Buyers with their Logo & Country:

S/L	Name	Origin	Logo
01	LEVI'S	USA	
02	GAP	USA	
03	H&M	Sweden	
04	BENETTON	Italy	
05	LAGER	USA	

06	CUBUS	Norway	
07	WOODLAND	India	
08	UNIQLO	Japan	
09	ELAND KOREA	Korea	
10	BENETTON INDIA	India	
11	ROOKIES	India	
12	ROOKIES SRILANKA	Srilanka	
13	ODEL	Srilanka	
14	RELIANCE	India	

15	SAILOR	Bangladesh	
16	TANJIM	India	
17	RICHMAN	Ohio	
18	CHEROKEE	USA	
19	MUFTI	India	
20	ARROW	USA	
21	TARGET	USA	
22	DERBY	India	
23	CITRUS	India	
24	MAX	India	

25	PETER ENGLAND	Ireland	
26	ALLEN SOLLY	India	
27	VINTAGE	USA	
28	PANTALOONS	India	
29	SF	India	
30	BUFFALO	Canada	
31	DJ&C	India	
32	P&B	England	
33	MATRIX	India	
34	MYNTRA	India	
35	US POLO	USA	
36	BIG BAZAR	India	
37	NUEON	India	

38	NEXT	England	
39	NEW YORKER	Germany	
40	BEING HUMAN	India	
41	MIXXO	Japan	
42	ZARA	Spain	
43	URBAN EAGGLE	India	
44	FERRARY	USA	
45	LEE COOPER	England	
46	OXYGEN	India	
47	RUSHI	India	

Table 2. 1: Major Buyers of Denimach Washing.

2.3 Human Resource & Organization Structure:

2.3.1 Organogram

2.3.1.1 Departmental Organogram:

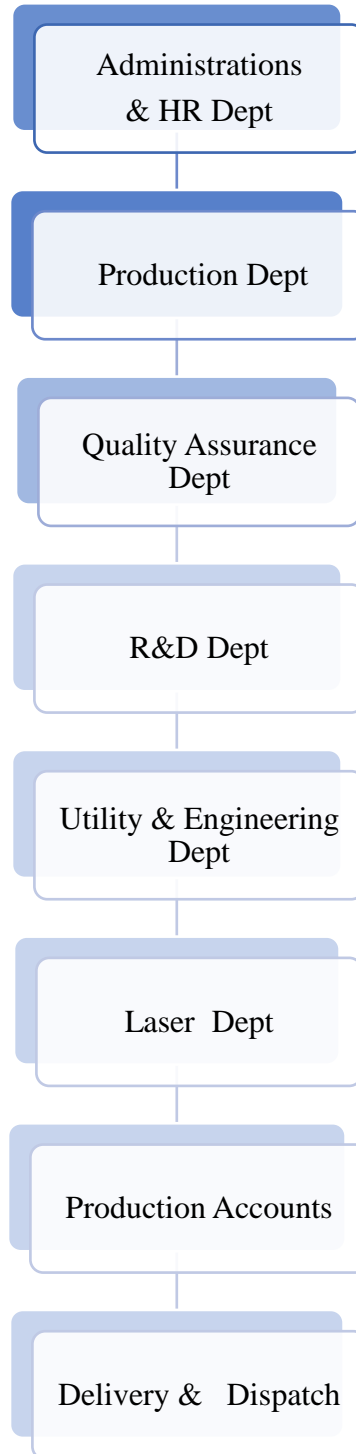


Fig 2. 3: Departmental Organogram.

2.3.1.2 Administration Organogram:

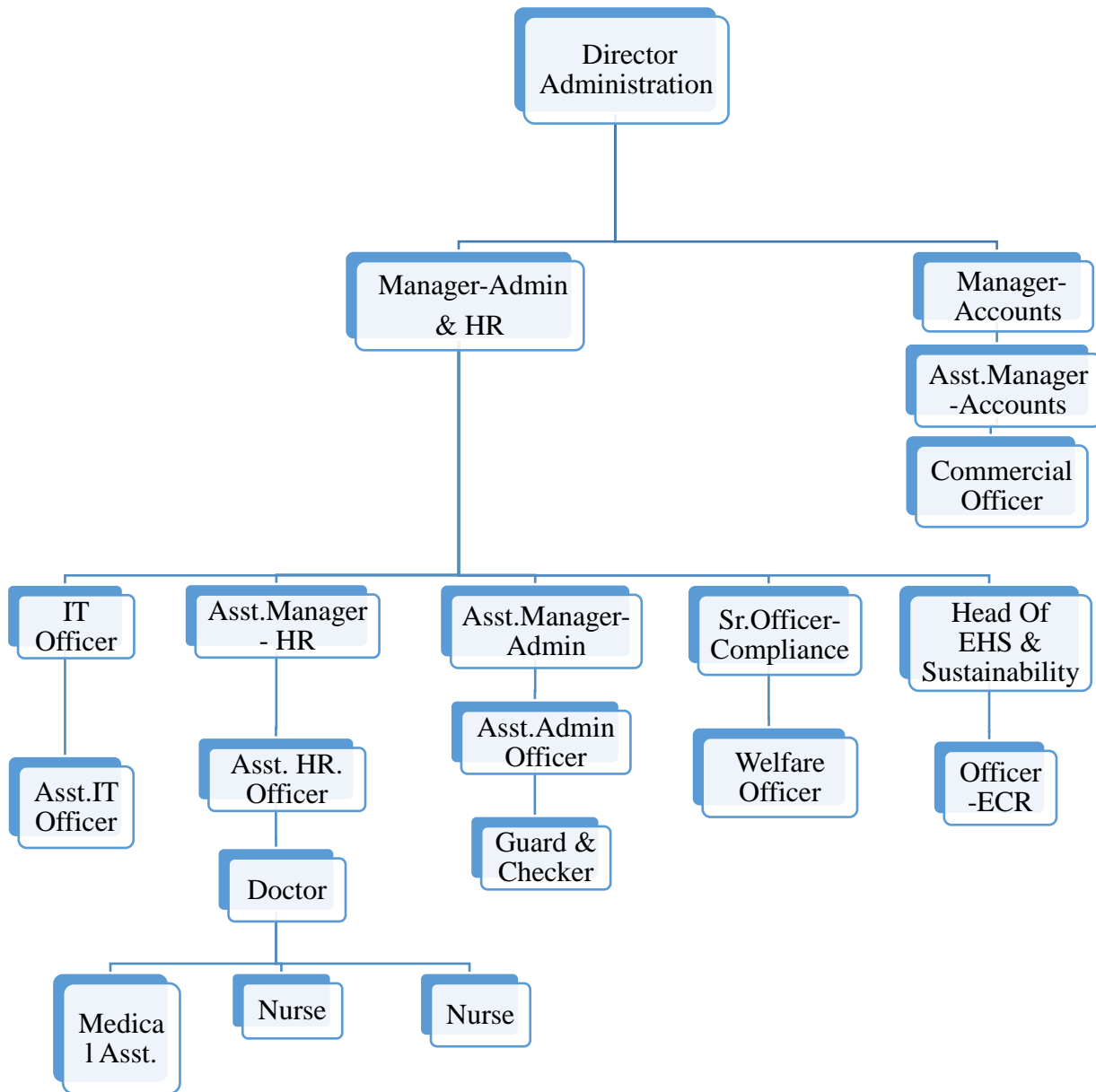


Fig 2. 4: Administration Organogram.

2.3.1.3 Production Organogram:

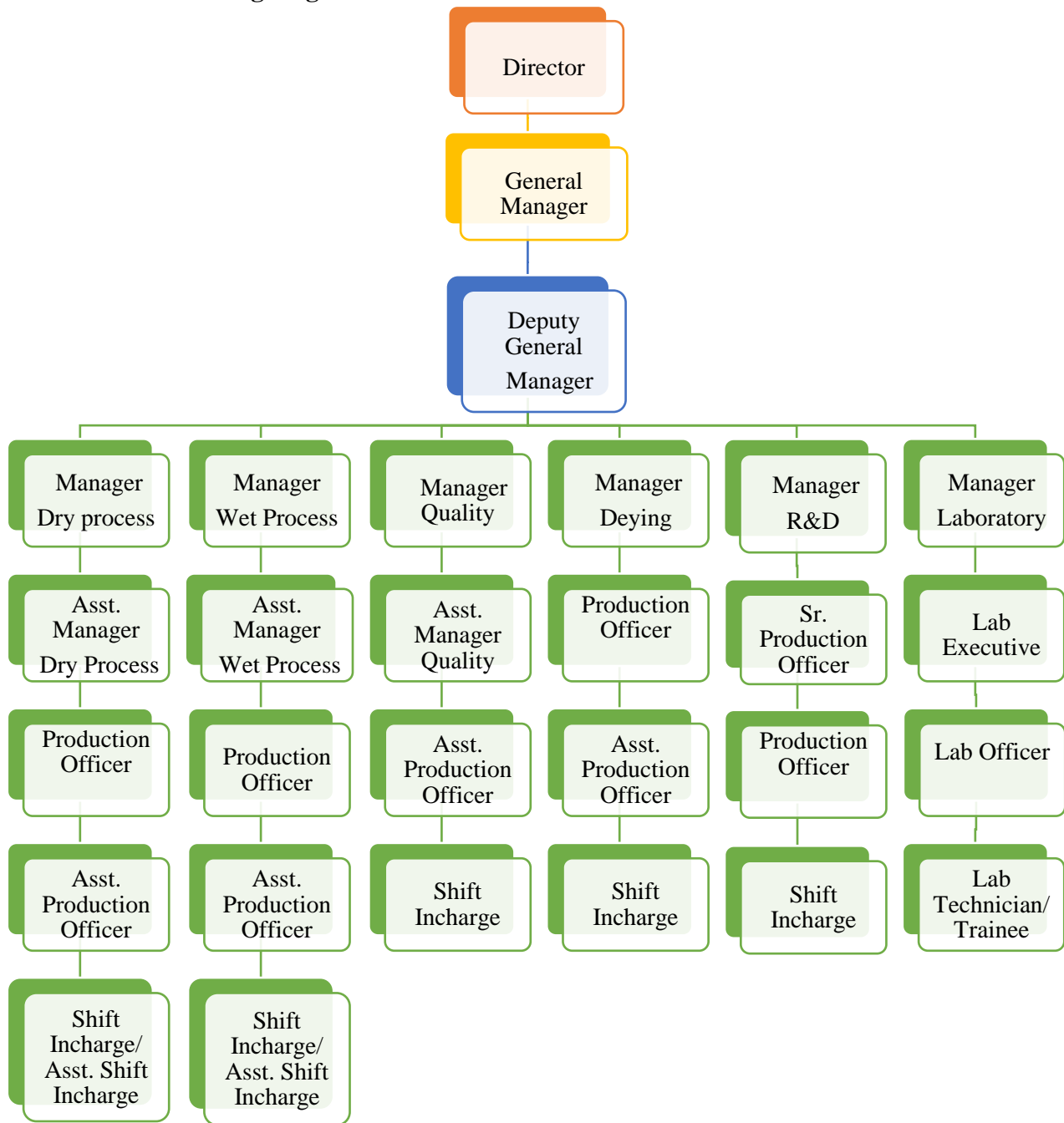


Fig 2. 5: Production Organogram.

2.3.2 Total no. of Departments:

11 (Eleven) departments.

2.3.3 Name of Department:

- Administrations & HR
- Store
- Production Accounts
- Production
 - Dry process
 - Wet process
- Laser
- Quality Assurance
- R&D
- Laboratory
- Delivery & Dispatch
- Finishing
- Utility & Engineering

2.3.4 Main Production:

All kinds of readymade denim garments wash.

2.3.5 Total no. of employee:

- 2,094

2.3.6 Vision & Mission:

Vision: To provide top quality woven garments at competitive prices with emphasis on innovation and timely deliveries, backed by unwavering integrity and commitment to produce ethically sustainable fashion, thereby significantly contributing to the growth of our stakeholders.

Mission:

- Quality assurance
- Fair deal policy
- Strategic partnerships
- Continuous upgradation
- Sustainable fashion
- Team spirit

3. Details of Attachment

3.1 Store section

3.1.1 Organogram:

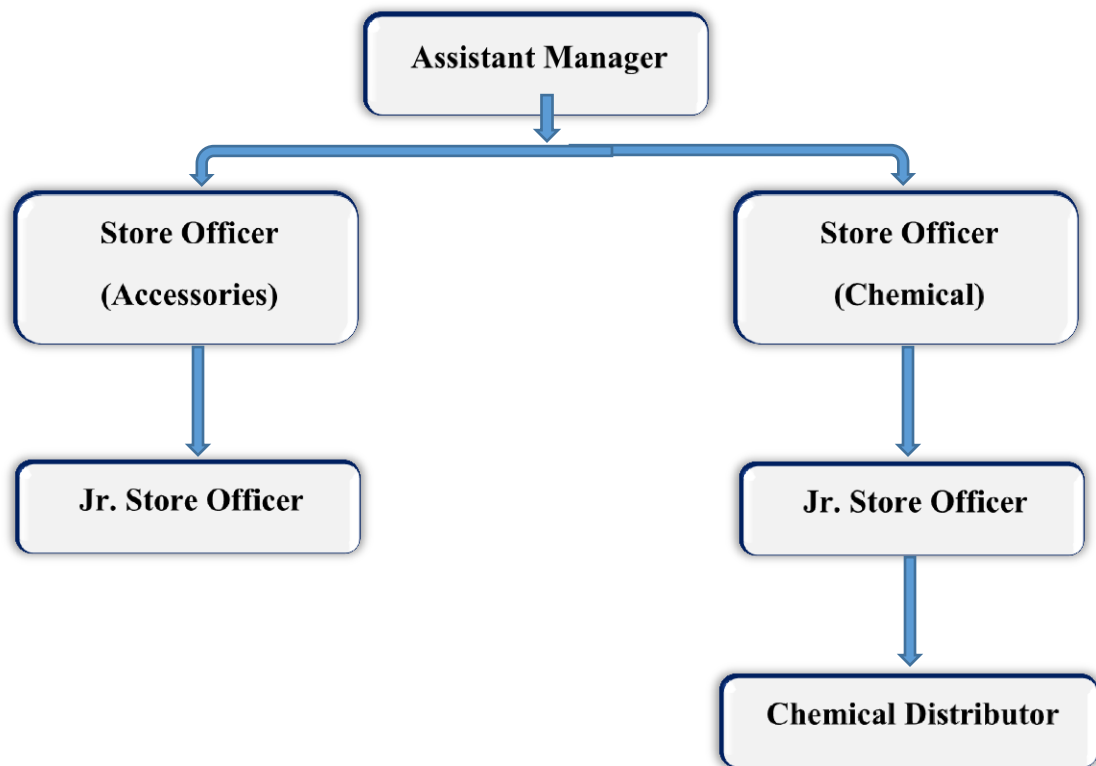


Fig 3. 1: Organogram of Store Section.

3.1.2 Layout:

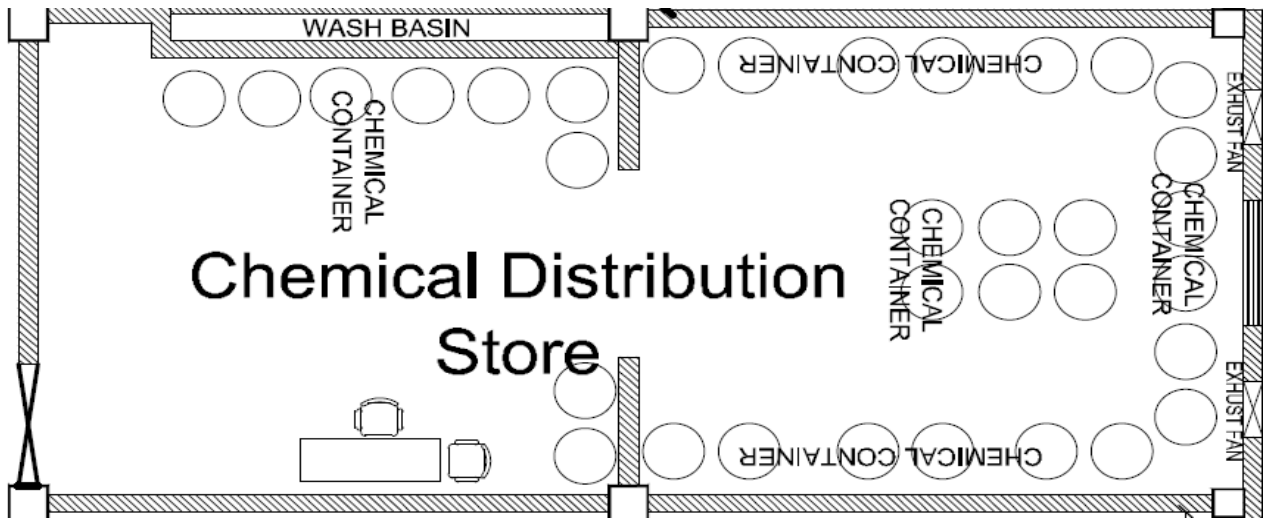


Fig 3. 2: Chemical Distribution Store.

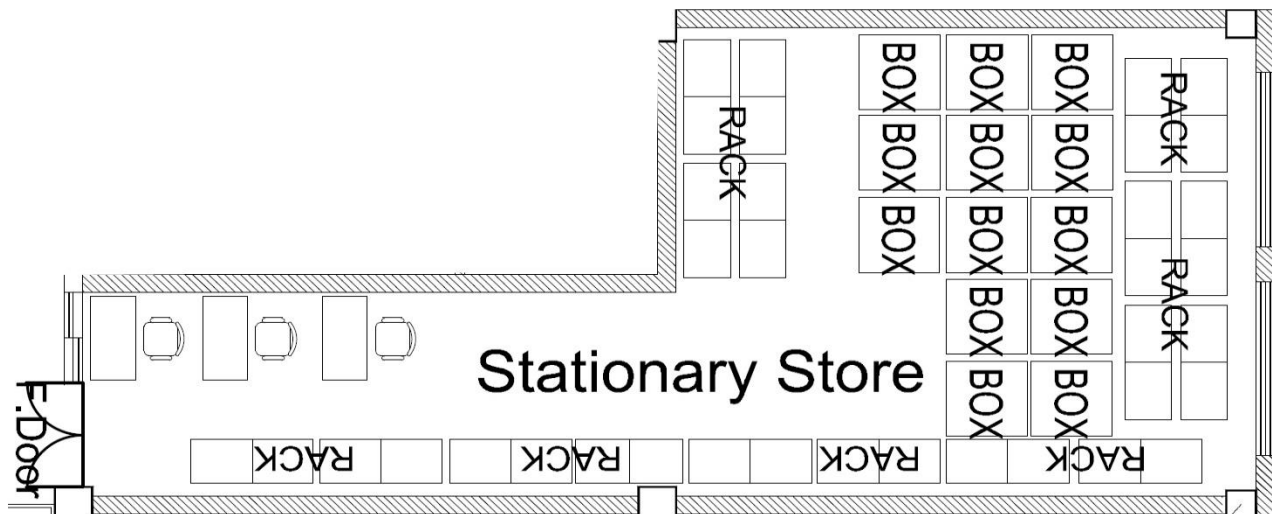


Fig 3. 3: Stationary Store.

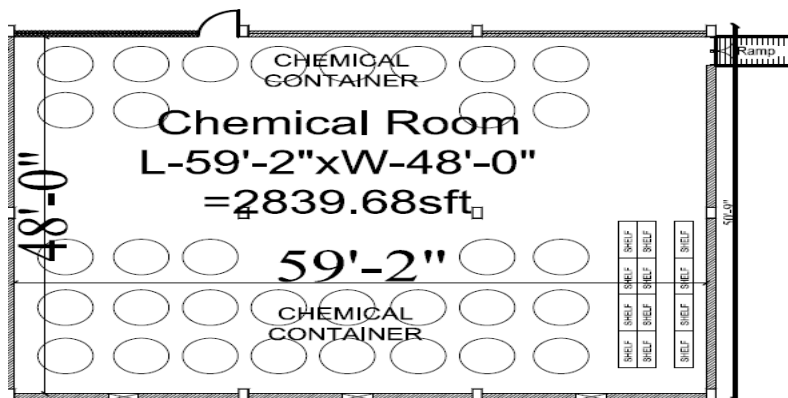


Fig 3. 4: Chemical Store.

3.1.3 Sections in Store:

- Stationary store
- Chemical store

3.1.4 Stationary Store:

All kinds of necessary stationaries product and accessories related to denim washing in both dry and wet process like emery paper, tacking pin, whisker pattern board, chalk, denim pen, marker, rope & so other are available and distributes according to the requisitions.

3.1.5 Chemical Store:

All the chemicals used in washing & ETP plant with approval of ECR are available and distributes according to the requisitions.

3.1.6 Major Chemical Supplier:

S/L	Name	Origin	Logo
01	OFFICINA BD	Bangladesh	
02	DYSTAR	Singapore	
03	ARCHROMA	Switzerland	
04	JAS	India	
05	S&D	Srilanka	
06	ATLANTIC	UAE	
07	ADITYA BIRALA	India	

08	GARMON	Republic of San Marino	
09	BEST	Singapore	
10	HUNTSMAN	USA	
11	CHT	Germany	
12	FOUR STAR	USA	
14	SOKO	Italy	
15	VIJOL	India	
16	DENIMIST	Turkey	
17	DYSIN	Bangladesh	
18	ASHUDEL	Bangladesh	
19	SETAS	Turkey	
20	TRADE LINKERS	India	

Table 3. 1: Major Chemical Supplier.

3.1.7 Chemical Chart:

S NO.	NAME OF CHEMICALS	TYPE OF CHEMICAL	BRAND/SUPPLIER
1	CYTRIC ACID	ACID	JAS
2	NEUTRA CB	GREEN ACID	S&D
3	PHOSPHORIC ACID	ACID	JAS
4	SIRRIX TA	ACID	ARCHROMA
5	CAUSTIC SODA	ALKALI AGENT	FOUR STAR
6	SODA ASH	ALKALI AGENT	JAS
7	HYPO	REDUCING AGENT	JAS
8	SODIUM METABISULPHITE	REDUCING AGENT	JAS
9	H ₂ O ₂	OXIDIZING AGENT	FOUR STAR
10	POTASH (Potassium Permanganate)	OXIDIZING AGENT	JAS
11	SODIUM SULPHATE (Glauber Salt)	SALT	FOUR STAR
12	STABLE BLEACHING POWDER	BLEACHING AGENT	BIRALA
13	BLEACH (SING CLONE)	BLEACHING AGENT	JAS
14	NOVOFADE ACTIVE	BLEACHING AGENT	ATLANTIC
15	NOVOFADE CONTROL	BUFFERING AGENT	ATLANTIC
16	ANTISTAIN-NSL	ANTIBACK AGENT	JLTICHEMI EXPORT
17	DETERPAL TSK -ECO	ANTIBACK AGENT	OFFICINA BD
18	DETERPAL EPQ	ANTIBACK AGENT	OFFICINA BD
19	LAVA SPERSE KTZ	ANTIBACK AGENT	DYSTAR
20	NOVOLUBE PEN 200	ANTICREASING AGENT	OFFICINA BD
21	DETERPAL AJT NEW	WETTING AGENT	OFFICINA BD
22	RECTAZE-Z40	DESIZING AGENT	S&D
23	NOVALASE LT 40	DESIZING AGENT	OFFICINA BD
24	POWER WASH EXTRA	DETERGENT AGENT	JLTICHEMI EXPORT
25	DETERPAL F33	DETERGENT AGENT	OFFICINA BD
26	LAVA CELL NHC COLD	STONE ENZYME	DYSTAR
27	NOVA STONE COMBI NEW	STONE ENZYME	OFFICINA BD
28	NOVOSTONE NEUTRAL MR	STONE ENZYME	OFFICINA BD
29	NOVASTONE NCL F	ENZYME	OFFICINA BD
30	LANZENE MAXI OV2	ENZYME	S&D
31	BIOPOLISH NDX	BIOPOLISH ENZYME	S&D
32	NOVASTONE L CONE	BIOPOLISH ENZYME	OFFICINA BD
33	DENIFADE LT LACCASE	LACCASE ENZYME	JLTICHEMI EXPORT
34	LAVACON PAP	PP ACTIVATOR	DYSTAR
35	NOVAPRET NFC/LT3	RESIN	OFFICINA BD
36	NOVAPRET 3DF	RESIN	OFFICINA BD
37	LEGAFINISH FAST	RESIN	GARMON
38	LAVAFIN U41	POLYURETANE	DYSTAR
39	EVO SOFT PEN	SOFTNING AGENT	DYSTAR
40	S-SOFT	SOFTNING AGENT	S&D
41	BASE O	CATIONIC SOFTNING	OFFICINA BD
42	MIDORY FT CLS	SOFTNING AGENT	BST
43	NOAMIN	TEAR & STRE IMPR	OFFICINA BD
44	NOAMIN V	ANTI OZONE SOFT	OFFICINA BD
45	LAVACON	NEUTRALIZING AGE	DYSTAR
46	REDUCER POWDER	NEUTRALIZING AGE	OFFICINA BD
47	NOVOFIX	WET RUBBING IMPR	OFFICINA BD
48	NOVO FIX EE-25	FIXING AGENT	OFFICINA BD
49	NOVOCRYL S-TP NEW	BINDER	OFFICINA BD
50	NOVAPRET	BINDER	OFFICINA BD
51	INDOSOL BLUE BL	DIRECT DYE	ARCHROMA
52	INDOSOL BLUE GL	DIRECT DYE	ARCHROMA
53	INDOSOL BLUE FBL	DIRECT DYE	ARCHROMA
54	INDOSOL ROSE FR	DIRECT DYE	ARCHROMA
55	INDOSOL ORANGE 2GL	DIRECT DYE	ARCHROMA
56	INDOSOL K NF	DIRECT DYE	ARCHROMA
57	INDOSOL LOW 2RL	DIRECT DYE	ARCHROMA
58	NOVACRO LOW S3R	REACTIVE DYE	HUNTSMAN
59	NOVACRO LOW S3R	REACTIVE DYE	HUNTSMAN
60	NOVA ROSE	REACTIVE DYE	HUNTSMAN
61	NOVA BLUE	REACTIVE DYE	HUNTSMAN
62	BEZAPRINT K DW	PIGMENT DYE	CHT
63	BEZAPRINT YELLOW RR	PIGMENT DYE	CHT
ETP CHEMICAL			
64	ALUM	COAGULANT AGEN	JAWAAD KAMAL
65	FEROUS SULPHATE	COAGULANT AGEN	CAMOTEX
66	LIME STONE	ALKALI AGENT	CAMOTEX
67	POLY ELECTROLYTE	FLOCCULANT AGEN	JAWAAD KAMAL
68	DEFIZZ-DE	ANTIFOMING AGEN	SH CHEMTEC
69	NALCO 2000	INHIBITOR-Corrosion Inhib	PACIFIC
70	MAX GREEN 3255	INHIBITOR-Corrosion Inhib	TRADE LINKERS
71	MAX TREAT 3002	INHIBITOR-Corrosion Inhib	TRADE LINKERS
72	MAX TREAT 2715	INHIBITOR-Corrosion Inhib	TRADE LINKERS
73	NALCO 7305	INHIBITOR-Corrosion Inhib	PACIFIC
74	MAX TREAT 635	INHIBITOR-Corrosion Inhib	TRADE LINKERS
75	MAX TREAT 605	INHIBITOR-Corrosion Inhib	TRADE LINKERS
76	SILSPERSE PLUS	INHIBITOR-Corrosion Inhib	PACIFIC

Fig 3. 5: Chemical Chart.

3.2 Production Accounting

3.2.1 Organogram:

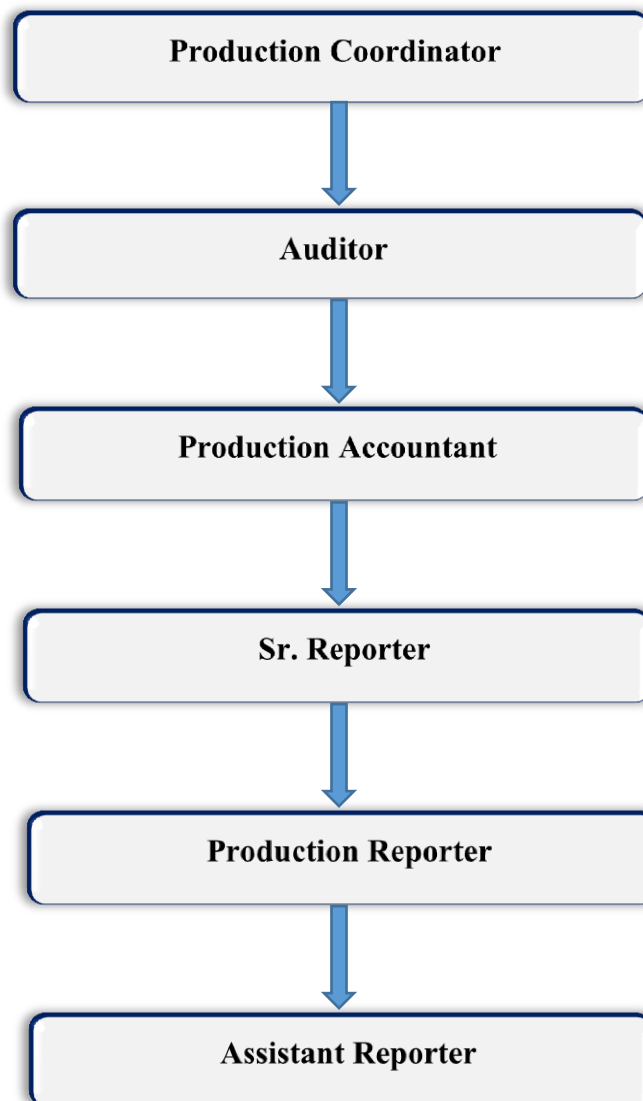


Fig 3. 6: Organogram of Production accounting.

3.2.2 Function of Production Accounting:

Keep accountings to the number of samples & bulk production pieces comes from garment section and go for the dry process or determined process.

3.2.3 Reporting system:

PM 6E:20

80/11/18

Denimach Washing Ltd.
Kewa Mouja, Ward # 5, Gorigoria, Masterbari, Steepur, Gazipur.

SHIFT: A Night
DATE: 22.10.18

SENDING BAY

SENT TO WASH STATUS

SL	FACTORY	STYLE	P.O	ROPE	WASH	RECEIVED			SENT TO WASH			BALANCE	LANDING BAY	REMARKS
						DAY	NIGHT	TOTAL	DAY	NIGHT	TOTAL			
1	DENIMA	0675	NABDY.USA	RED T-BLK	LT. WASH	00	00	1080	200	00	720	250	00	
2	GAP													
3	D/P	0675	NAB35.USA	RED T-YE	DK. WASH	00	1072	1072	00	00	00	1072	00	
4		0675	NAB37. CA	OR T-BR	"	00	844	844	00	00	00	844	00	
5														
6		771	1623X.USA	BLK T-BR	LT. WASH	00	00	2871	05	00	15	2856	2456	11/5 STOP
7		771	15240. CA	BL+RED T-YE	"	00	00	756	00	00	00	756	756	11/5 STOP
8														
9		771	MX52J.USA	BR T-VIO	"	00	00	7256	00	00	00	7256	7256	11/5 STOP
10														
11		744	LY04D. CA	BLK T-VIO	BLOE. BLCK	00	00	1055	00	810	810	245	00	
12		744	1478298(CHINA)	YE T-BR+CF	"	00	00	138	00	00	00	138	00	
13														
14		758	MX502.USA	BLCK	LT. WASH	00	00	14257	00	00	00	14257	14257	11/5 STOP
15		758	1476298(CHINA)	YE T-COF	"	00	00	472	00	00	00	472	472	11/5 STOP
16														
17		758	1476298(CHINA)	VIO T-RED	DK. WASH	00	00	525	00	00	00	525	00	
18														
19		758	MX51A.USA	BLOE	MED. WASH	00	1500	1477	00	00	200	12177	11277	
20														
21		610	LY14D.USA	ASH	DOMINICA	1210	1680	1905	1210	1680	12410	598	00	
22														
23														
24														
25	DENITON													
26		513		YE T-BLK	902	00	00	12345	00	00	8550	13026	00	
27		513		VIO T-BK	700	00	00	740	00	00	160	180	00	
28														
29		054		ASH T-BR	701	00	00	6947	00	840	992	2750	00	
30		054		WH T-BL	700	00	00	4050	00	00	256	13094	00	
31														
32		054		RED T-ASH	902	00	498	17672	720	800	15672	1100	00	
33		054		BR T-BLK	304	00	00	8421	00	00	7858	5103	00	
34														

Fig 3. 7: Production Accounts Report.

3.3 Dry Process:

3.3.1 Organogram:

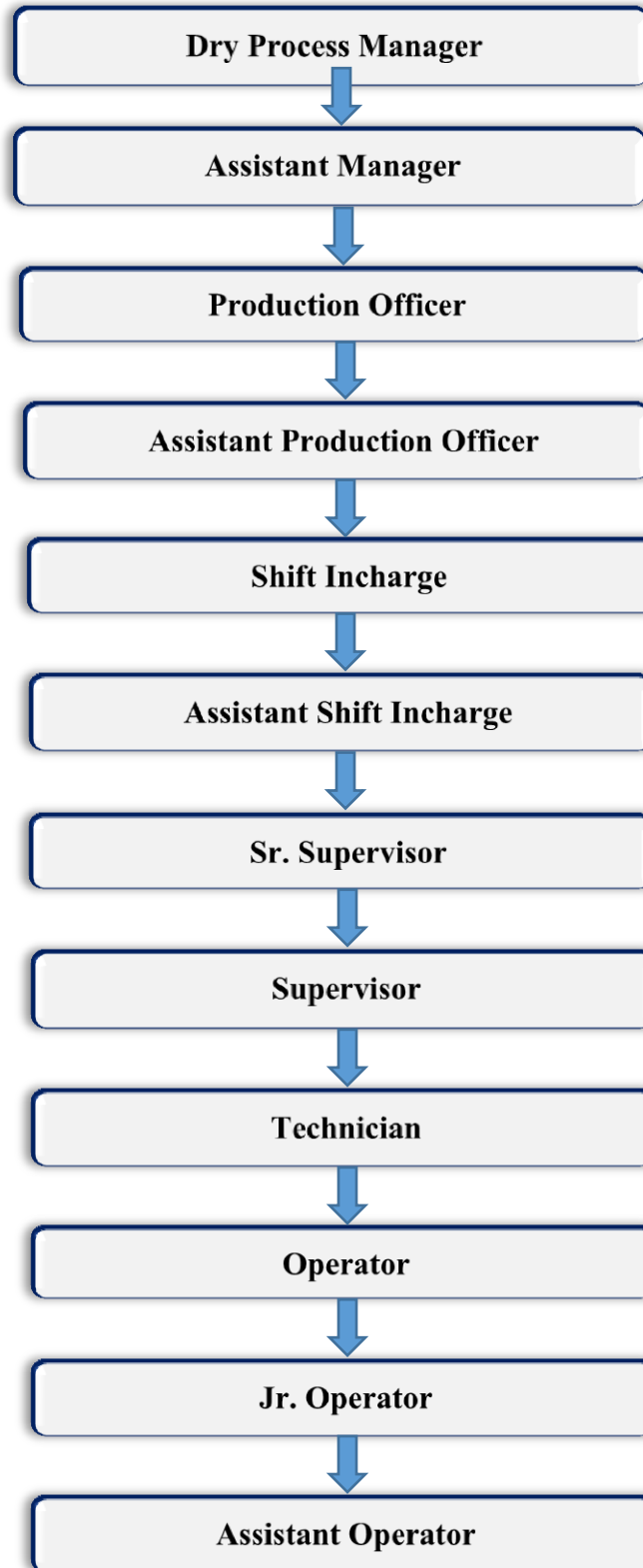


Fig 3. 8: Organogram of Dry process.

3.3.2 Layout:

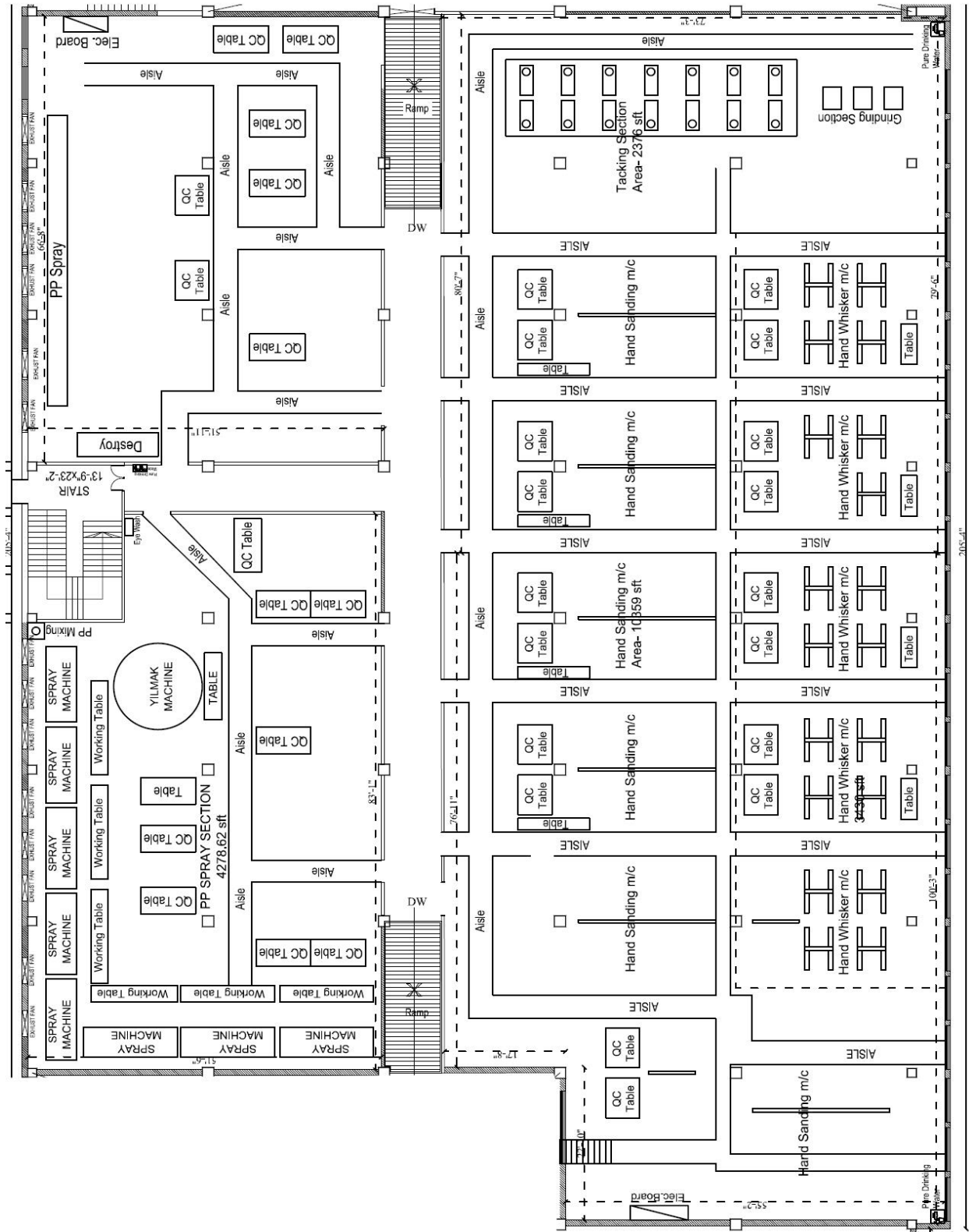


Fig 3. 9: Dry process 1st floor.

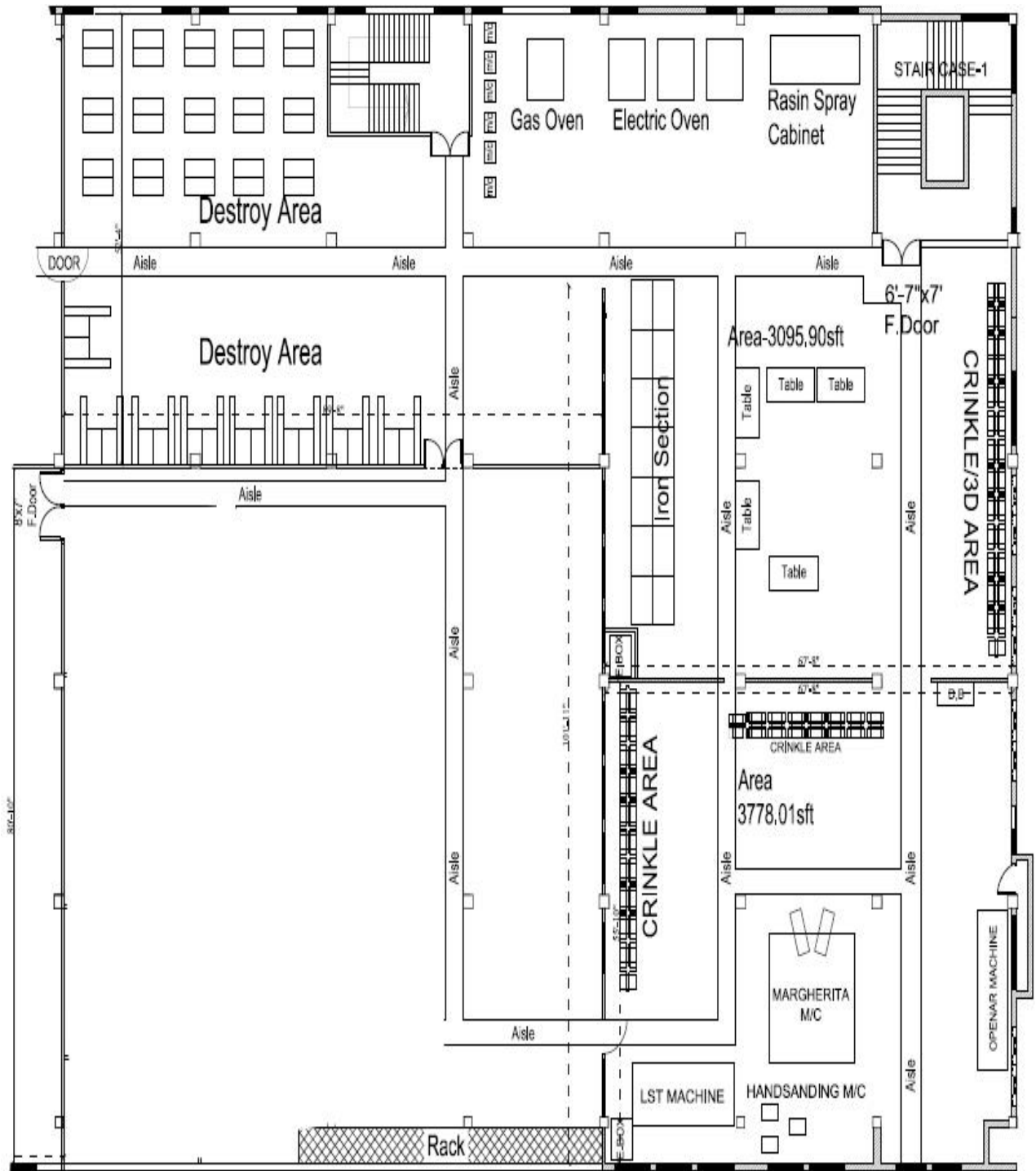


Fig 3. 10: Dry Process 2nd floor.

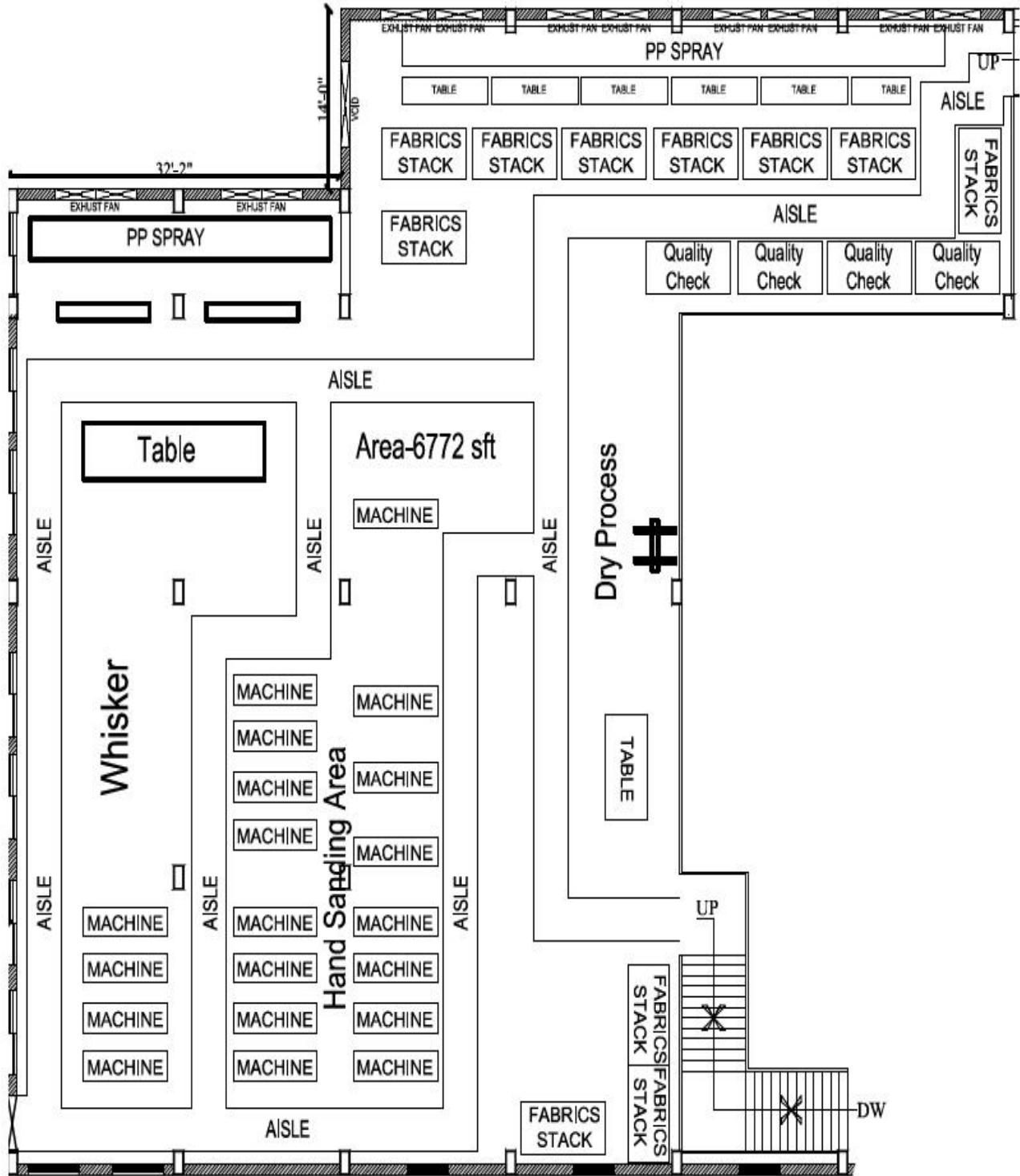


Fig 3. 11: Dry process (Rookies Floor).

3.3.3 Process Flowchart:

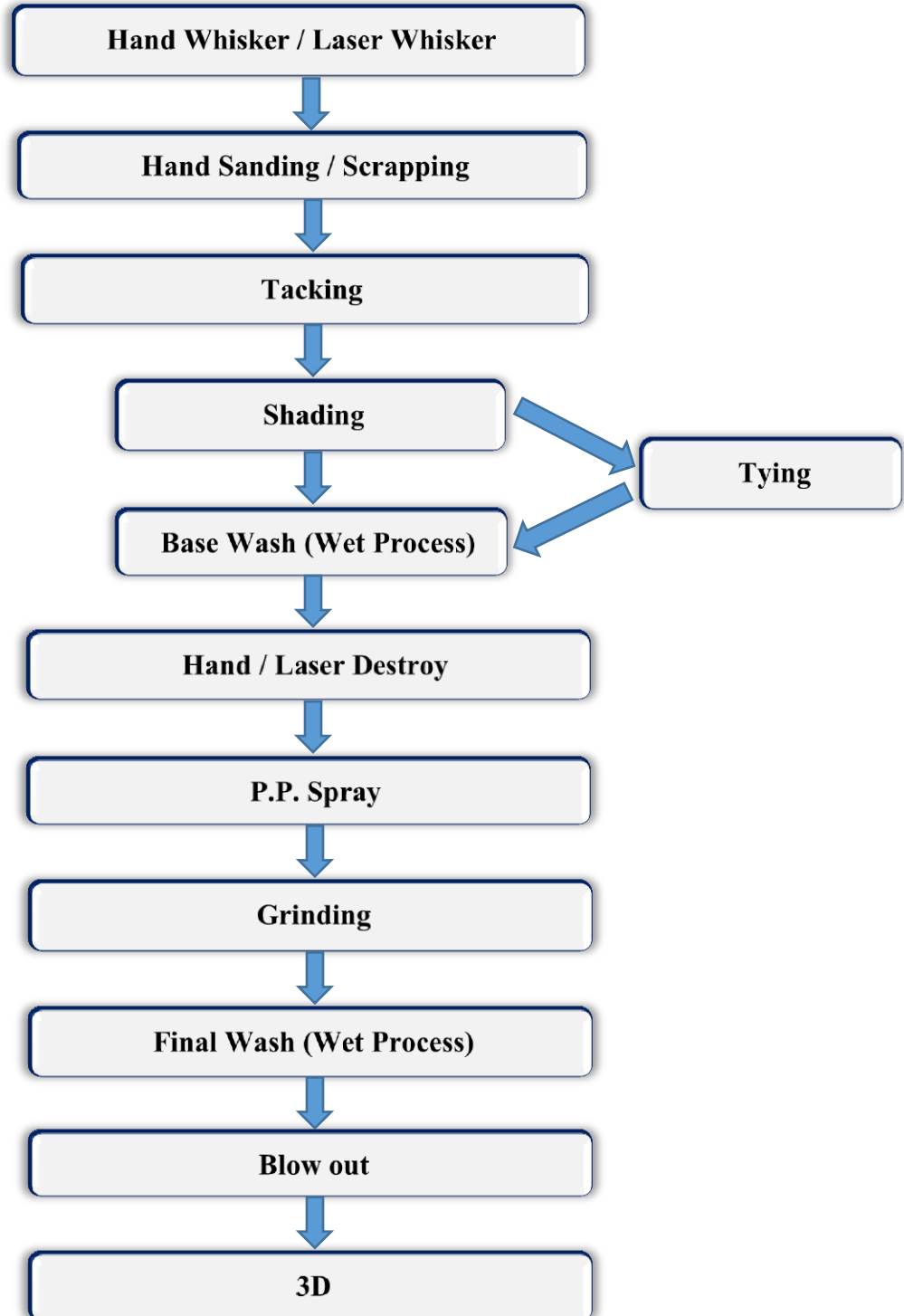


Fig 3. 12: Flowchart of Dry process.

3.3.4 Operation & Tools:

3.3.4.1 Hand Whisker:

Whiskers are one of the most important design of a used look garment. The idea of whiskers is taken from the worn out lines and impression patterns generated by natural wearing on hips and front thigh area. On old jeans, a number of patterns can be finding consequential to fabric, body shape of user or sitting posture.

- **Position of whisker:**
 - Top whisker
 - Chevron whisker
 - Knee chevron / Knee star
 - Back knee whisker

- **Total production line:** 16 line.
- **Number of operator:** 80-90
- **Production capacity:** 50,000 / day.

- **Equipment used:**
 - Whisker pattern
 - Sand paper / Emery paper

- **Picture:**



Fig 3. 13: (a)Hand Whisker, (b)Whisker Pattern.

3.3.4.2 Hand Sanding / Hand Scrapping:

Hand sanding are one of the most important design of a used look garment. The idea of whiskers is taken from the worn out color fading generated by natural wearing on hips, front thigh area, pocketing area, back thigh & knee area.

- **Total production line:** 16 line.
- **Number of Dummy:** 75 dummy.
- **Production capacity:** 50,000 / day.
- **Equipment used:**
 - Dummy
 - Sand paper / Emery paper
- **Picture:**



Fig 3. 14: Hand Sanding / Scrapping.

3.3.4.3 Emery Paper:

Emery paper is a type of abrasive paper or sand paper that can be used to abrade (remove material from) surfaces or mechanically finish a surface. This is accomplished by moving the abrasive-coated paper, with some pressure, against the fabric being processed. Generally abrasion is performed by manual labor.

➤ **Types of Emery paper used:**

- Black emery paper
- Red emery paper

➤ **Types of emery paper based on number:**

- 220
- 320
- 400
- 600
- 800
- 1000

➤ **Picture:**

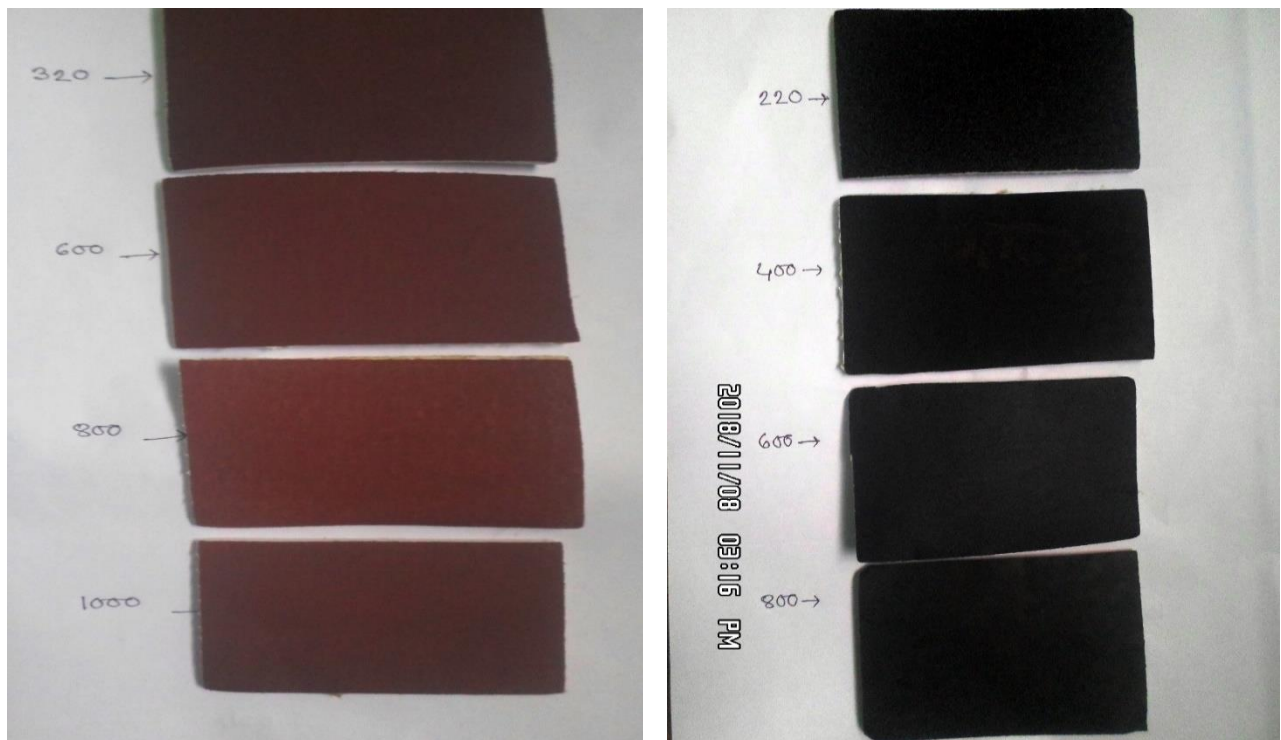


Fig 3. 15: Red & Black Emery Paper.

3.3.4.4 Tacking:

Tacking is one type of dry process which is done on the denim garment for effect. Actually it is done in some specific area to protect those area from color fading due to wash.

➤ **Number of machine:**

- 22

➤ **Equipment used:**

- Hand Tack Gun
- Tacking m/c
- Tack pin

➤ **Production capacity/day:**

- 15000 – 18000 / shift

➤ **Picture:**



Fig 3. 16: (a,b) Tacking m/c, (c) Hand Tag Gun.

3.3.4.5 Destroy:

Destroying is a dry process which is used to impart an old & destroyed look on the garment being processed. Generally warp yarn of the garment but some time both warp & weft are destroyed on specific area of garment.

- **Number of Destroy tools:**
 - 50 destroy tools.
- **Number of Grinding m/c:**
 - 12 grinding m/c
- **Equipment used:**
 - Destroy tools
 - Grinding m/c
 - High pressure air flow
- **Production capacity/day:**
 - 30,000 – 40,000 pcs/day
- **Picture:**




S/L	Name	Number	Picture
01	Destroy tools	50	
02	Grinding m/c	12	
03	Blowout (High pressure air flow)		

Table 3. 2: Destroy tools.

3.4.4.6 Laser:

Laser treatments are used exclusively in the upper end of the denim and are considered a more environmentally acceptable process than the traditional methods of finishing. It is a water free fading of denim. It is an ecological and economical process, less time consuming & higher Production capability, less floor Space consuming & consistency of Production is very high.

- **Number of Laser m/c:**
 - **Production running:** 5 m/c
 - **Newly Imported (Setting up) :** 4 m/c
- **Production capacity/day:**
 - 12,000 pcs/shift
- **Operations:**
 - Whisker
 - Scrapping effect
 - Destroy

➤ **Picture:**






S/L	Power	Number	Picture
01	100 W Single Head	1	
02	150 W Single Head	3	
03	600 W Single Head	1	
04	1200 W Double Head	4	New (Production isn't started yet)
			 

Table 3. 3: Laser Machine.

3.3.4.7 Potassium Permanganate (PP) spray:

Potassium permanganate spray is done on jeans to take a bright effect on scrapped area. PP solution is sprayed on the garment by normal spray gun. This PP spray appears pink on garment when fresh and turns to muddy brown on drying. The garment is hanged in open to dry after spray and when the potassium permanganate turns its colors completely then it is considered to ready for next process. It is always followed by neutralization process. Sodium Meta Bisulphate is most commonly used neutralizer.

- **Total production cabinet:** 4
- **Number of Spray guns:** 35
- **Equipment used:**
 - Spray gun
 - Compressed air
 - Dummy
 - Chemical (Potassium Permanganate, activator , water)
- **Production capacity/day:** 50,000 pcs/day
- **Picture:**



Fig 3. 17: PP Spray.

3.3.4.8 3D / Crinkle:

➤ **Equipment used:**

- China 3D m/c
- Steam Iron
- Hanger trolley
- Oven
- Resin spray gun
- Chemical : Resin, binder, water

➤ **Production capacity/day:**

- 40,000 pcs / day

➤ **Picture:**






S/L	Name	Number	Picture
01	China 3D m/c	33	
02	Steam Iron	29	
03	Oven i. Steam ii. Gas (conveyer=1)	3 2	
04	Hanger trolley		
05	Resin Spray booth	1	

Table 3. 4: 3D / Crinkling.

3.4 Wet Process:

3.4.1 Layout:

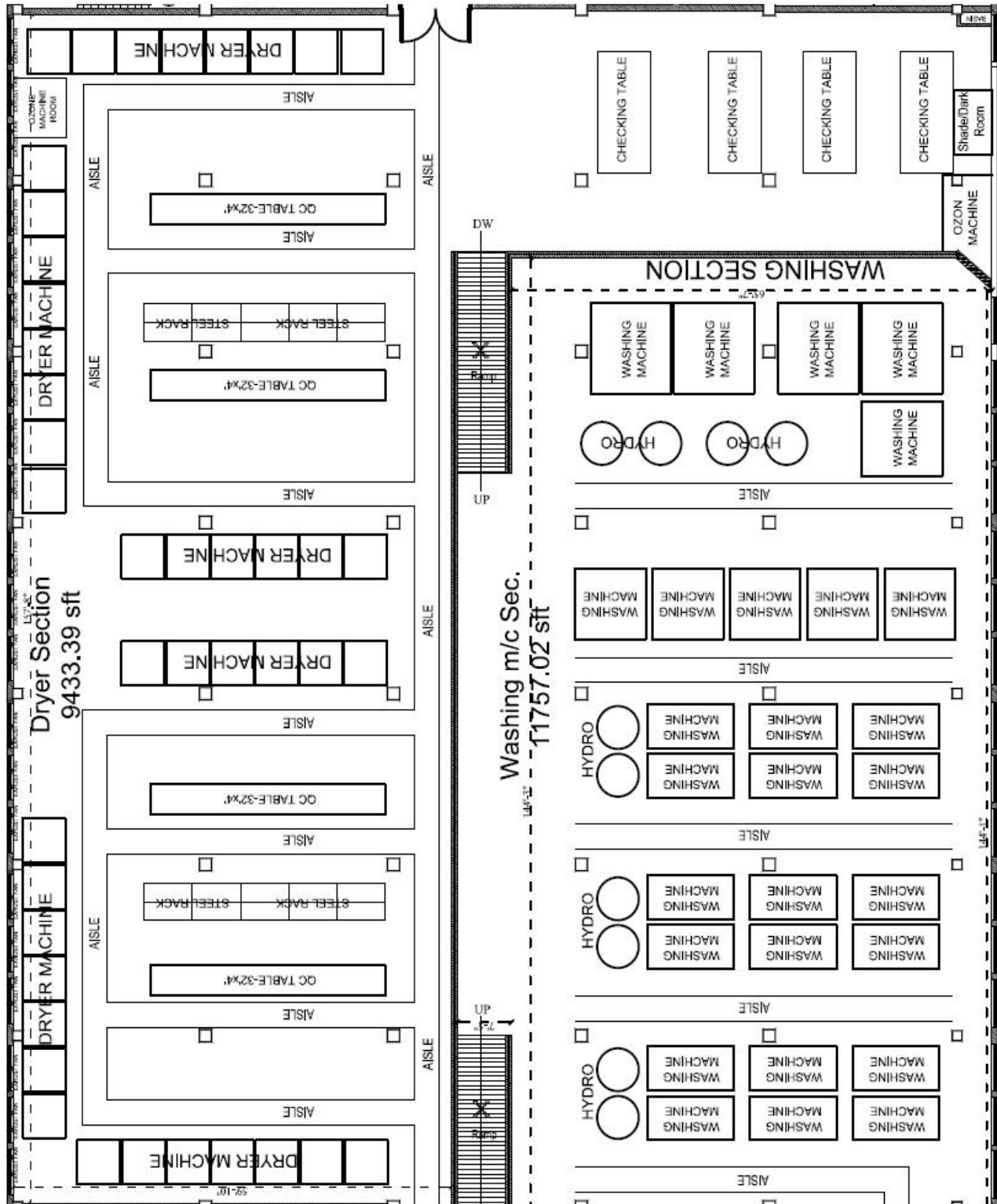


Fig 3. 18: Wet process floor 1.

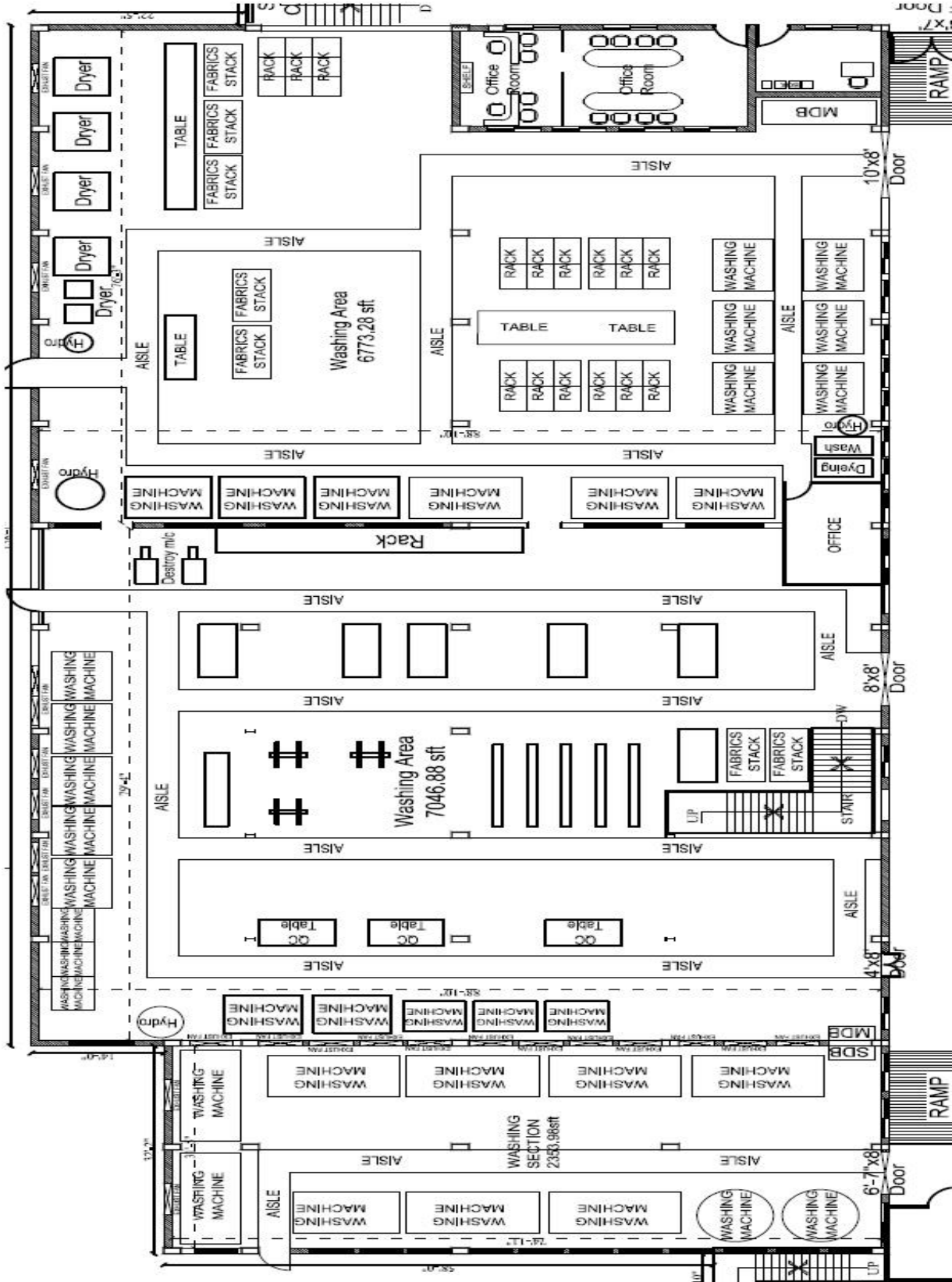


Fig 3. 19: Wet process floor 2.

3.4.2 Organogram:

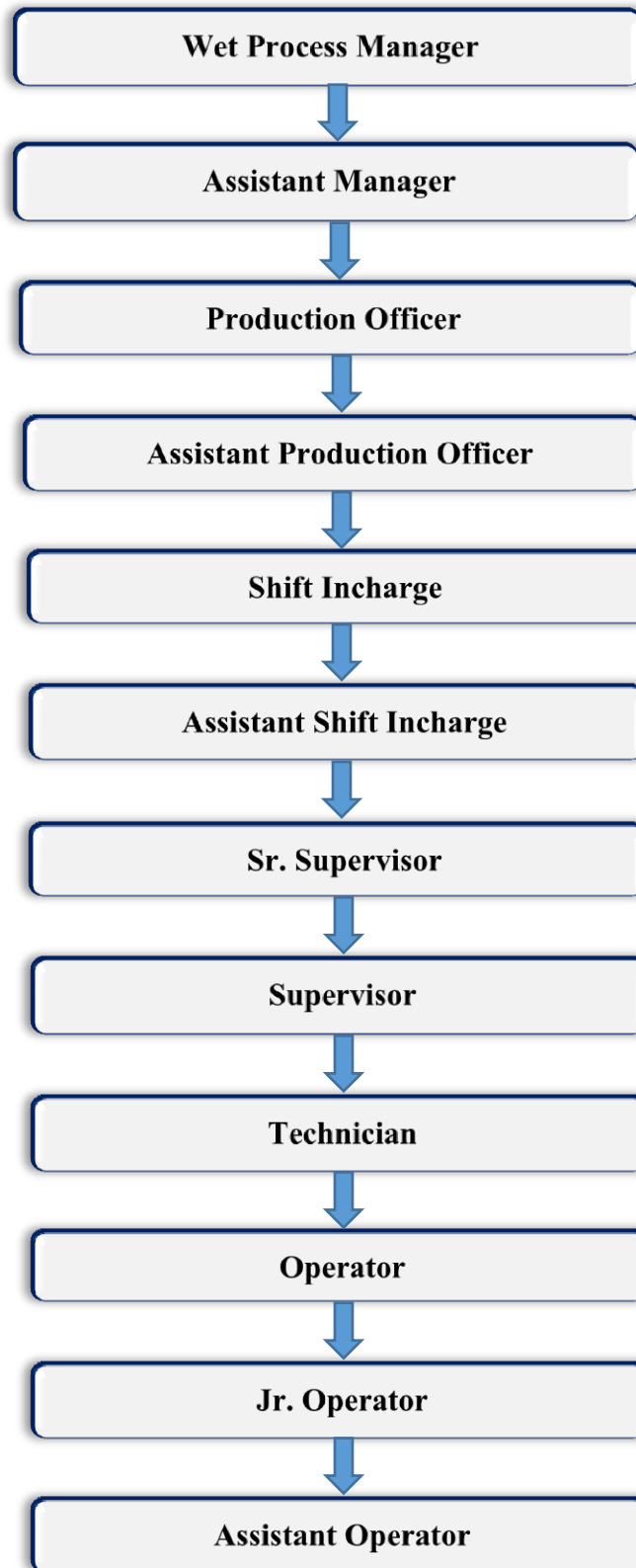


Fig 3. 20: Organogram of Wet process.

3.4.3 Process Flowchart:

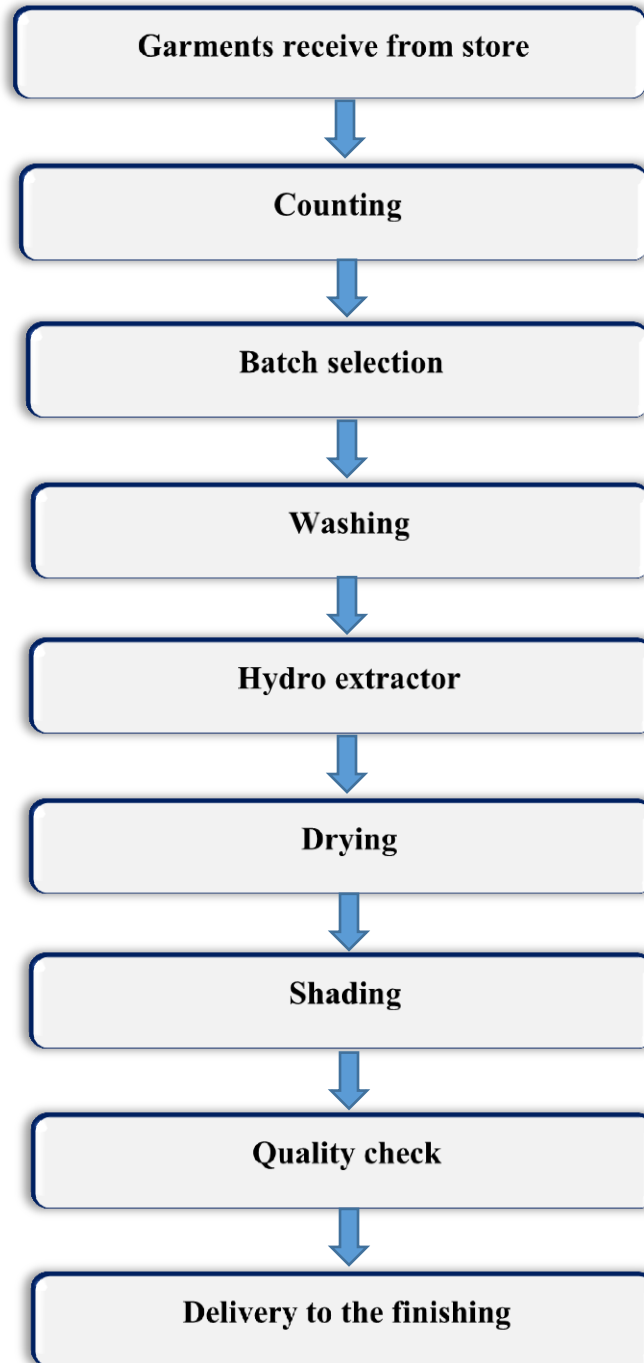


Fig 3. 21: Flow Chart of Wet process.

3.4.4 Machineries used:

3.4.4.1 Washing m/c:

- **Total Production line:** 9 line.
- **Types of m/c:**
 - Side loading / Belly loading
 - Front loading
- **Total number of m/c:**
 - Side loading = 29
 - Front loading=16 (DANIS:10 + Brongo: 6)
- **Average RPM :** 25 – 30
- **Function:** Any kind of wet wash.
- **Production capacity/day:**
 - **Base wash:** 45,000-50,000 pcs/day
 - **Final wash:** 65,000-70,000 pcs/day
- **Picture:**



a



b



c

Fig 3. 22: a. Side loading, b. Front loading (Brongo), c. Front Loading (DANIS).

3.4.4.2 Hydro extractor:

- **Total number of m/c: 15**
- **Average RPM : 1400**
- **Function:** Remove excess water (65%) from washed garments.

- **Picture:**



Fig 3. 23: Hydro extractor Machine.

3.4.4.3 Dryer:

- **Types of Dryer m/c:**
 - Steam dryer
 - Gas dryer
- **Total number of m/c:** 42
- **Average RPM :** 25 – 30
- **Function:** Dry the garments after wash.
- **Picture:**



S/L	Dryer Type	Number	Picture
01	Gas Dryer	13	 A long row of blue gas dryers in a laundry facility. The machines are arranged in a line, and the image shows the front panels with circular doors. A timestamp in the bottom right corner reads "2018/11/08 01:45 PM".
02	Steam Dryer	29	 Two steam dryers in a laundry facility. The machines are blue and have two circular doors each. A timestamp in the bottom right corner reads "2018/11/08 01:47 PM".

Table 3. 5: Dryer Machine.

3.4.4.4 Ozone Machine:

Ozone machine takes air from the atmosphere and transforms it into ozone, liberating the particles inside the tumbler to produce results such as the elimination of indigo dye excess or the reproduction of the bleaching effect to give garments the real look of outdoor usage.

➤ **Total number of m/c:** 01

➤ **Average RPM :** 20-25.

➤ **Function:**

In dry processes the ozone effectively cleans the garment, improving the whiteness of used areas and eliminating the back staining. By applying ozone to wet garments we accomplish the bleaching effect without chemicals and in just one step. This sustainable process can be used to fade down colors in denim garments.

➤ **Brand Name:** DANIS

➤ **Picture:**



Fig 3. 24: Ozone Machine.

3.4.5 Types of wash performed:

S/L	Wash Name	Chemical Used
01	Desizing	Soda ash, Anti back stain (Deterpal EPQ, Deterpal TSK), Caustic soda, H ₂ O ₂ , Deterpal AJT New, Biode, Softener, Shine code SD, ect.
02	Enzyme wash	MR, Combie, Biopolish NDX, Biopolish CR, Anti back stain
03	Bleach wash	Chlorine bleach 35%, Chlorine bleach 65% , Anti back stain, etc.
04	Stone wash	Pumice stone, Anti back stain, etc.
05	Stone enzyme	Pumice stone, MR, Combie, PW-888, Bio new NST, Bionew test, D-5, Denimistone cold, NHC cold,
06	Random wash	Ball, cocsheet, stone, potash, phosphoric acid, acetic acid, pp activator
07	Towel potash	Towel, potash, phosphoric acid, acetic acid
08	Towel bleach	Towel, Chlorine bleach 65%
09	Fixing	Nova fix FF20, WRI, etc.
10	Cleaning	Detergent, soda ash, H ₂ O ₂ , oxalic acid, DAM, f-33, hydrose, Anti back stain, etc.
11	Potash wash	Potash, PAP, phosphoric acid, acetic acid
12	Bleach Neutral	Sodium meta bishuphite, MAX, peroxide, hypo, etc.
13	Potash Neutral	Sodium meta bisulohite, MAX, peroxide
13	Softening	OT CON, AZ new, Anti Ozone, Nonamin, Anti ozone 10, Evo soft pen, Megasoft 955, Biosoft CLS, Noamin LST 40,
14	Tinting	Yellow 2RL, Yellow K2RL, Orange 2GL, Scarlet BNL, Red BWS, Dark blue GL, Black NF, Black VSF, Black CLS, Turkish blue FBL, Khaki UK, Brown AGL, Brightenr- (blue, red, white)

Table 3. 6: Wash name & chemical used.

3.5 Quality section

3.5.1 Organogram:

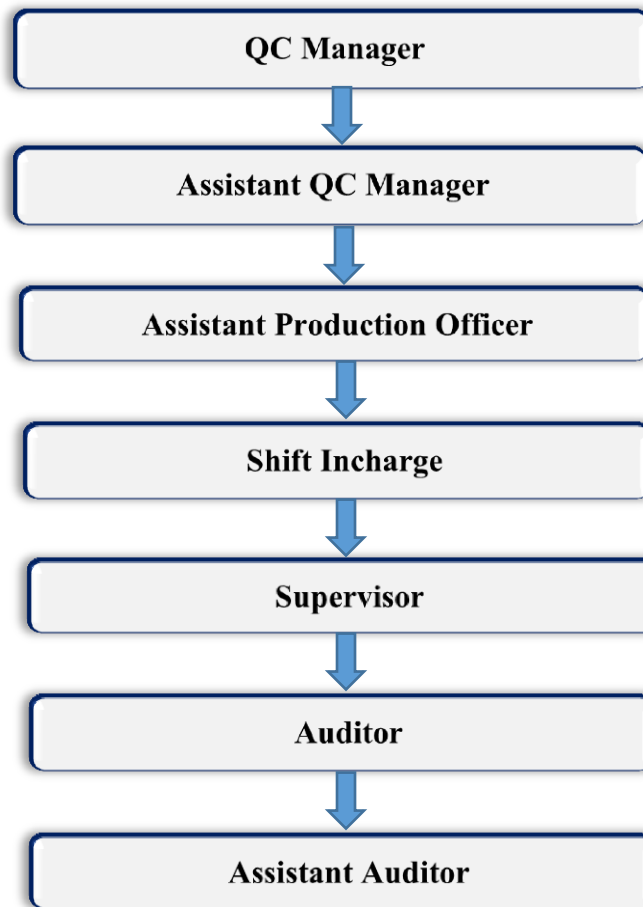


Fig 3. 25: Organogram of quality section.

3.5.2 Process Flowchart:

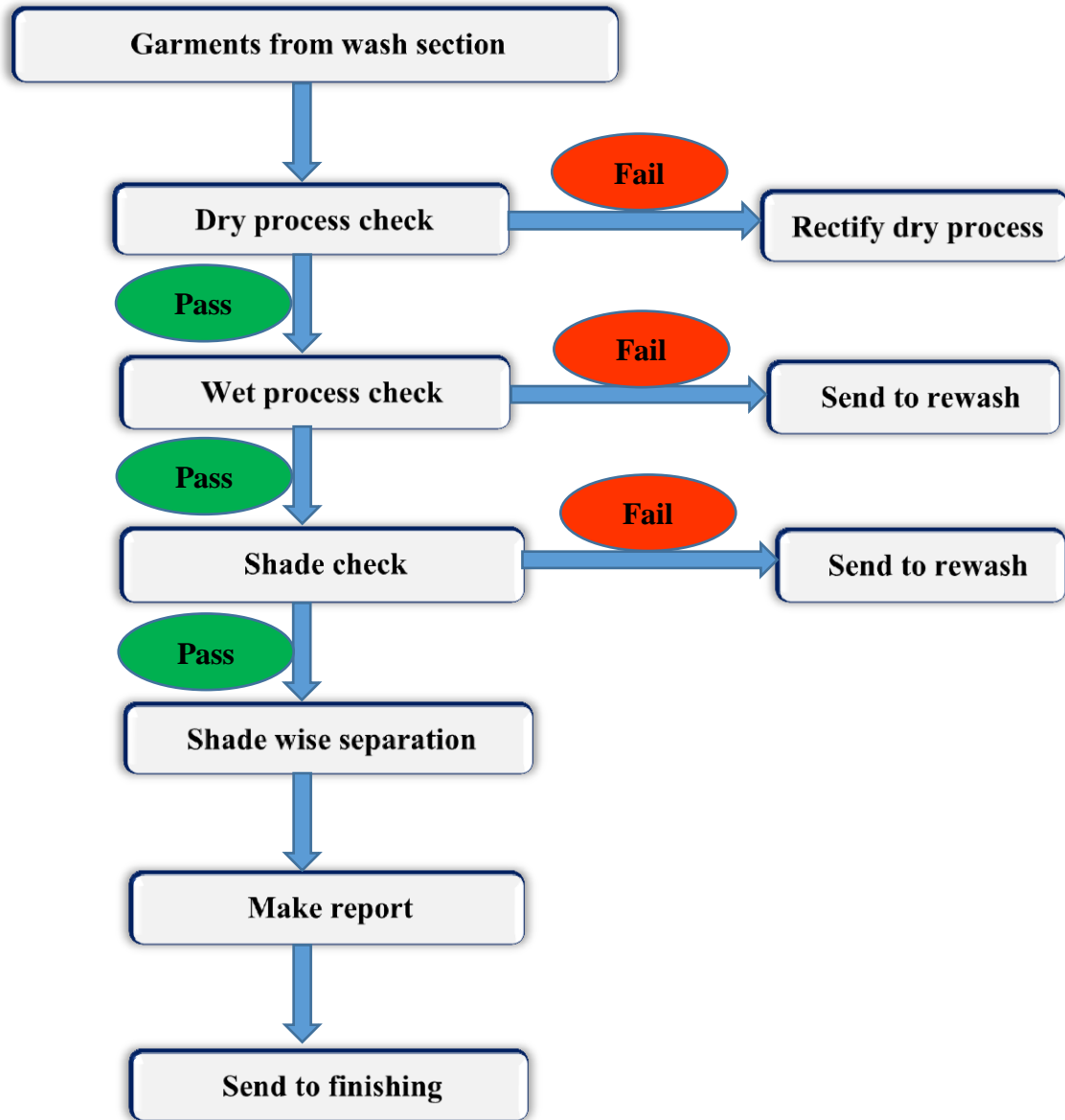


Fig 3. 26: Flowchart of quality section.

3.5.3 Reporting Format:

BUYER : _____

STYLE NO : _____

WASH : _____

DATE :

SHIFT :

QC. NAME : _____

ITEMS : _____

BUYER : _____

DATE :

SHIFT :

dm **Denimach Washing Ltd.**
 Kewa Mouja, Ward # 5, Gorgania, Masterbari, Steepur, Gazipur.

DAILY QC PASS HOURLY REPORT

SL NO	HOURS	PASS GMTS	WET PROCESS			TOTAL REWASH	SHADE LIGHT	WHISKER PROBLEM	DRY PROCESS REWORK				TOTAL REWORK	SPOTS	REJECT	OTHERS
			SHADE DARK	SHADE BLUE	TINT MORE				TINT LESS	H/S HEAVY	H/S LESS	F.P SPRAY				
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
TOTAL																

COMMENTS : _____

SHIFT SUB

SHIFT INCH

TOTAL CHECKED PCS

TOTAL PASS PCS

TOTAL WET REWORK

TOTAL DRY REWORK

SPOTS

REJECTIONS

A.P.O.P.O

AQAM/DM

MANAGER (PROD)

DGM

Fig 3. 27: Reporting format of quality section.

3.6 Research & Development (R&D)

3.6.1 Layout:

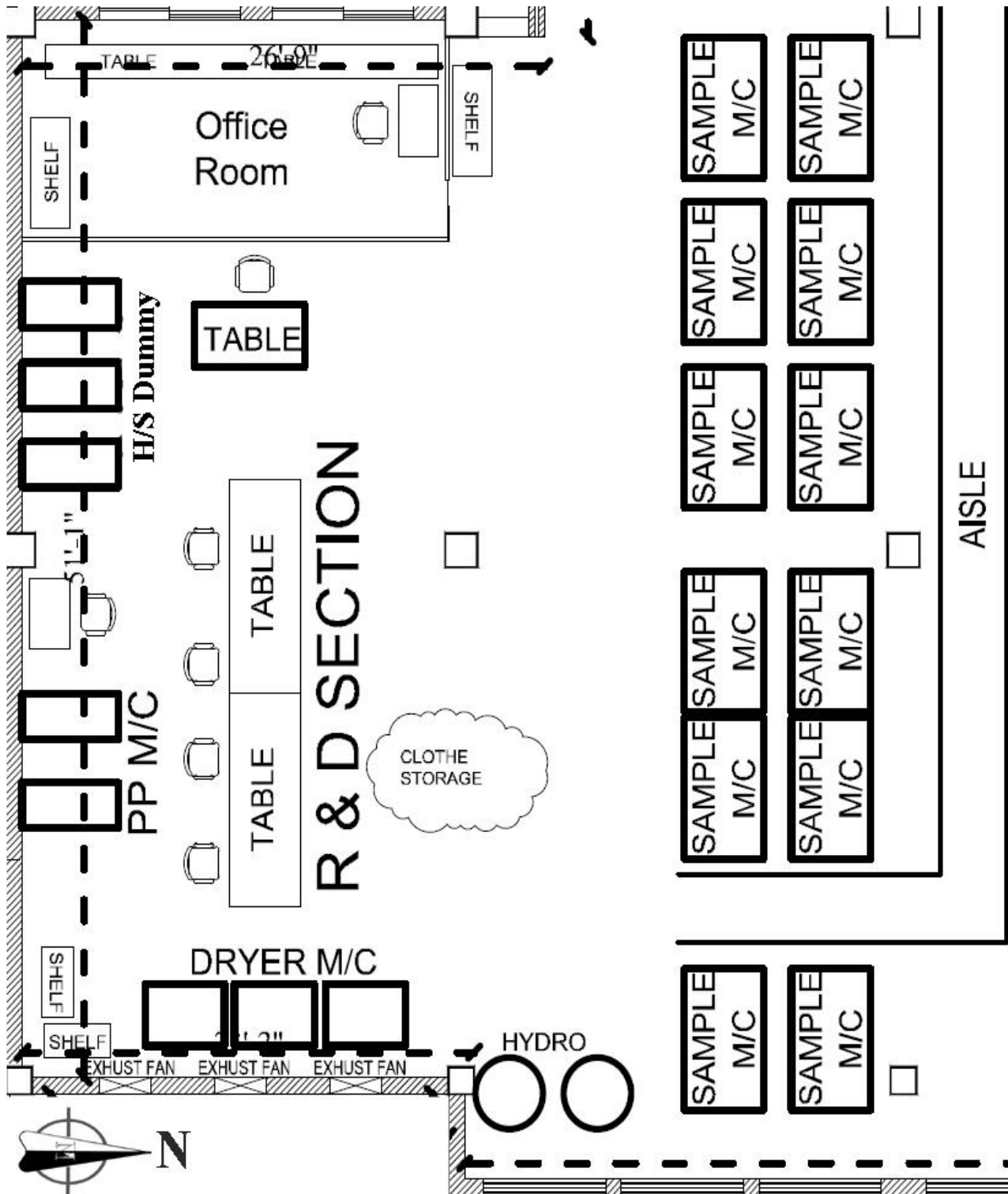


Fig 3. 28: Layout of R&D section.

3.6.2 Organogram:

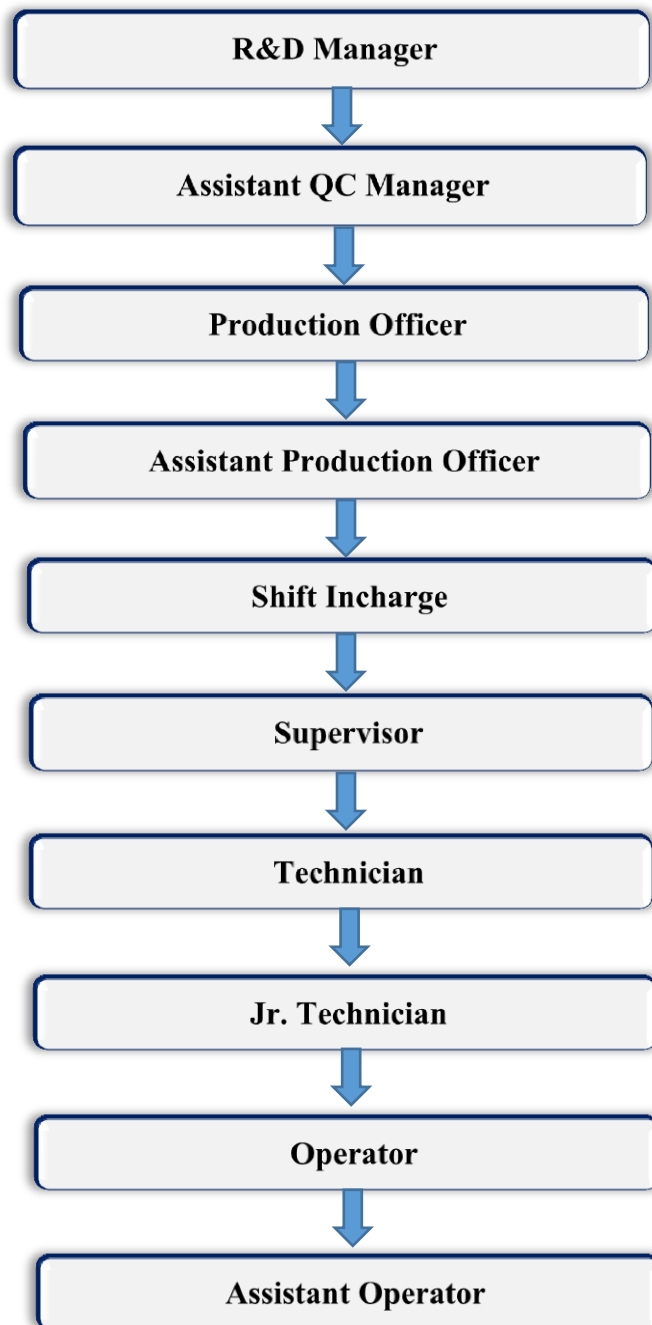


Fig 3. 29: Organogram of R&D section.

3.6.3 Machines & Tools:

Process	Name	Number	Picture
Wet process	Washing m/c	Side loading= 19	
		Front loading= 2	
		Total (19+2) =21	
	Hydro extractor	3	
	Dryer	3	
	Hand Scrapping Dummy	3	
	PP Gun	3	







Dry Process	PP Spray Dummy	2	
	Tacking m/c	1	
	Grinding m/c	1	
	Destroy Tools	3	
	China 3D	1	
	Oven	1	

Table 3. 7: Machines & tools of R&D section.

3.7 Laboratory

3.7.1 Layout:

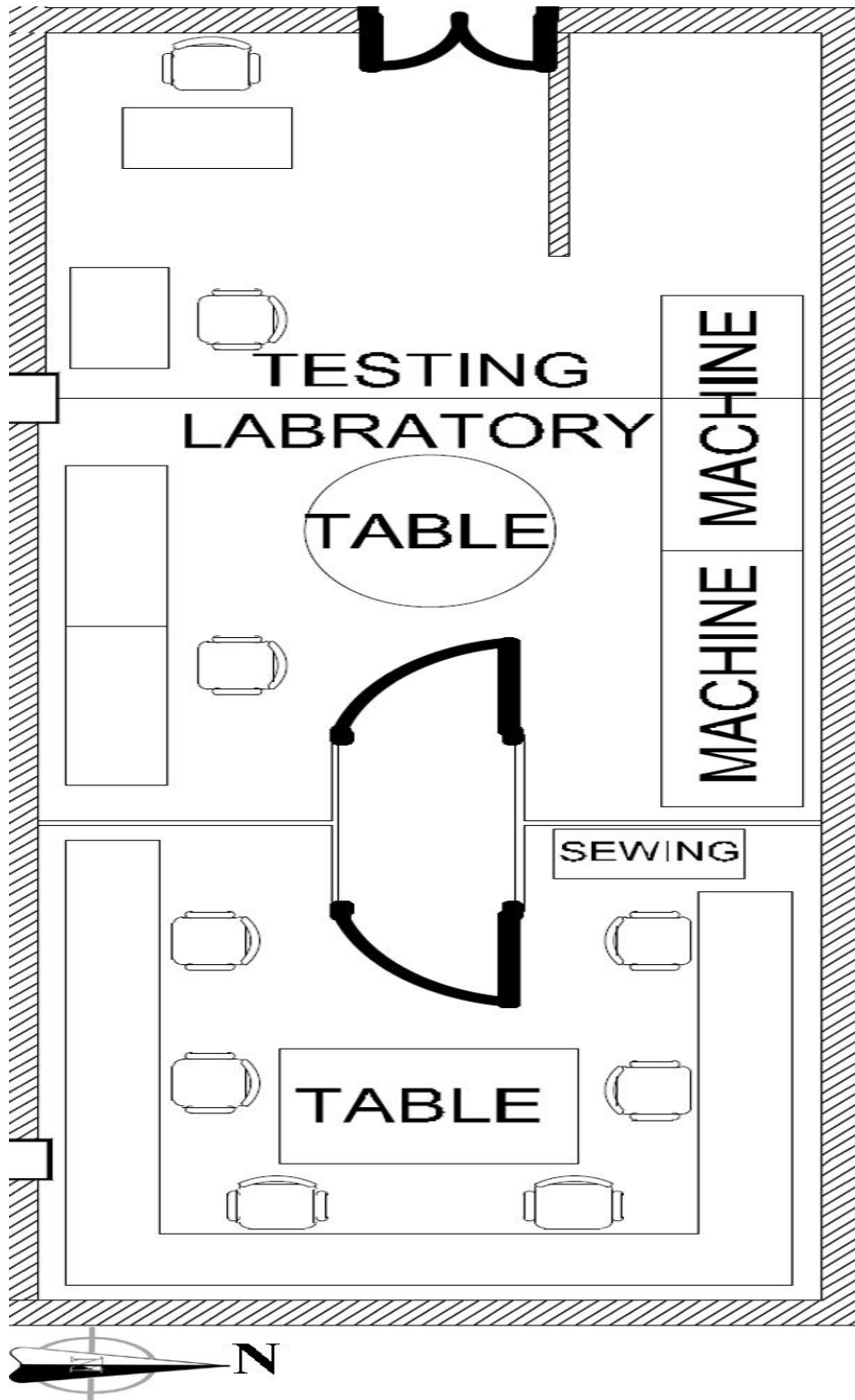


Fig 3. 30: Layout of laboratory.

3.7.2 Organogram:

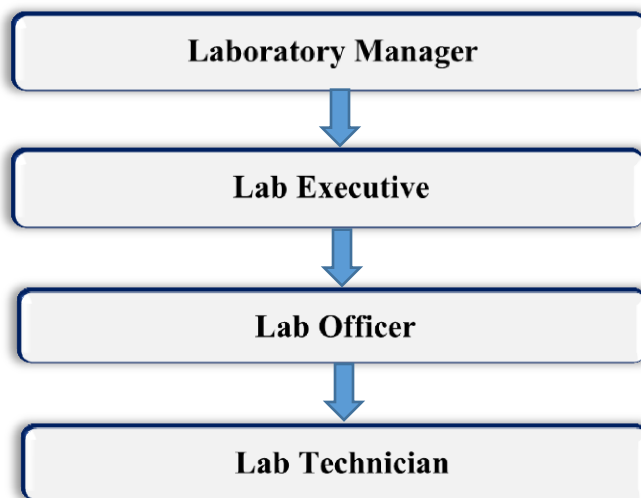


Fig 3. 31: Organogram of Laboratory.

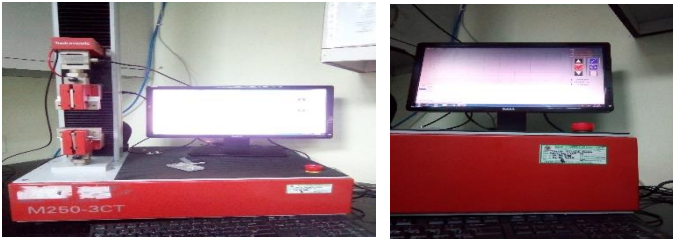


3.7.3 Test Performed:

S/L	Test Name	Standard	Sample size & Specification
01	Fabric weight	ASTM D3776	
02	Color Fastness to Rubbing	ISO 105 X12 AATCC-8	Standard white fabric 5cm × 5 cm
03	Color Fastness to Ozone	AATCC 109	Sample: 10 cm × 6 cm Cycle time: 4 hr 30 min O₃ PPM: 5
04	Color Fastness to Washing	ISO 105-C10A(1)	Sample: 10 cm × 4 cm
05	Color Fastness to water	ISO 105-E01	Sample: 10 cm × 4 cm
06	Color Fastness to Perspiration	ISO 105-E04	Sample: 10 cm × 4 cm
07	pH test	ISO 3071	Sample: 5mm × 5mm Sample weight: 2 gm Tested sample: 3
08	Nickel test	EN 12471	Chemicals: Amonia (NH ₃) Dimethyl glyoxime.
09	Shrinkage percentage test	ISO 6330	Sample: 50cm × 50 cm Measurement Area: 35 cm × 35 cm
		EN 26330	
10	Appearance after home laundering	CPSD-SL-31005-METHOD	Sample: 10 cm × 4 cm
		ASTM-D1424	Sample: 100mm × 75 mm Slit: 20 mm Notch: 12mm

11	Tear strength test	ISO 13937-2	Sample: 200mm × 50mm Slit: 100mm Tear: 75mm
		ASTM-D2261	Sample: 200mm × 75mm Slit: 75mm Tear: 75 mm
12	Tensile strength test	ASTM-D5034	Sample: 150mm × 100 mm
		ISO 13934-2	Sample: 200mm × 100 mm
		ISO 13934-1 (Grave strip method)	Sample: 200mm × 50 mm
13	Button pulling strength test		
14	Stretch, Growth & Recovery test	ASTM D3107 (MODIFIED)	Sample: For Garment: (100+152+100)mm×50mm For Fabric: (100+252+100)mm×50mm Folding: 33mm Sewing: 27mm

Table 3. 8: Test perform in lab.

3.7.4 Machines & Equipment:

S/L	Name	Picture
01	Tensile Strength Tester	
02	Elmendorf Tear Tester	
03	Crock Meter	

04	Ozone Exposure Chamber	
05	Washing Machine	
06	Dryer	
07	Mechanical Shaker	
08	Digital Balance	
09	pH Meter	

10	Perspirometer	
11	Thermo hygograph	
12	Plain Lock Stich Sewing m/c	
13	Stretch Growth & Recovery Board	
14	GSM Cutter	
15	Templates of Tear & Tensile test	
17	Color Matching Cabinet	
18	Grey Scale	
19	Scissors & Measuring instruments.	

Table 3. 9: Machine & equipment in lab.

3.8 Finishing Section

3.8.1 Organogram:

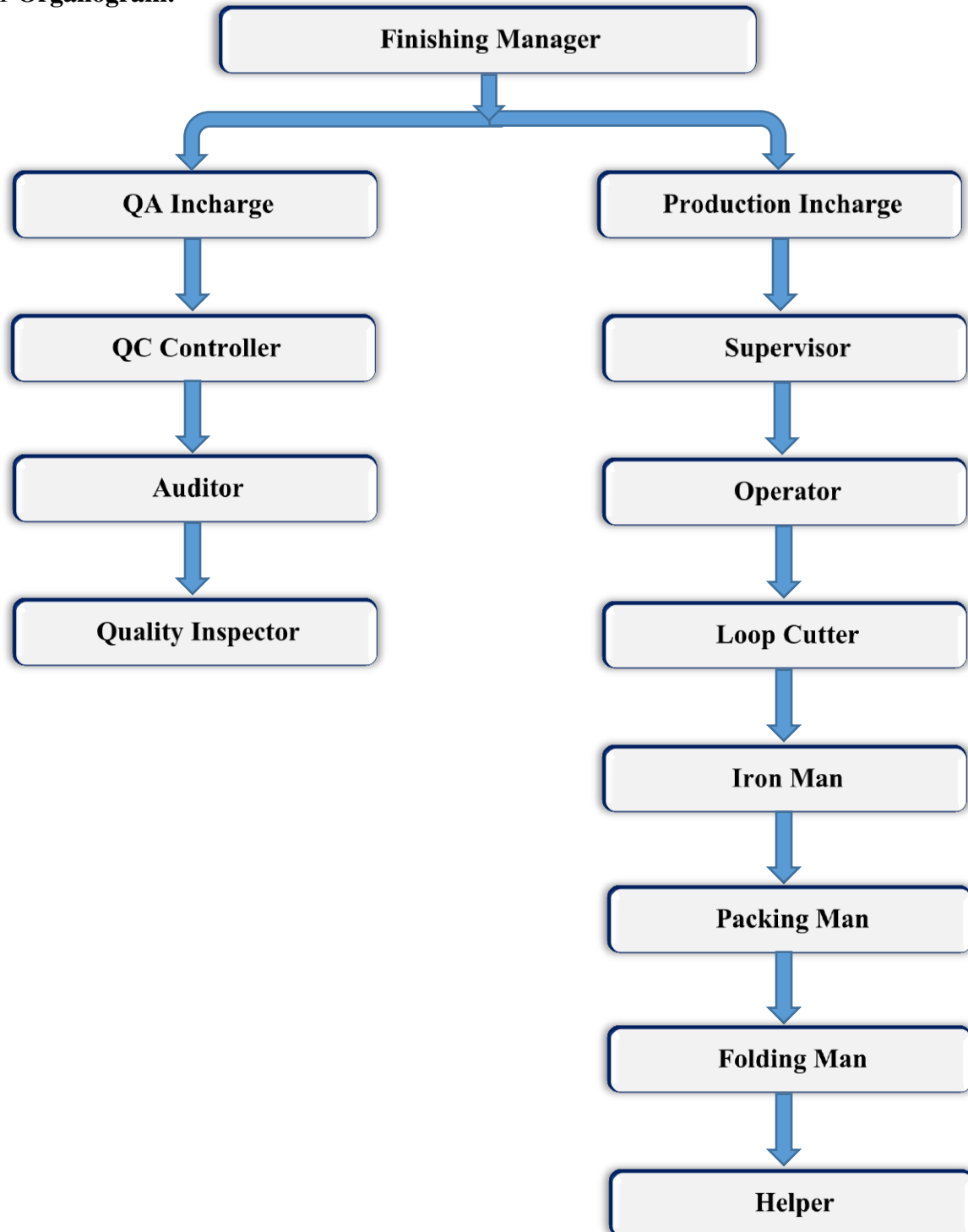
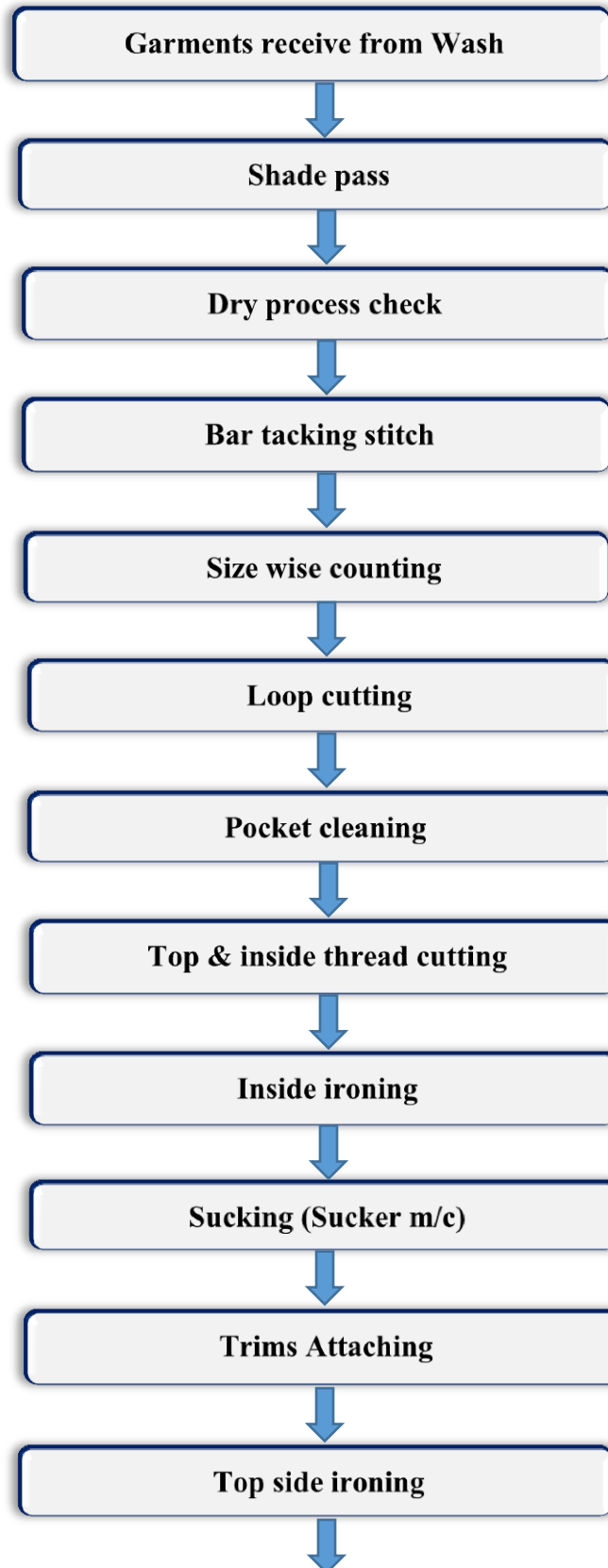


Fig 3. 32: Organogram of Finishing Section.

3.8.2 Process Flowchart:



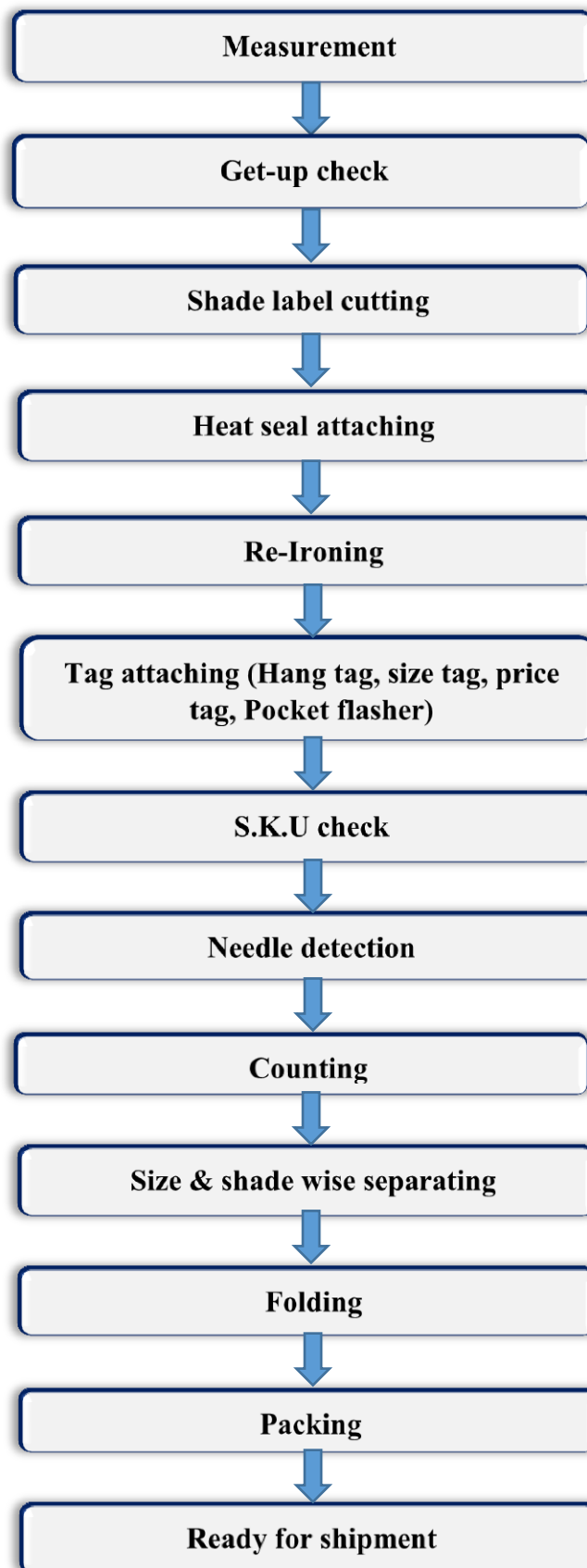


Fig 3. 33: Process flowchart of finishing section.

3.8.3 Major Operations:

- Ironing
- Quality check
- Metal detection
- Trims & accessories attaching (Hang tag, Price tag, hanger, sticker, button, logo etc.)
- QA inspection
- Folding / Rolling
- QA supervision
- Packing / cartooning

3.8.4 Machines and equipment:

- Bar tacking m/c
- Steam iron
- Sucker m/c
- Lock stitch sewing m/c
- Button attaching m/c
- Heat pressing m/c
- Tag gun
- Tacking m/c
- Needle detector
- Hand metal detector
- Thread cutter
- Scissors
- Measuring Instruments

3.8.5 Product Evaluation Process:

- Shade check
- Top side check
- Inside check
- Accessories check
- Measurement check

- Get-up check
- S.K.U. check
- Final Random Inspection (FRI)

3.8.5.1 **Final Inspection:**

Garments are inspected by AQL. In this system samples are collected & inspected by statistically from the lot size and will decide the lot of garments to be granted or rejected. AQL is mainly used in final inspection after garment making.

3.8.5.2 **Defect Classification:**

The client defines the AQL and the maximum number of defective goods allowed in the sample size.

Defects detected during visual inspection are usually classified within 3 categories: “Critical”, “Major” and “Minor”.

Allowed defect according to lot size for all sample size,

Critical defect= 0

Major= 2.5

Minor= 4.0 / 6.5

3.9 Maintenance, Utility & Engineering Section

3.9.1 Layout:

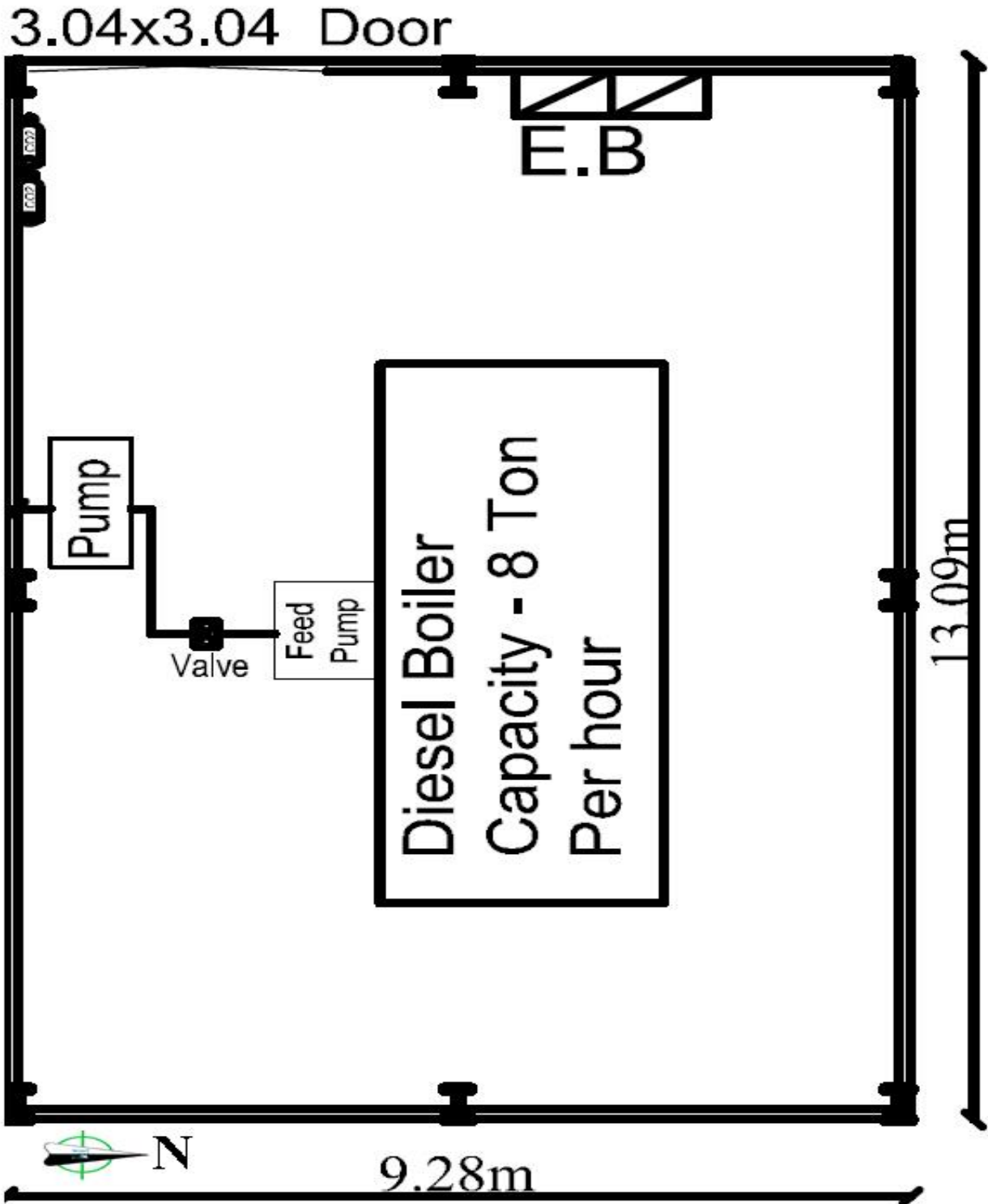


Fig 3. 34: Layout of diesel boiler section.

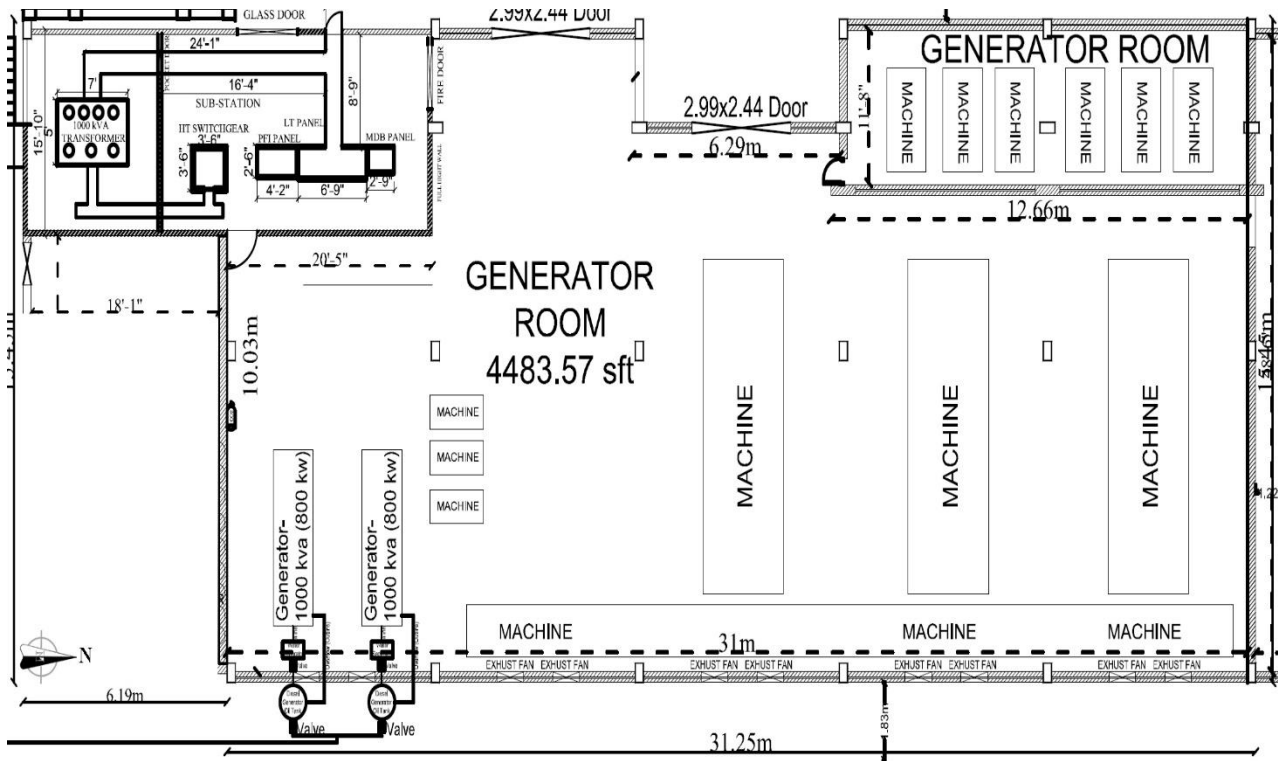


Fig 3. 35: Layout of generator section.

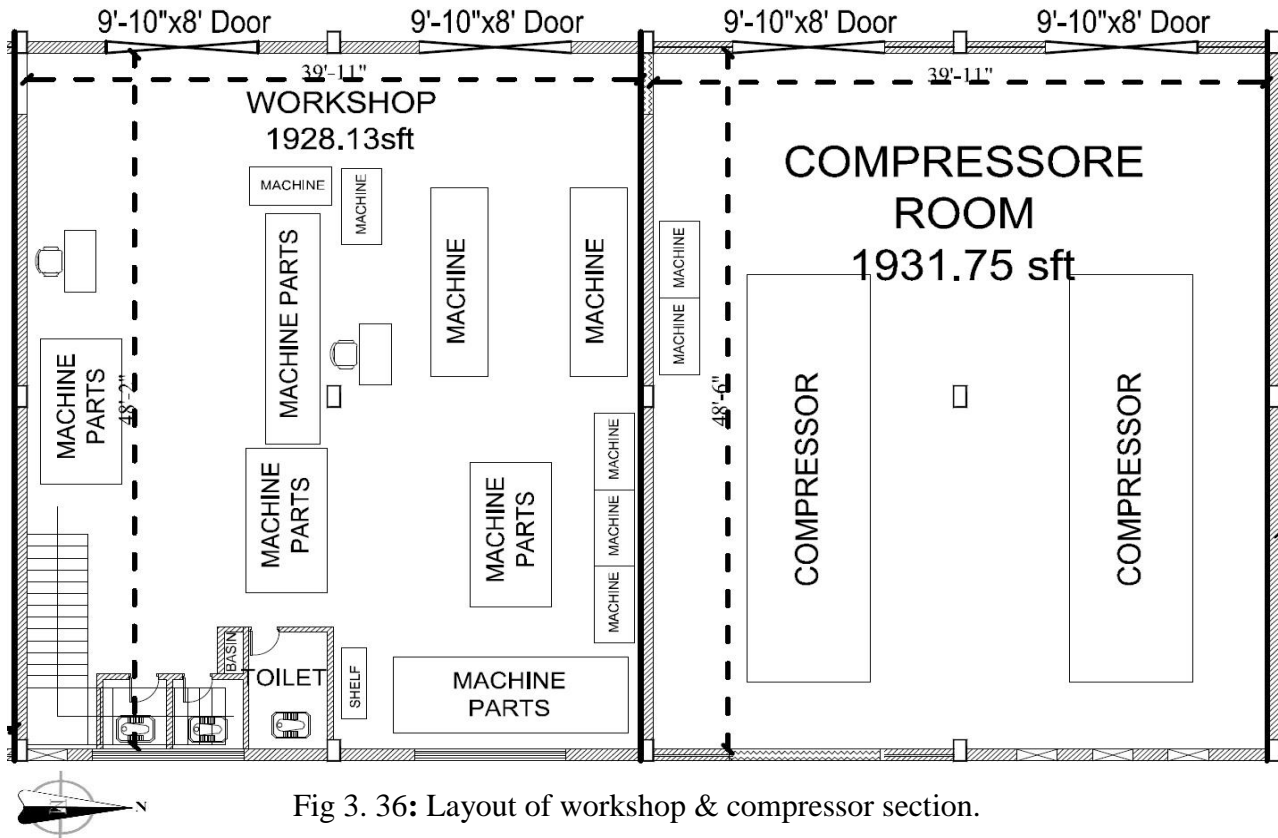


Fig 3. 36: Layout of workshop & compressor section.

3.9.2 Organogram:

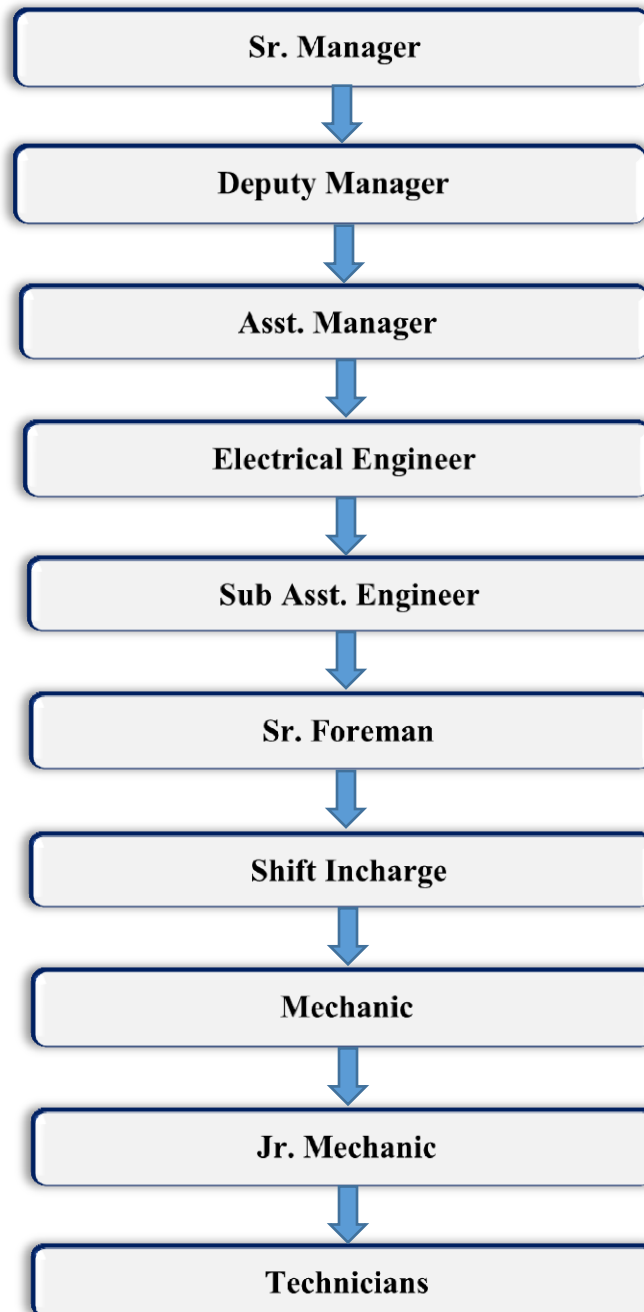


Fig 3. 37: Organogram of utility & engineering section.

3.9.3 Boiler:





S/L	Boiler Type	No.	Capacity (Ton)	Tube content	Brand	Picture
01	Diesel	1	8	Fire tube	THERMAX	
02	Gas	2	5+5			
		1	250kg			
03	Exhaust Gas (EGB)	1	1.5			
Total		5				

Table 3. 10: Boiler.

3.9.4 Generator:



S/L	Generator type	No.	Capacity (KW)	RPM	Volt	Brand	Picture
01	Gas 12 Cylinder & Water cooling	3	900 × 3	1000			
02	Diesel	2	800 × 2	1500	415		
Total		5					

Table 3. 11: Generator.

3.9.5 Compressor:



S/L	Number	Power (KW)	Capacity (m ³ /min)	Origin	Brand	Picture
01	5	75	12,59	Belgium = 4, India = 3		
02	2	55	8.71			
Total = 7						

Table 3. 12: Compressor.

3.9.6 Mechanical workshop:

S/L	Name	No.	Picture
01	Lathe m/c	3	
02	Grinding m/c	1	
03	Ark Welding m/c	2	
04	Stand Drill m/c	2	
05	Bar cutter m/c	1	
Other Instruments			
 			

Table 3. 13: Equipment in mechanical workshop.

3.9.7 Operation:

Maintenance is a process by which equipment is looked after in such a way that trouble free.

- All machines are checked in every month.
- All power boards & electrical equipment are checked every day
- If any problem occurs exchange machine or solve machine problem as early as possible

3.10 Effluent Treatment Plant (ETP):

3.10.1 Types of ETP Plant:

- Chemical ETP
- Biological ETP (Under construction)

3.10.2 Flow process of Chemical ETP:

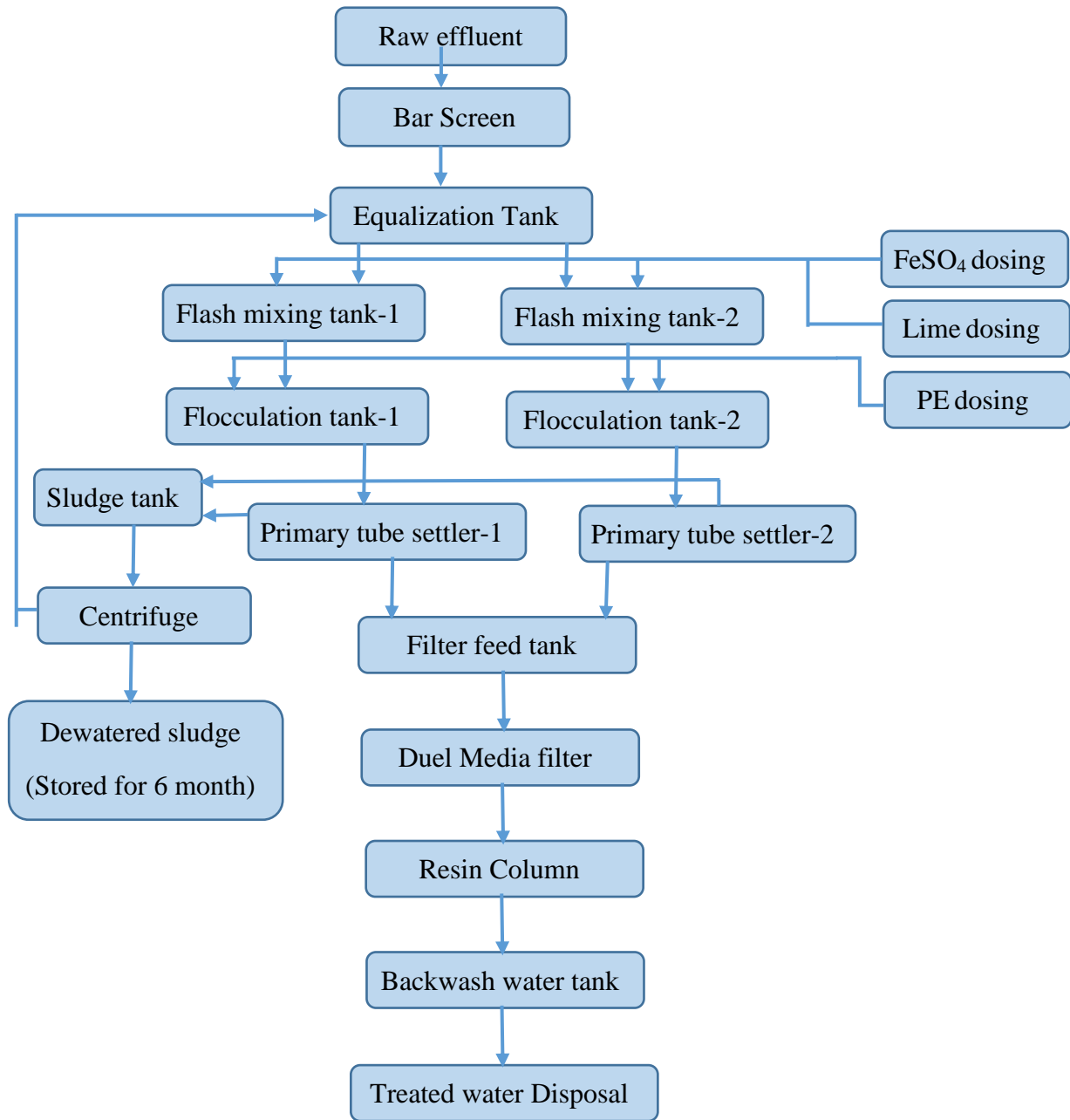


Fig 3. 38: Flow process of chemical ETP.

3.10.3 Function of Different Processes in ETP:

S/L	Process	Function
01	Screening	Extra-large material removes from water.
02	Equalization Tank	Different color water mixing and cooling. Temperature controlled around 50 ⁰ c
03	Flash Mixing Tank	Mixing chemicals to produce sludge
04	Flocculation Tank	Flocculate sludge in water
05	Primary tube settler	Flocculated sludge separate from water
06	Filter feed tank	Filtrate water & storage for filter
07	Duel media filter	Filtrate water
08	Resin column	Filtrate water
09	Backwash water tank	Water containing sludge is stored
10	FeSO ₄ dosing	Used for cleaning water
11	Lime dosing	Used for cleaning water
12	Polyelectrolyte (PE) dosing	Used to sediment / coagulant sludge
13	Sludge tank	Store sludge.
14	Sludge centrifugation	Remove excess water from sludge

Table 3. 14: ETP operations & their function.

3.10.4 Chemical Used in ETP:

- Alum
- Ferrous Sulphate
- Lime stone
- Poly Electrolyte
- Defizz-de

3.10.5 Equipment for Testing:

- TDS meter
- DO meter
- pH meter
- Thermometer

3.10.6 Capacity of ETP plant:

- Chemical ETP: 208 m³ treated water/hour.
- Biological ETP (Under Construction): 300 m³ treated water/hour.

3.10.7 Format of Reporting:

dm Denimach Washing Ltd.

Kewa Mouja, Ward # 5,
Gorgania Masterbari,
Sreepur, Gazipur, Bangladesh
Tel: +88-06825-52700/01

Daily checklist for waste water parameters. Date: / / 2018

Time	Water category	pH	Temp. °C	TDS	Shift	Tested by	Signature	Remarks
	Inlet water							
	Outlet water							
	Inlet water							
	Outlet water							
	Inlet water							
	Outlet water							
	Inlet water							
	Outlet water							
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	Inlet water							
	Outlet water							
	Inlet water							
	Outlet water							

Review by

Approved by

Fig 3. 39: Format of ETP report.

4. Impact of Internship

4.1 Store Section:

In Store section I have learned about the following topics:

- ✓ Working procedure of stationary store
- ✓ Working procedure of chemical store
- ✓ Requisition, inventory & distribution processes of both stationary and chemical store
- ✓ Major chemical suppliers & stored chemicals in chemical store

4.2 Production Accounting Section:

In Production accounting section I have learned about the following topics:

- ✓ Process of keep accounting to the number of sample or bulk bodies come from garment section, send to different process & delivery to the finishing section
- ✓ Accounting for the samples & bulk bodies are kept separately

4.3 Dry Process Section:

In Dry process section I have learned about the following topics:

- ✓ Different types of dry processes
- ✓ Introduced with different types of emery paper and their numbering
- ✓ Whisker pattern and how to make it
- ✓ Process of hand sanding / hand scrapping
- ✓ Tacking process
- ✓ Different types tying
- ✓ PP spray and its recipe
- ✓ Resin and its use
- ✓ Introduced to resin recipe
- ✓ Introduced to 3D and crinkle
- ✓ Grinding and destroy tools and their function and working procedure as well
- ✓ Oven and its operation
- ✓ “Data Pack” system to measure the efficiency of oven m/c
- ✓ Different types of work done in laser
- ✓ Design making process in laser m/c

4.4 Wet Process Section:

In wet process section I have learned about the following topics:

- ✓ Introduced with different types of wet washing process
- ✓ Different types of chemicals and their functions as well
- ✓ Method of different types of wet washing process
- ✓ Different machine parts of wet process section
- ✓ Different types of machine used in washing like front loading & side loading
- ✓ Operating process of washing machine, hydro-extractor, dryer m/c
- ✓ Limitation of different process on wet washing process
- ✓ Shade matching processes after washing

4.5 Quality Section:

In quality section I have learned about the following topics:

- ✓ Introduced with the process flow of quality section
- ✓ Process of base washed garments quality check
- ✓ Process of final washed garments quality check
- ✓ Process & check parameters of dry process
- ✓ Process & check parameters of wet process

4.6 R&D Section:

In R&D section I have learned about the following topics:

- ✓ Introduced with different types of samples
- ✓ Different types of sample development process

4.7 Laboratory:

In laboratory we have learned about the following topics:

- ✓ Different types of machine used for lab test
- ✓ Machine parts of different types of machine
- ✓ Different types of test performed in garment before & after wash
- ✓ Working procedure of different tests
- ✓ Result measure of different testing process

4.8 Finishing Section:

In finishing section we have learned about the following topics:

- ✓ Introduced with working flow process of finishing section
- ✓ Attaching trims & accessories
- ✓ Process of different types of quality check in finishing section
- ✓ Ironing process & measurement checking process
- ✓ Function of needle detector m/c
- ✓ Folding & packaging process
- ✓ Size ratio wise assortment
- ✓ Process of final inspection process
- ✓ Different types of defect
- ✓ AQL

4.9 Maintenance & Utility Section:

In ETP we have learned about the following topics:

- ✓ Working procedure of maintenance & utility section
- ✓ Regular checking process of maintenance section
- ✓ Generators, boilers, compressors & other utility equipment

4.10 ETP:

In ETP we have learned about the following topics:

- ✓ Function of ETP
- ✓ Details about chemical ETP
- ✓ Processes of chemical ETP
- ✓ Different types of chemical used in bio-chemical ETP
- ✓ Capacity of chemical newly constructed biological ETP
- ✓ Different type's water test, etc.

5. Conclusion

5.1 Conclusion

The industrial training gives us the first opportunity to work in washing factory. It was a practical experience beyond the normal academic learning. This training gave us actual picture about man, machine, money, material, method and market and interdependence. We have earned the direct practical knowledge about the raw materials, actual running condition of the machine, works of technologist, administration. Industrial training is an essential part for textile education because it minimizes the gap between theoretical and practical knowledge and also increase our thinking level about textile technology.

I was completed my industrial attachment from “**Denimch Washing Ltd.**”. I learned about denim garments washing processes including dry process, wet process, production calculation, lab tests and so many things. I was learned the working procedure of various section and their activities.