Report On

Application of Lean Tools in Hams Garments Ltd. Of Hams Group

By

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An internship report submitted to the Executive Development Center, Brac Institute of Governance and Development (BIGD), Brac University in partial fulfillment of the requirements for the degree of
Post Graduate Diploma in Knitwear Industry Management (PGD-KIM)

Executive Development Center, BIGD
Brac University
May, 2021

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Declaration

It is hereby declared that

1. The internship report submitted is my own original work while completing degree at Brac University.
2. The report does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The report does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

Student's Full Name & Signature:

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Letter of Transmittal

Date: 24-05-2021

Md. Muslim Uddin

Senior Trainer, PGD-KIM

BIGD, Brac University

66 Mohakhali, Dhaka-1212

Subject: Submission of Internship Report

Dear Sir,

With due respect, as a student of BRAC university I would like to submit my internship report on "Application of lean management in garments industry". Actually, it's a great learning opportunity for me to such a topic. I have tried my level best to follow your guidelines in every aspect of planning of this report. I have also collected what I believe to be the most important information to make this report specific and coherent as possible. I enjoyed the challenge of preparing the report as it provided me with an opportunity to enlarge knowledge. I am honestly thankful for your guidance during the preparation of this report. I hope you will appreciate my effort. I have done the study in a complete form and I have tried my level best to conduct this in a professional manner. It is true that, it could have been done in a better way if there were not limitations. I hope you will assess my report considering the limitations of the study.

Sincerely yours,

_____

Md. Mehedi Hasan

Student ID: 19281177

Section- 12B

Intake- 4ii

Post Graduate Diploma in Knitwear Industry Management (PGD-KIM)

Executive Development Center, BIGD

Brac University

Non-Disclosure Agreement

This agreement is made and entered into by and between BIGD and the undersigned student at

EDC, BIGD, Brac University Md. Mehedi Hasan.

I understand that I may have access to confidential information about the business and financial interests of the company where I have done my internship. I understand that Confidential Information is protected in every form, such as written records and correspondence, oral communications and computer programs and applications.

We agree both the partners being an important entity of this project not to use, copy, make notes regarding, remove, release, or disclose Confidential Information, unless it is permitted by the Respective Organization.

And I also agree not to share or release any authentication code or device, password, key card, or identification badge to any other person, and I agree not to use or release anyone else's authentication code or device, password, key card, or identification badge.

We understand that any breach of confidentiality may result in disciplinary action, including termination from the Internship Program (with the status of 'Failure' placed on my permanent transcript) or legal action.

We certify by my signature that I acknowledge being informed of the confidentiality policy concerning confidential information or its treatment.

We agree to adhere to and uphold the private and privileged information therein.

Student's Full Name & Signature:

Md. Mehedi Hasan
Student ID: 19281177

Industry Supervisor's Full Name & Signature:

Afzal Hossain
Manager, Industrial Engineering
Hams Group

Acknowledgement

Firstly, I would like to thank to Almighty Allah who has given the opportunity to finish this three months long time training program and report. Secondly, I would like to thank those people who co-operate me to finish this report more effectively. For their guide line, co-operation also helped me too much to complete this report effectively. And I would like to thank also my academic supervisor Md. Muslim Uddin who has checked my internship report with essential correction. He has advised the way of successful completion of training.

I would like to thank my industrial supervisor Afzal Hossain for his guidelines & suggestions which direct me how to complete this training successfully. He helped me to collect effective information from different departments within this short time.

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Thanks goes to all Engineers, officers, technicians, employees, stuffs, all section in-charges for their cordial behavior and help.

Finally, I want to thank the authority of **HAMS Group** who gave me the opportunity to complete my industrial attachment here & grateful to the authority of Executive Development Center, BRAC for designing such an effective course including industrial training program.

Executive Summary

A 100% export oriented leading garments industry starts journey in 2001 with 2 sewing lines and total of 350 workforces at Sreepur area in Gazipur city in Bangladesh. Now it's quite 12,000 workforces with 153 sewing lines within different project of HAMS Group in Gazipur. It expands business into knit, woven, and lingerie products.

Industrial Engineering (IE) is a branch of engineering which deals with man, machine and material to illustrate maximum efficiency. IE team provide SMV by using IE tools which is used to calculating CM, minute cost of factory, efficiency of the factory.

Lean manufacturing is a Japanese technology and KAIZEN is a lean tools which works for continuous improvement. Basically, lean identify non value added work from process and suggest to eliminate that added more value for the company.

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List of Acronyms

RMG	Ready Made Garments
IE	Industrial Engineering
ERP	Enterprise Resource Planning
GSM	Gram per Square Meter
QC	Quality Controller
DHU	Defects per Hundred Unit
AQL	Acceptable Quality Level
OK	Objection Killed
UK	United Kingdom
USA	United State of America
SMV	Standard Minute Value
BMC	Body Movement Class
SWOT	Strength Weakness Opportunity
CM	Cost of Making
CPM	Cost Per Minute
KPI	Key Performance Indicator
HRM	Human Resource Management

Chapter 1

HAMS Group Profile

1.1 Overview of the Industry

HAMS Group started its journey as a house of Readymade Garments (RMG) engaged in manufacturing and exporting of Knit Apparels since 20012 and has been considered today as one of the biggest conglomerates with substantial establishment of its backward linkage of all kinds of knit garments, textile, wet processing & garments accessories. It has the state of art vertically integrated garments manufacturing facility which ensures one stop service to the buyers. We have established ourselves as an important Garments manufacturer for a number of renowned brand apparels of Europe, USA & Australia. As it stands today, HAMS Group became the name of lifestyle of its personnel, suppliers & buyers. For the greater commitment & care - HAMS Group always plays a significant role in its every activity by protecting environment and has earned an iconic image among the green corporate houses. These achievements of ours prevailing due to the personnel of the HAMS Group are placed at their right positions according to their caliber and inspiration.

1.2 Vision & Mission

Vision

To achieve a long term sustainable quality level through continuous improvement.

Mission

Goal of the HAMS Group is to satisfy their customer's expectation by providing better quality products.

1.3 Quality Policy

HAMS Group is committed to achieve customer satisfaction with best quality readymade garments through effective quality management system and continuous improvement.

1.4 Factory Profile

Company Name	HAMS Group
Type	100% export oriented knit garments factory
Name of the owner	Engr. Shofiqur Rahman
Year of Foundation	2012
Company Logo	HAMS GARMENTS LTD.
Corporate office address	House # 01, Road # 06, Block # F, Niketon, Gulshan-1, Dhaka-1212
Contact No	9897847
E-mail	info@hams.com.bd
Website	www.hams.com.bd

1.5 Department wise Current Capacity

Department	Capacity
Knitting	250 Ton/Month
Dyeing	500 Ton/Month
Cutting	28 To 30 Lakhs/Month
Sewing	30 To 31 Lakhs/Month
Finishing	30 To 32 Lakhs/Month

1.6 Factories of HAMS Group

Garments Divisions

HAMS Group within a short span of time of its inception in 1994 secured a remarkable position in the emerging industry of Ready Made Garments with first venture HAMS Garments Limited in 2012 with 2 (two) sewing lines and total of 200 workforces at Sreepur area in Gazipur city in Bangladesh. Now it has more than 18,000 workforces with 111 sewing lines within different project of HAMS Group in several areas of Dhaka and Gazipur, promoted by a team of young and dynamic visionaries. At Present HAMS Group is capable of producing 92,000 pieces of ready-made garments in a day.

- HAMS Garments Ltd. (Knit) – 42 Lines
- HAMS Garments Ltd. (Lingerie) – 32Lines
- Dhaka Fashion Limited (Woven) – 19 Lines
- Victoria Intimates (Lingerie) – 60 Lines

Backward Linkage

Textile Division:

HAMS Knitting Ltd. (HKL)

HAMS Dyeing Ltd. (HDL)

Testing Laboratory:

HAMS Testing Lab Ltd. (HTLL)

Washing Unit:

Dhaka Washing Ltd. (DWL)

1.7 Factory Organogram

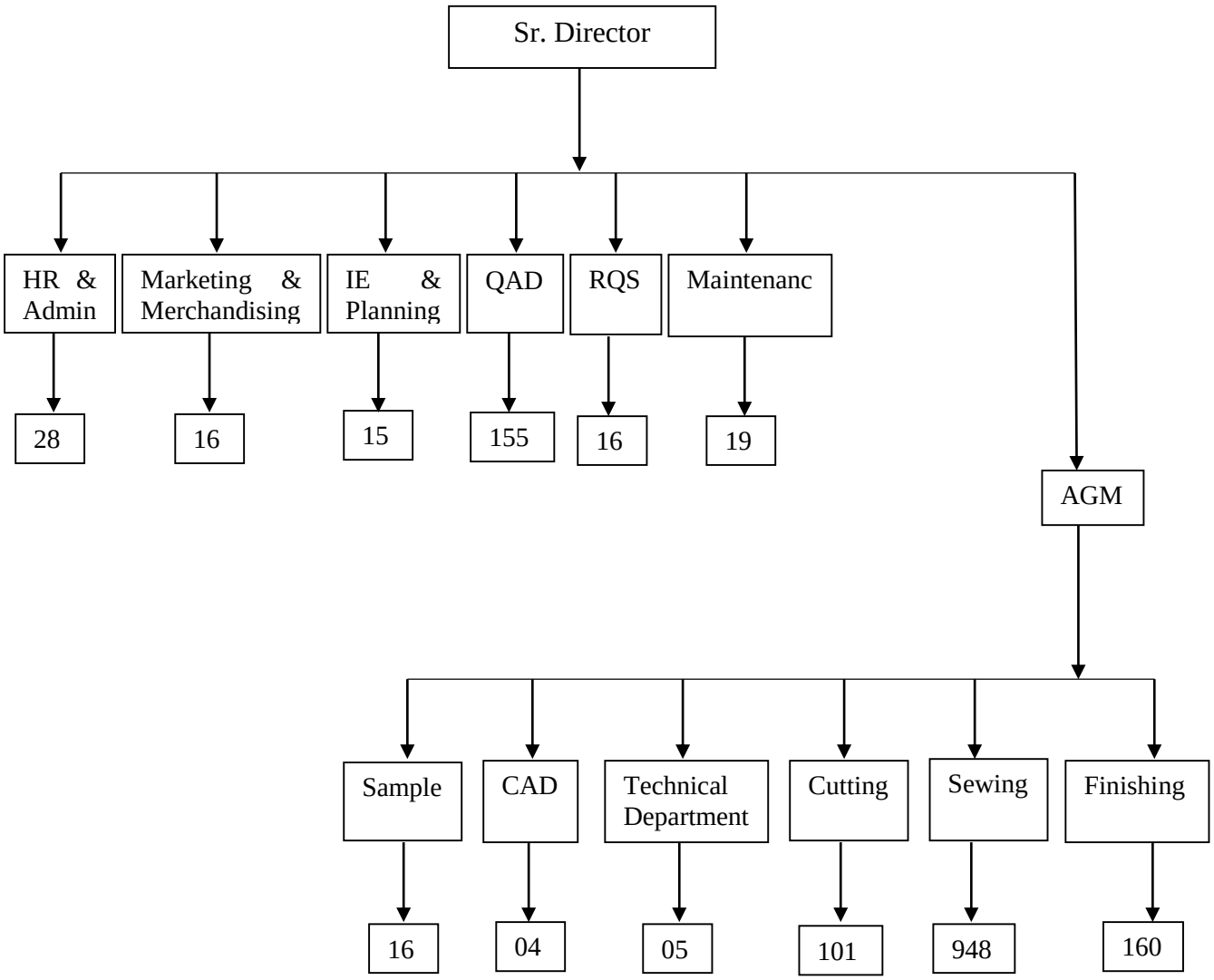


Fig 1: Factory organogram

1.8 IE Department Organogram

IE Department

Organogram of Hams Garments Ltd. (Lingerie)

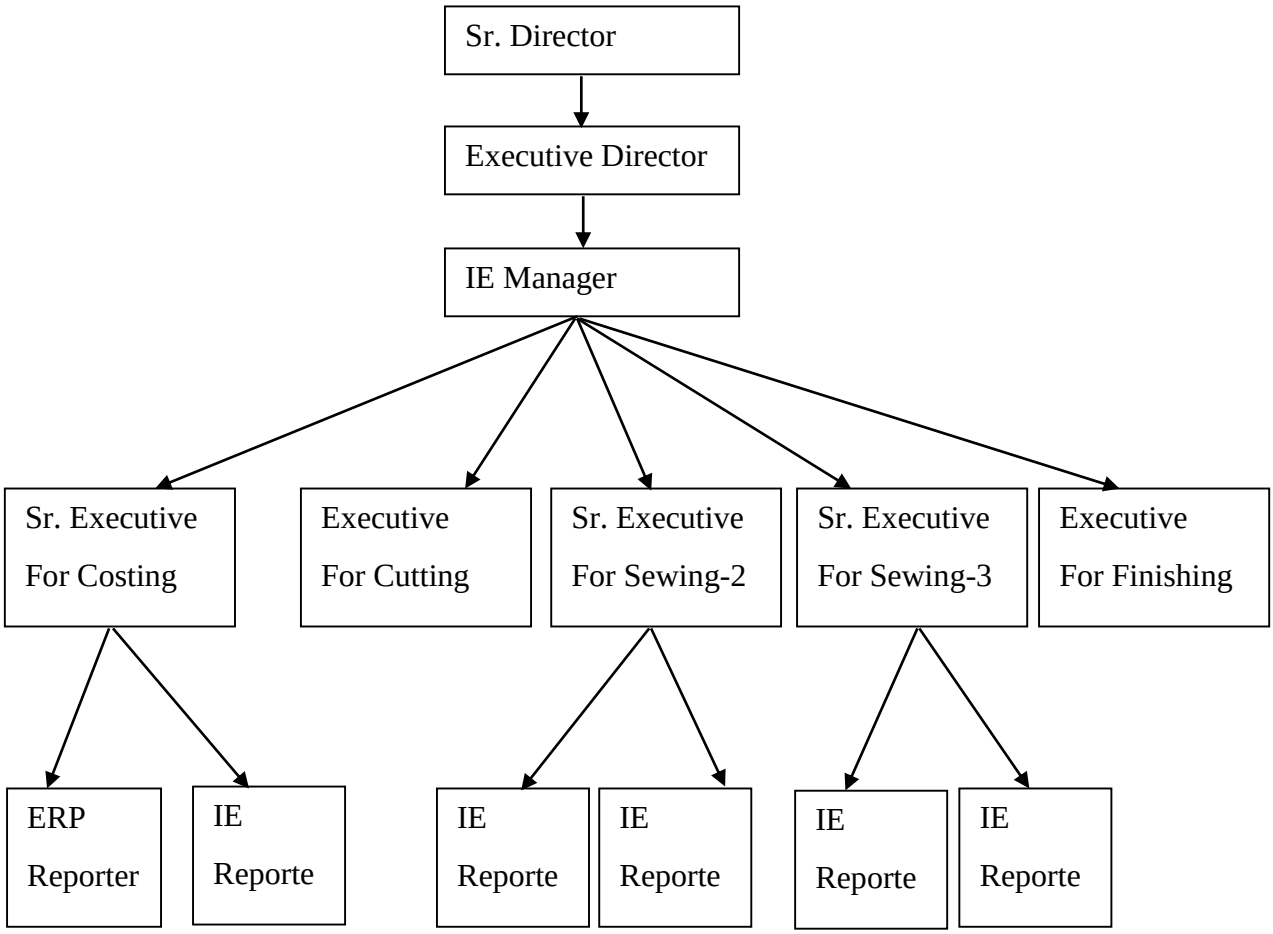


Fig 2: IE Department Organogram

1.9 Flow Chart of Cutting Department

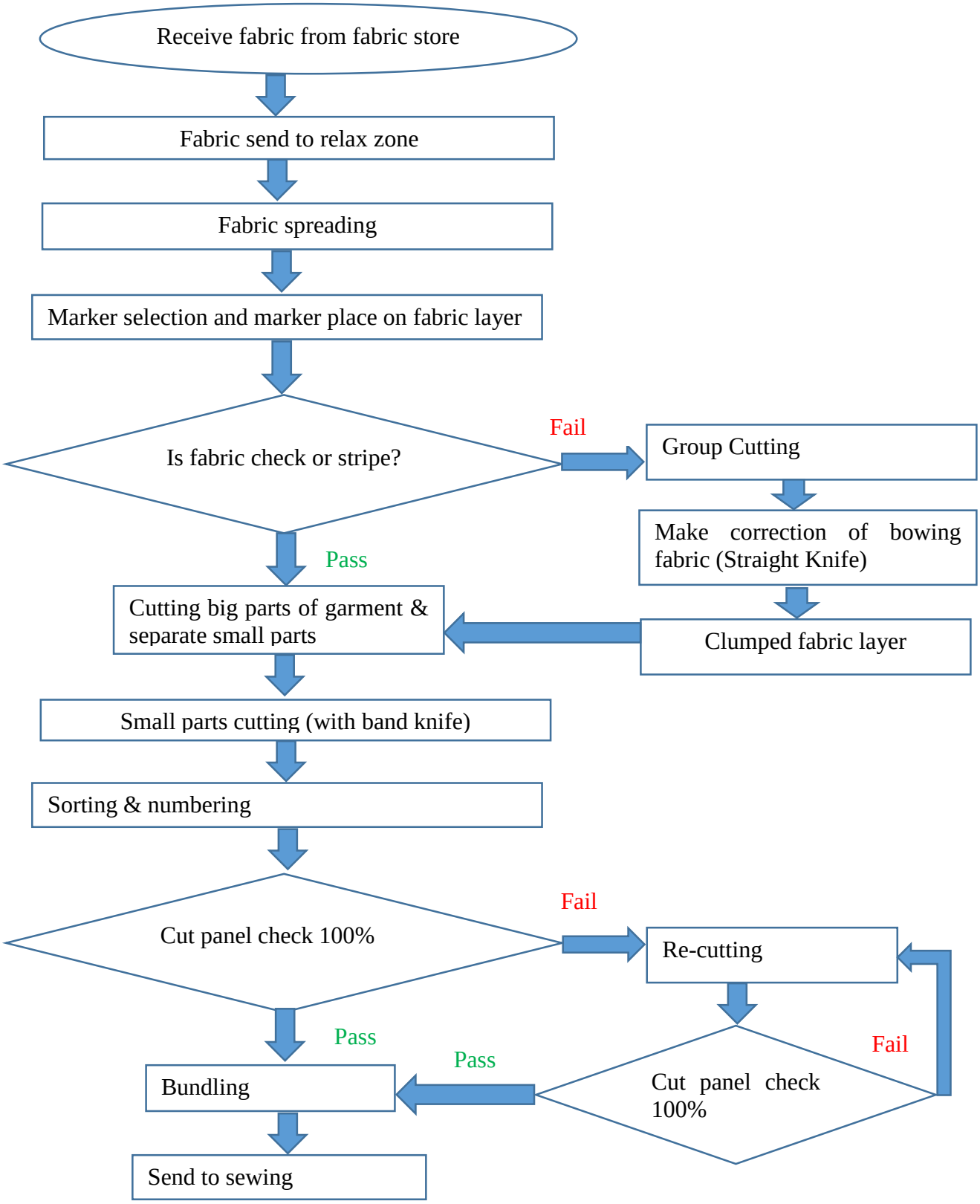


Fig 3: Flow Chart of Cutting Department

1.10 Flow Chart of Finishing Department

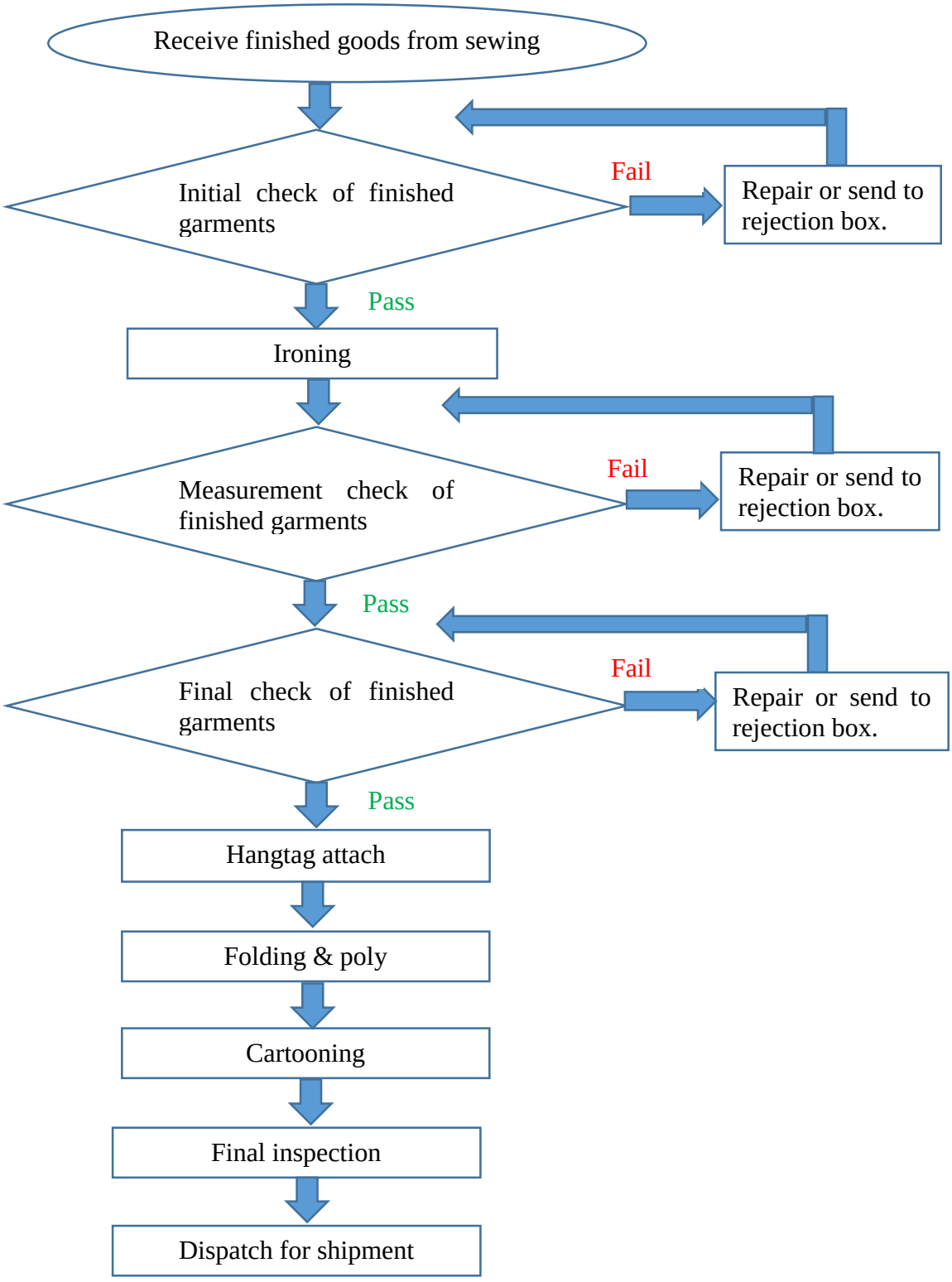
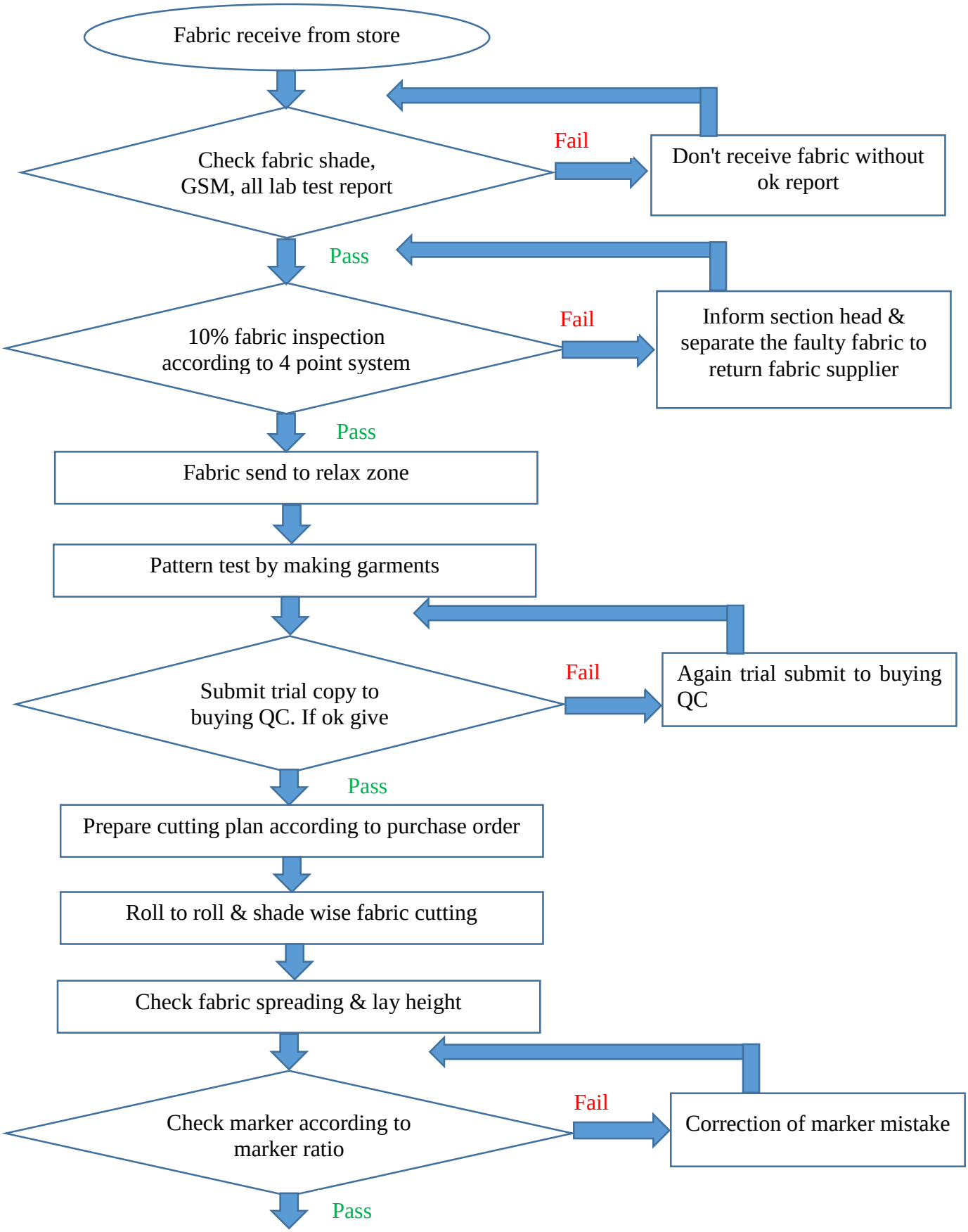


Fig 4: Flow Chart of Finishing Department

1.11 Flow Chart of Cutting Quality Assurance Department



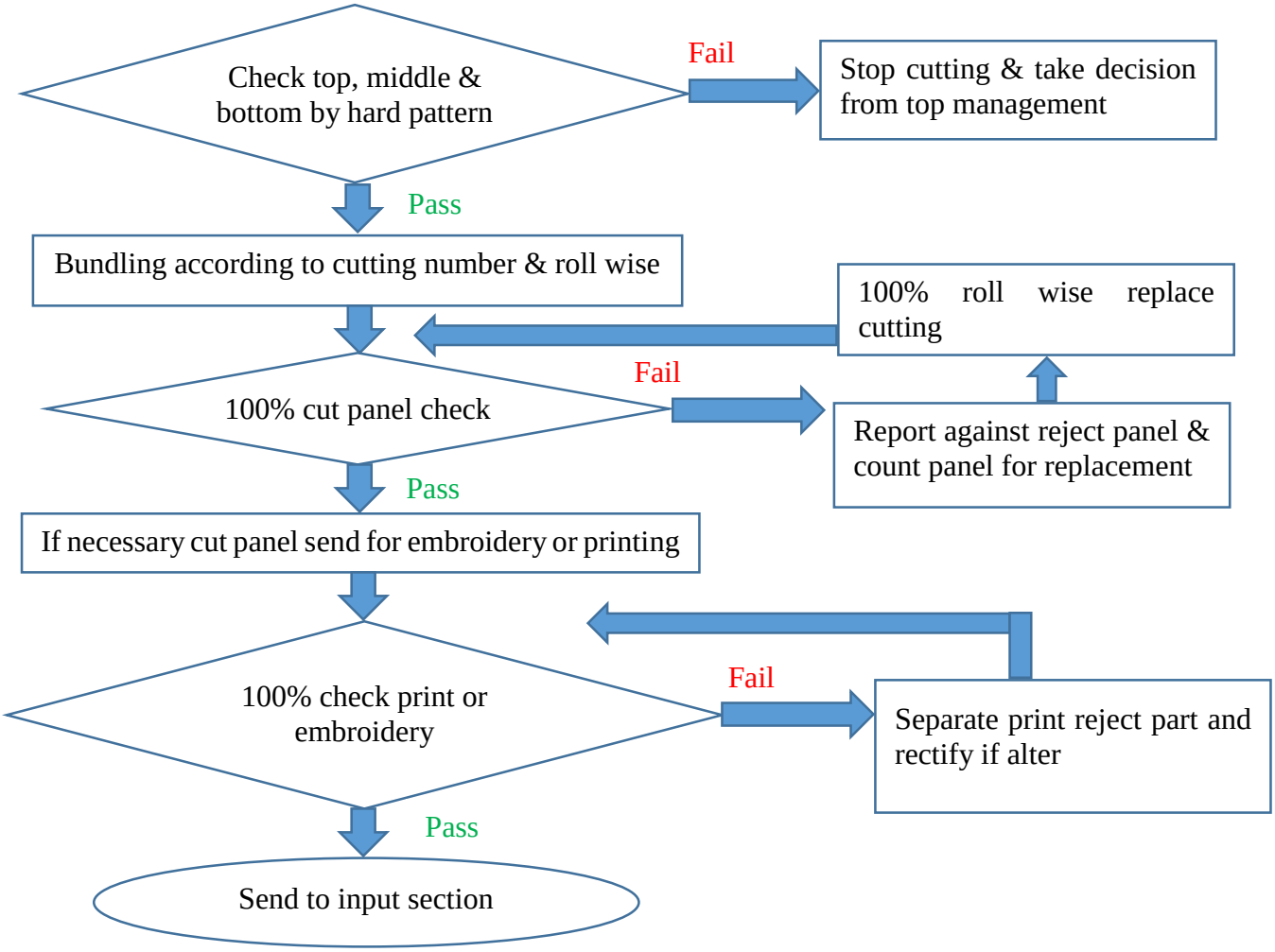
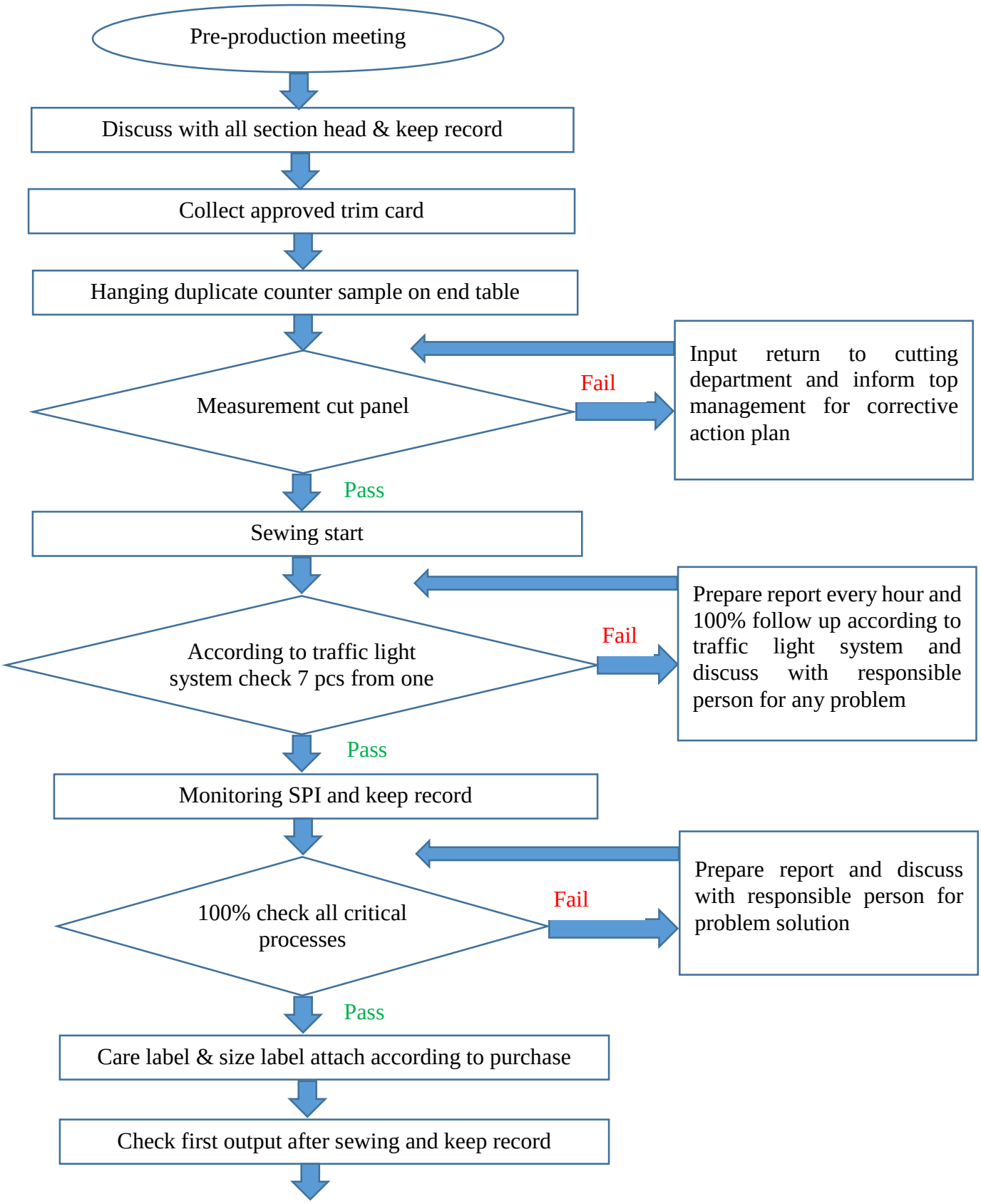


Fig 5: Flow Chart of Cutting Quality Assurance Department

1.12 Flow Chart of Sewing Quality Assurance Department



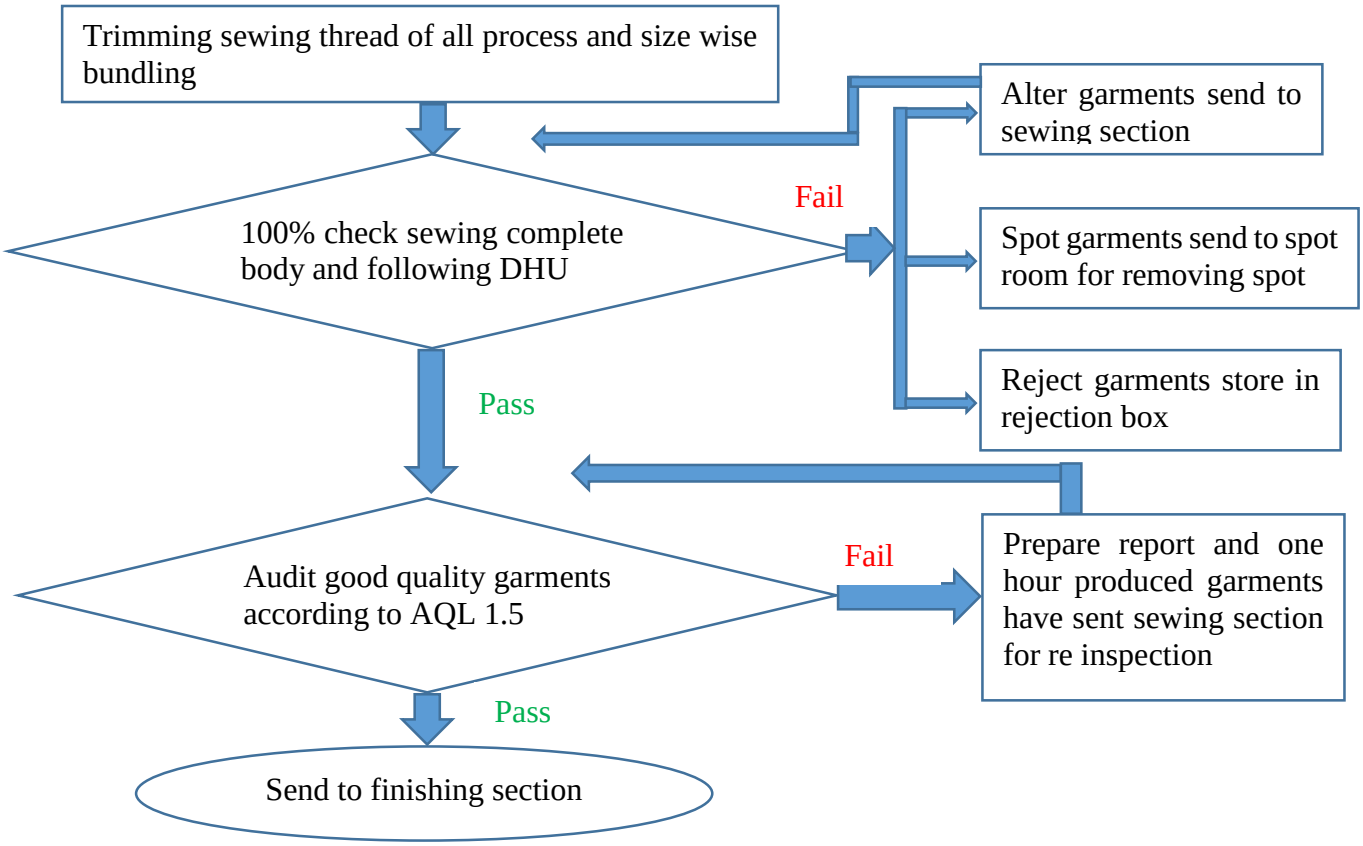
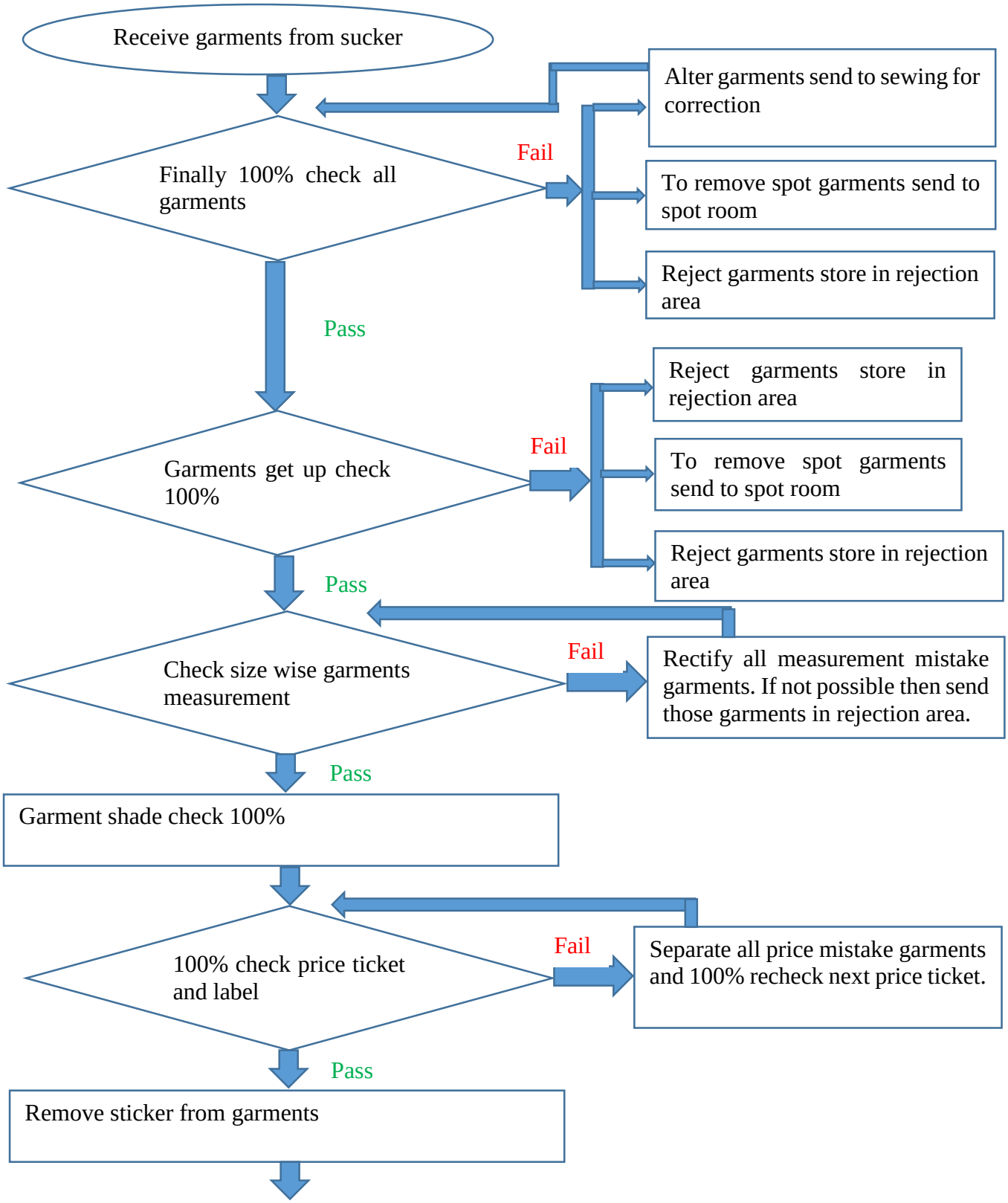


Fig 6: Flow Chart of Sewing Quality Assurance Department

1.13 Flow Chart of Finishing Quality Assurance Department



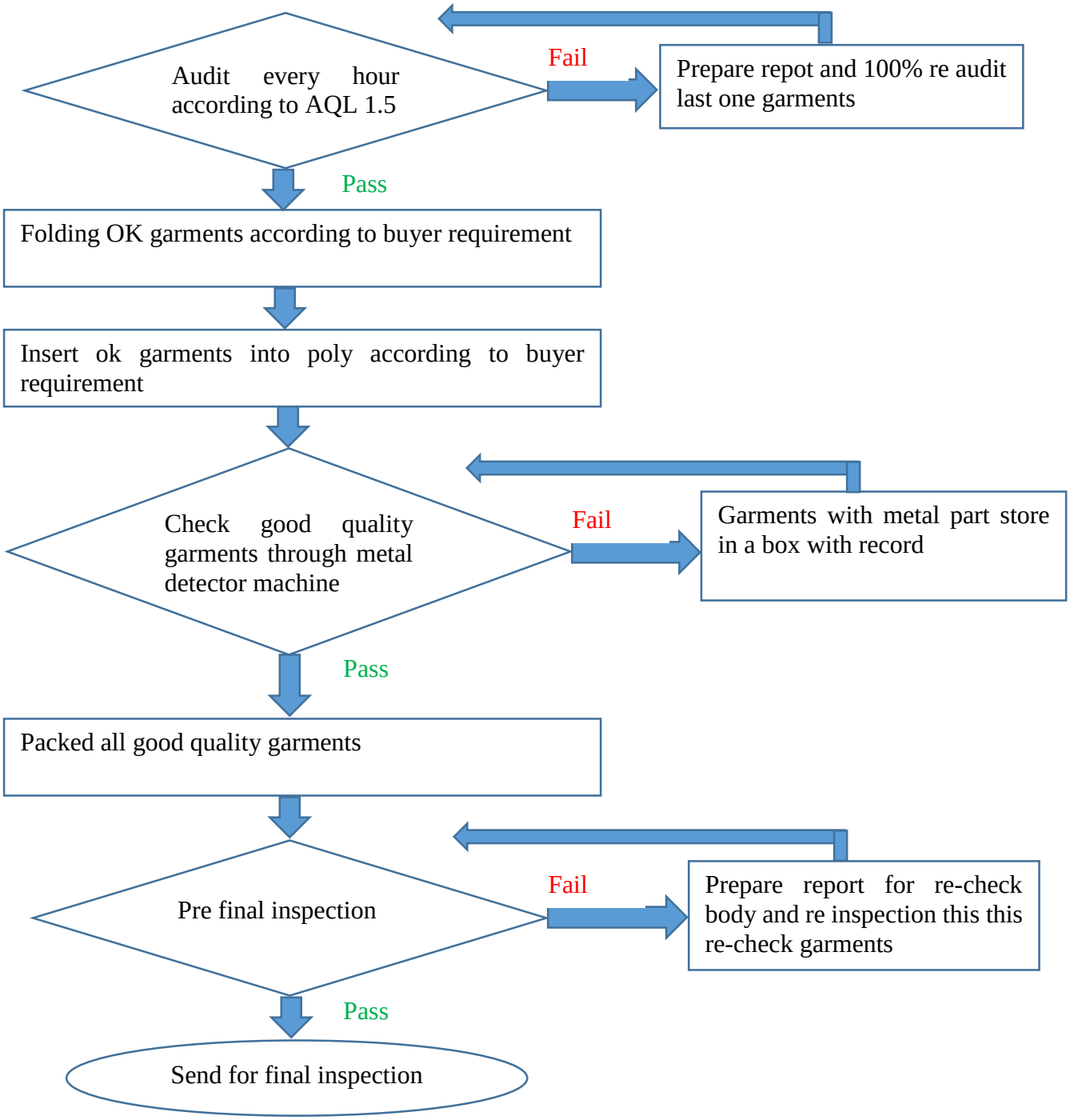


Fig 7: Flow Chart of Finishing Quality Assurance Department

1.14 Products Information

Knit Fabrics	➢ Single Jersey ➢ 1*1 Rib ➢ 2*1 Rib ➢ Lacoste ➢ Pique ➢ Fleece ➢ Terry Fleece
Garments	➢ T-shirt ➢ Leggings ➢ Ladies Long Line Vest ➢ Sweatshirt ➢ Short skirt ➢ Polo Shirt ➢ Jogger ➢ Tank top ➢ Short Pant ➢ Hoody Jacket ➢ Brief ➢ Boxer ➢ Long Pant

1.15 Business Partners

HAMS Group works with worldwide leading brands in apparel sector.

Buyers Name	Country	Logo
M&S (Marks & Spencer)	UK	
H&M (Hennes & Mauritz)	Sweden	
C&A	Belgium	
Next	England	
Kmart	US	
New look	UK	
s.Oliver	Germany	

C&A

C&A is a Belgian-German-Dutch chain of fast-fashion retail clothing stores, with European head offices in Vilvoorde, Belgium, and Dusseldorf, Germany. The company was founded, in Sneek, by brothers Clemens and August Brenninkmeijer in 1841 as a Dutch textile company, taking its company name from their initials. It has retail stores in many European countries. It serves only the largest markets of Asia, North America and South America. C&A's brands include Angelo Litrico, Avanti, Canda, Clockhouse, Here+There, Palomino, Rodeo (ski and snowboard clothes), Westbury, Yessica, Yessica Pure and, Your Sixth Sense.

Next

Next plc (styled as next) is a British multinational clothing, footwear and home products retailer, which has its headquarters in Enderby, England. It has around 700 stores, of which circa 500 are in the United Kingdom, and circa 200 across Europe, Asia and the Middle East. The company was founded by Joseph Hepworth in Leeds in 1864 as a tailor under the name of Joseph Hepworth & Son.

H&M

Hennes & Mauritz AB is a Swedish multinational clothing-retail company known for its fast-fashion clothing for men, women, teenagers and children. As of November 2019, H&M operates in 74 countries with over 5,000 stores under the various company brands, with 126,000 full-time equivalent positions. Founded by Erling Persson and run by his son Stefan Persson and Helena Helmersson, the company makes its online shopping available in 33 countries

Marks & Spencer

Marks & Spencer is a major British multinational retailer with headquarters in London, England, that specializes in selling clothing, home products and food products, mostly of its own label. M&S was founded in 1884 by Michael Marks and Thomas Spencer in Leeds. They have around 703 stores in the UK and another 361 stores spread across over 40 different countries.

New Look

New Look is a British global fashion retailer with a chain of high street shops. It was founded in 1969. The chain sells womenswear, menswear, and clothing for teens. New Look was founded by Tom Singh in Taunton, Somerset, in 1969. Since then the company has expanded and now operates across a chain of over 900 stores internationally.

S.Oliver

s.Oliver is a German fashion company headquartered in Rottendorf that sells apparel, shoes, accessories, jewellery, fragrances and eyewear worldwide. The company was founded in 1969 by Bernd Freier (who was also its billionaire CEO until 2014) as a small boutique in Wurzburg with only 25 square metres of floor space. There are currently three lifestyle segments under the s.Oliver brand, all targeting different buyer types. s.Oliver Casual is the company's largest segment, it focuses on ladies and gents leisure fashion.

Kmart

Kmart Corporation is an American big box department store chain headquartered in Hoffman Estates, Illinois, United States. S. S. Kresge, the founder of the company that would become Kmart. The company was incorporated in 1899 as S. S. Kresge Corporation and renamed Kmart Corporation in 1977. Kmart operated 2,486 stores globally, including 2,323 discount stores and Super Kmart Center locations in the United States.

Chapter 2

Description about task accomplishment

2.1 Cutting Department

The cutting department is responsible for cutting fabrics and feeding the sewing department with cuttings. The cutting department's capacity is planned based on the daily feeding requirement of the sewing lines. The cutting department is set up with a cutting department head, cutters, spreaders, quality checkers and helpers for sorting, ply numbering and bundling. The activities of the cutting department are explained in this post.

- Receive fabric from the fabric store
- Fabric relaxation
- Cutting according to planning
- Fabric spreading
- Set marker on fabric layer
- Fabric cutting
- Sort out and bundling
- Send for printing if printing required
- Read for input

2.2 Cutting Target Sheet

Hams Garments Ltd
Undergarments Unit

Date-10/4/2021

Daily Cutting Target Sheet

Cutting Table	Buyer	Style	Item	Req M/P	Pre. M/P	Short M/P	SMV	Tgt./ Hr.	TTL TGT	Spent Min	Produced Min	Tgt./ Eff%	W/H	Remarks
A	K-mart	F21-90NSA321-3PK	trunk	4	4	0	0.09	2400	4800	480	432	90%	2	
	K-mart	90NSA320H-3PK STRIPE				0			0	0	0	#DIV/0!		
	K-mart	F21-34NSGMP001-7PK GIRLS BLUSH	Brief	4	4	0	0.03	4500	18000	960	504	53%	4	
	H&M	Tantop		4	4	0	0.23	1000	11500	1200	1035	86%	4	
	K mart	F21-34NSBT008-7PK	basic	4	5	0	0.05	2800	2800	300	140	47%	1	
TOTAL				**4**	**9**	**0**	**0.10**	**10700**	**37100**	**2940**	**2111**	**72%**	11	
B	K-mart	F21-34NSBMP008-7PK	BRIEFS	4	4	0	0.03	4000	8000	480	240	50%	2	
	H&M	Robin				0			0	0	0	#DIV/0!		
	K-mart	wark wear				0			0	0	0	#DIV/0!		
	K-mart	F21-34NSGB0011-7PK		4	4	0	0.04	4000	16000	960	640	67%	4	
	K-mart	warehouse				0			0	0	0	#DIV/0!		
	K mart	F21-90NSA321-3PK	trunk	4	4	0	0.07	2700	13500	1200	945	79%	5	
TOTAL				**4**	**8**	**0**	**0.05**	**10700**	**37500**	**2640**	**1825**	**69%**	11	
C	H&M	Daniel	toos	4	4	0	0.04	4000	20000	1200	800	67%	5	
	K-mart	Ware Wouse				0			0	0	0	#DIV/0!		
	K-mart	F21-11NSBL472-COMFORT				0			0	0	0	#DIV/0!		
	K-mart	F21-90NST4A-3PK	trunk			0			0	0	0	#DIV/0!		
	H&M	Robin	basic			0			0	0	0	#DIV/0!		
	H&M	Chris 10PK	Boxer	4	5	0	0.08	2500	15000	1800	1200	67%	6	
TOTAL				**4**	**9**	**0**	**0.06**	**6500**	**35000**	**3000**	**2000**	**67%**	11	
D	H&M	Recut	Boxer	4	4	0	0.80	250	2750	2640	2200	83%	11	
TOTAL				**4**	**4**	**0**	**0.80**	**250**	**2750**	**2640**	**2200**	**83%**	11	
Grand Total				**16**	**26**	**0**	**0.25**	**28150**	**112350**	**11220**	**8136**	**73%**	**11.00**	

2.3 Operation Breakdown

To do an operation breakdown following task are accomplished-

1. Collect the sample of this style 34NSBMP008.
2. Analysis the sample.
3. Arrange operation sequence of the style.
4. Calculate required man, machine, folder and guide attachment.
5. Calculate machine SMV and manual SMV.
6. Set theoretical output target and possible output target.
7. Calculate balance efficiency of this style.

2.4 Operation Breakdown Sheet

Hams Garments Ltd.
Operation Bulletin (K.Mart Brief)

Layout paper submit time					**Styling Sample**			
Prepared By	**Afzal Hossain**				**Layout Date**		**30/4/2021**	
Line No			**Order Qty.**			**No of line allocated**		
Buyer: K-Mart	**Style:**		**34NSBMP008/001/009**			**Item**	**Brief**	
Total (SMV)	**2.98**		**Theoritical output**	**544**	**Line Forecast**	**480**	**Days Tgt Production**	**4800**
Machine/Operator (SMV)	**M/C**	**2.24**	**Lowest OutPut**	**480**	No.of O.P	**20**	**Plan Tgt Production**	**4349**
Manual (SMV)	**H/P**	**0.74**	**Bal.Eff(%)**	**88%**	**No.of A.O.P**	**7.00**	**Plan Eff(%)**	**80%**
Working time(Minutes)		**600**	**Pcs/Man**	**17.78**	**Total Plan Manpower**	**27**	**Pitch Time**	**0.11**

Sl	Operation Description	Manual/ M/c	Folder/ Attach.	SMV	HAMS	OP/ AOP		Tgt/Hr	Tot.Tgt/Hr	Var.	Operation Request
						Req.	Alot.				
1	Side seam Overlock	O/L		0.31	0.31	2.48	3	194	581	101	19
2	Inseam Overlock	O/L		0.22	0.22	1.76	2	273	545	65	13
3	Leg elastic join	O/L		0.34	0.34	2.72	3	176	529	49	20
4	Trime & aside	H/P		0.11	0.11	0.88	1	545	545	65	7
5	Leg elastic T/S	F/L		0.35	0.35	2.80	3	171	514	34	21
6	Trime & aside	H/P		0.12	0.12	0.96	1	500	500	20	7
7	Elastic cut	H/P		0.11	0.11	0.88	1	545	545	65	7
8	Elastic mark & make	S/N		0.22	0.22	1.76	2	273	545	65	13
9	Waist elastic attach Overlock	O/L		0.33	0.33	2.64	3	182	545	65	20
10	Lable Make	S/N		0.12	0.12	0.96	1	500	500	20	7
11	Lable Attach	S/N		0.11	0.11	0.88	1	545	545	65	7
12	Waist elastic top Stc.	F/L		0.24	0.24	1.92	2	250	500	20	14
13	Final Trime	H/P		0.4	0.40	3.20	4	150	600	120	24
				2.98		23.84	27				

Machine Summary

Layout Start Time:-	S/N	O/L	F/L	FD	B/H	Z/Z	B/T	Total M/C	AOP	Total Manpower
	4	11	5	0	0	0	0	20	7	27
Layout Finish Time:-										

34NSBMP008/001/009

Eff.Level	Prod./Hr	8 Hr. Prod.	9 Hr. Prod.	10 Hr. Prod.	Eff.Level	Prod./Hr	8 Hr. Prod.	9 Hr. Prod.	10 Hr. Prod.
30%	163	1305	1468	1631	70%	381	3044	3425	3805
40%	217	1740	1957	2174	80%	435	3479	3914	4349
50%	272	2174	2446	2718	90%	489	3914	4403	4893
60%	326	2609	2936	3262	100%	544	4349	4893	5436

2.5 Capacity Study

Capacity study is a systematic study which is used in industrial engineering department to find out achievable production for a sewing line. It helps to find out one hour achievable production of an operator. First of all, I collect some data from the sewing line by using stop watch and find following information-

- Capacity of different operation
- Theoretical output
- Line forecast
- Lowest output
- Pitch time
- Balance efficiency etc.

2.6 Capacity Study Sheet

HAMS GARMENTS LTD.

Undergarments

Capacity Study

BUYER	Kmart	LINE	L1
Style	34NSBMP008	SMV	2.98

Date: 31-03-2021

SL. No.	Process Name	Operator Name	Operator ID	M/C Type	Cycle Time										Avg. Cycle Time	Performance Rating	Basic Time	Allowance with 10%	Total Time	IE Capacity	Process Capacity
					1	2	3	4	5	6	7	8	9	10							
1	Inseam Join	Minara	204964	O/L	6.33	7.04	6.59	6.41	7.33	6.24	7.09	6.85	6.22	5.89	6.599	100.0	6.6	0.66	7.26	496	850
2	Inseam Join	Marufa	204964	O/L	9.09	9.46	6.8	9.34	9.84	8.91	10.4	9.87	9.48	9.27	9.248	100.0	9.2	0.92	10.17	354	
3	Side Seam	Sorifa	203283	O/L	15.1	15.3	17	15.9	16.09	14.9	16.2	15.01	14.9	16.2	15.656	100.0	15.7	1.57	17.22	209	606
4	Side Seam	Popy	204938	O/L	20.1	19.8	19.2	20.1	19.87	18.7	20.2	18.08	20.4	20.2	19.676	100.0	19.7	1.97	21.64	166	
5	Side Seam	Mithu	122668	O/L	15	15.3	13.3	15.2	14.65	13.1	12.9	14.09	15.1	13.3	14.200	100.0	14.2	1.42	15.62	230	
6	Leg Elastic Attach	Sumi	203880	O/L	12.9	13.2	14.9	14.3	14.12	15.3	13.8	14.21	13.1	15.3	14.115	100.0	14.1	1.41	15.53	232	780
7	Leg Elastic Attach	Rubel	203486	O/L	10.8	10.8	11.7	11.2	10.09	11.1	10.8	10.11	10.4	11.1	10.814	100.0	10.8	1.08	11.90	303	
8	Leg Elastic Attach	Rashedul	204673	O/L	12.3	13	13.2	13.8	12.85	14.2	15.3	13.83	12.7	12.2	13.335	100.0	13.3	1.33	14.67	245	
9	Leg Elastic T/S	Manik	203989	F/L	15.7	16.2	15.1	16.8	15.36	16.3	14.7	15.33	17.2	16.3	15.900	100.0	15.9	1.59	17.49	206	680
10	Leg Elastic T/S	Sonia	204171	F/L	15.1	14.7	17.2	15.2	15.62	14.8	15.6	15.82	17.1	15.3	15.634	100.0	15.6	1.56	17.20	209	
11	Leg Elastic T/S	Nargis	203641	F/L	12.7	13.1	11.1	12.7	12.08	14.3	11.6	13.49	10.8	11.9	12.372	100.0	12.4	1.24	13.61	265	
12	Elastic Tack	Dipa	204312	S/N	7.09	6.91	6.14	6.77	7.19	8.04	5.99	6.91	7.13	7.64	6.981	100.0	7.0	0.70	7.68	469	963
13	Elastic Tack	Mim	204372	S/N	5.88	6.93	7.11	6.42	5.96	6.31	7.95	6.08	5.73	7.83	6.620	100.0	6.6	0.66	7.28	494	
14	Waist Overlock	Farid	201454	O/L	14.3	14.9	14.3	15.9	14.31	15.3	14.8	16.81	14.2	15.6	15.034	100.0	15.0	1.50	16.54	218	600
15	Waist Overlock	Sumi	203403	O/L	15.5	15.9	16.1	15.2	13.91	17	15.6	16.35	14.8	14.2	15.443	100.0	15.4	1.54	16.99	212	
16	Waist Overlock	Saleha	203831	O/L	19.3	18.1	17.7	19.9	19.24	20.8	18.5	18.69	19.3	20.4	19.189	100.0	19.2	1.92	21.11	171	
17	Label Attch	Nurunnahar	204289	S/N	3.95	4.05	4.09	4.28	3.98	3.84	3.5	4.68	4.95	3.88	4.12	100.0	4.1	0.41	4.53	794	
18	Waist Elastic T/S	Runa	202799	F/L	11.2	12.1	11.9	13.5	11.34	10.5	12.2	10.71	10.3	12.1	11.577	100.0	11.6	1.16	12.73	283	583
19	Waist Elastic T/S	Majharul	203403	F/L	10.3	12.3	9.59	9.84	11.43	13.2	10.2	11.57	9.87	10.8	10.910	100.0	10.9	1.09	12.00	300	

2.7 Line Balancing

After completing line layout an industrial engineer prepare line balancing sheet. Line balncing sheet need to prepare for following reasons-

- To calculate operator individual performance.
- To calculate process wise capacity.
- To calculate bottle neck operation.
- To calculate line balancing efficiency.
- For counting actual manpower need to hit the production target for this line.
- To caculate line balancing efficiency.
- To calculate pitch time of this line.

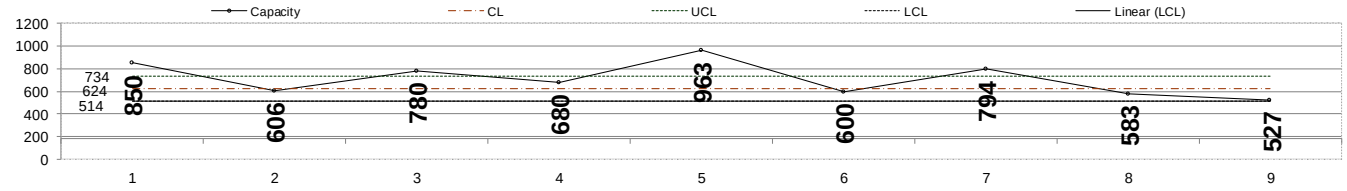
2.8 Line Balancing Sheet

HAMS Garments Ltd. (UG)

Line Balance Chart

Line No.			Present Graph Date:	10-Mar-21		Prod. Start Date:		8-Mar-21		Style	34NSBMP008
Total Time	M/C	1.51	Theoritical output	717	pcs	Days Tgt Production	5000	Total Operator	19		
TotalTime	H/P	0.41	Lowest OutPut	500	pcs	Plan Tgt Production	4879	Total Helper	4		
Total Time		1.92	Bal.Eff(%)	**70%**		Plan Eff(%)	68.00%	Total Manpower	23		
Spent Minute		600	Pcs/Man	21.74		Pitch Time	0.08	Line Forecast	500.00		

Sl.	Optn	Name	ID	Process	M/C	Req.	Alot	Time	Avg. Time	Capacity	Total Cap.	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Remarks
1	1	Minara	204964	Inseam Join	O/L	1.18	2	0.11	0.13	496	424.91	6.33	7.04	6.59	6.41	7.33	6.24	7.09	6.85	6.22	5.89	
2	1	Marufa	204969	Inseam Join	O/L			0.15		354		9.09	9.46	6.8	9.34	9.84	8.91	10.42	9.87	9.48	9.27	
3	2	Sorifa	203283	Side Seam	O/L	2.476	3	0.26	0.28	209	201.95	15.1	15.27	16.98	15.88	16.09	14.94	16.22	15.01	14.85	16.22	
4	2	Popy	204938	Side Seam	O/L			0.33		166		20.14	19.84	19.24	20.11	19.87	18.67	20.23	18.08	20.41	20.17	
5	2	Mithu	122668	Side Seam	O/L			0.24		230		14.97	15.31	13.32	15.24	14.65	13.08	12.89	14.09	15.13	13.32	
6	3	Sumi	203880	Leg Elastic Attach	O/L	1.923	3	0.24	0.21	232	259.97	12.94	13.18	14.86	14.27	14.12	15.34	13.84	14.21	13.05	15.34	
7	3	Rubel	203486	Leg Elastic Attach	O/L			0.18		303		10.77	10.83	11.74	11.22	10.09	11.14	10.82	10.11	10.37	11.05	
8	3	Rashedul	204673	Leg Elastic Attach	O/L			0.22		245		12.3	13.01	13.22	13.75	12.85	14.23	15.28	13.83	12.69	12.19	
9	4	Manik	203989	Leg Elastic T/S	F/L	2.207	3	0.27	0.24	206	226.56	15.71	16.21	15.11	16.78	15.36	16.33	14.68	15.33	17.16	16.33	
10	4	Sonia	204171	Leg Elastic T/S	F/L			0.26		209		15.14	14.68	17.19	15.16	15.62	14.76	15.64	15.82	17.08	15.25	
11	4	Nargis	203641	Leg Elastic T/S	F/L			0.21		265		12.66	13.14	11.07	12.67	12.08	14.29	11.59	13.49	10.79	11.94	
12	5	Dipa	204312	Elastic Tack	S/N	1.038	2	0.12	0.11	469	481.59	7.09	6.91	6.14	6.77	7.19	8.04	5.99	6.91	7.13	7.64	
13	5	Mim	204372	Elastic Tack	S/N			0.11		494		5.88	6.93	7.11	6.42	5.96	6.31	7.95	6.08	5.73	7.83	
14	6	Farid	201454	Waist Overlock	O/L	2.499	3	0.25	0.28	218	200.05	14.31	14.85	14.26	15.87	14.31	15.34	14.82	16.81	14.19	15.58	
15	6	Sumi	203403	Waist Overlock	O/L			0.26		212		15.46	15.85	16.08	15.16	13.91	17.01	15.64	16.35	14.81	14.16	
16	6	Saleha	203831	Waist Overlock	O/L			0.32		171		19.34	18.06	17.73	19.86	19.24	20.83	18.47	18.69	19.27	20.4	
17	7	Nurunnahar	204289	Label Attch	S/N	0.629	1	0.07	0.07	794	794.35	3.95	4.05	4.09	4.28	3.98	3.84	3.5	4.68	4.95	3.88	
18	8	Runa	202799	Waist Elastic T/S	F/L	1.716	2	0.19	0.19	283	291.33	11.21	12.06	11.85	13.54	11.34	10.46	12.17	10.71	10.34	12.09	
19	8	Majharul	203403	Waist Elastic T/S	F/L			0.18		300		10.29	12.34	9.59	9.84	11.43	13.17	10.18	11.57	9.87	10.82	
20	9	Nipa	203284	Trimmings	H/P	3.797	4	0.41	0.41	134	131.70	24.23	25.62	23.87	24.09	23.49	25.09	24.38	23.88	24.61	24.54	
21	9	Ratna	204265	Trimmings	H/P			0.41		133		23.88	23.49	25.37	24.88	25.64	25.12	23.19	24.86	25.04	24.28	
22	9	Sathi	204789	Trimmings	H/P			0.42		128		26.88	25.31	26.09	25.64	24.22	25.09	26.34	25.48	26.32	23.48	
23	9	Rajia	204235	Trimmings	H/P			0.42		131		25.86	25.03	24.98	25.64	24.11	23.84	25.49	25.31	24.11	25.54	
					23																	



and Work /Helper only by H/W or Manual

Less than or equal to SL. No. containing last data

527

Op	Time	Qty	Avg Time	Capacity
1	0.26	2	0.13	850
2	0.83	3	0.28	606
3	0.64	3	0.21	780
4	0.73	3	0.24	680
5	0.23	2	0.11	963
6	0.83	3	0.28	600
7	0.07	1	0.07	794
8	0.37	2	0.19	583
9	1.66	4	0.41	527

2.9 Paper Layout

Before start layout an industrial engineer to do a Paper Layout following task are accomplished-

1. Operation breakdown collect
2. Paper layout collect
3. Inform maintenance and technician department
4. Allocate man and machine
5. Design layout according to paper layout
6. Theoretically balance the line
7. Handover to maintenance and technical department
8. Continuously follow up the line

2.10 Paper Layout Sheet

HAMS GROUP

Layout Paper

Style 34NSBMP008

Inseam		
M/C	CT	Capacity
Over lock	7.25	497

Side seam join		
M/C	CT	Capacity
Over lock	17.22	209

Elastic round make		
M/C	CT	Capacity
Plain	7.28	495

Waist elastic join		
M/C	CT	Capacity
Over lock	16.53	218

Waist elastic T/S		
M/C	CT	Capacity
Flat Lock	12	300

Trimmings		
M/C	CT	Capacity
Manual	12	300

Side seam join		
CT	Capacity	M/C
21.64	166	Over lock

Leg elastic attach		
CT	Capacity	M/C
11.89	303	Over lock

Leg elastic T/S		
CT	Capacity	M/C
13.6	265	Flat Lock

Label attach		
CT	Capacity	M/C
6.27	574	Plain

Trimmings		
CT	Capacity	M/C
6.27	574	Manual

QC End Table

Trimmings		
M/C	CT	Capacity
Manual	12.73	283

Waist elastic T/S		
M/C	CT	Capacity
Flat Lock	12.73	283

Elastic round make		
M/C	CT	Capacity
Plain	7.67	469

Leg elastic T/S		
M/C	CT	Capacity
Flat Lock	17.49	206

Leg elastic attach		
M/C	CT	Capacity
Over lock	15.52	232

Inseam		
M/C	CT	Capacity
Over lock	10.17	354

Trimmings		
CT	Capacity	M/C
21.1	171	Manual

Waist elastic join		
CT	Capacity	M/C
21.1	171	Over lock

Waist elastic join		
CT	Capacity	M/C
16.98	212	Over lock

Leg elastic T/S		
CT	Capacity	M/C
17.19	209	Flat Lock

Leg elastic attach		
CT	Capacity	M/C
14.66	246	Over lock

Side seam join		
CT	Capacity	M/C
15.62	230	Over lock

2.11 Finishing Department

Stitched garments are finished prior to packing into poly bag. Major activities of a finishing department include thread trimming, checking of garments and ironing. Packing department in a factory works side by side of the finishing department. Folding, tagging and packing of garments are done in the finishing department. Based on product categories finishing room activities may vary.

Activities of the finishing department are listed below

- Thread trimming
- Attach button and button holing in case these jobs are done in the stitching section
- Checking of garments
- Stain removing
- Garment Pressing / Ironing
- Folding and Tagging
- Packing
- Communicate with internal department

2.12 Finishing Target Sheet

HAMS GARMENTS Ltd.

Undergarments finshing

Date-31/07/19

Daily Finishing Production Target Sheet

Final Table	Buyer	Style	PO	Item	Req M/P	Present M/P	Short M/P	SMV	Tgt./ Hr.	TTL TGT	Tgt./ Eff%	W/H	Remarks
A	K mart	moto	16979576	Brief	5	5	0	0.08	3600			.	
	K mart	Boxer	GB007	Boxer	5	5		0.14	1875	15000	88%	8	
TOTAL					5	5.00		0.14	5475	15000	88%	8	
B	H&M	Daniel	223903	Boxer	5	5	0	0.09	3000	24000	93%	8	
	K mart	Brief	113	Brief	5	5		0.08	3600	0			
TOTAL					5	5		0.09	6600	24000	93%	8	
C	H&M	Robin	110113	Boxer	5	5	0	0.10	3000	12000	95%	4	
	K mart	Pink	16979576	Boxer	5	5		0.08	3600	14400	90%	4	
TOTAL					5	5		0.08	3600	26400	93%	8	
Grand Total					15	15.00	0	0.10	15675	65400	91%	8.0	

Chapter 3

Critical assessment of Internship work

3.1.1 Work Method Analysis and Development

Method study is the systematic analysis of current method and find out new cost effective method that reduce time and cost. Unnecessary motion of human body creates waste in working method. If we can reduce unnecessary motion and activities from work method, it makes easier the work.

3.1.2 Objectives of Method Study

- To improve procedure as well as process
- To improve design of plant & equipment
- To improve layout design
- To improve men, machines and materials utilization
- To reduce unnecessary movement of human body
- To reduce fatigue
- To improve work safety standards
- To create better working environment

3.1.3 Layout Design with 50% Worker

I select a style of boys brief for critical analysis and develop method. In this table I reduce 50% manpower that reduce processing time of this product and reduce waiting time also.

HAMS GROUP

Layout Paper

Style 34NSBMP008

QC End Table

Trimmings		
M/C	CT	Capacity
Manual	0.356	169

Trimmings		
CT	Capacity	M/C
0.348	172	Manual

Waist elastic T/S		
M/C	CT	Capacity
Flat Lock	0.159	377

Label attach		
CT	Capacity	M/C
0.058	1034	Plain

Elastic round make		
M/C	CT	Capacity
Plain	0.111	541

Waist elastic join		
CT	Capacity	M/C
0.193	311	Over lock

Leg elastic T/S		
M/C	CT	Capacity
Flat Lock	0.194	309

Leg elastic attach		
CT	Capacity	M/C
0.164	366	Over lock

Inseam		
M/C	CT	Capacity
Over lock	0.11	545

Side Seam join		
CT	Capacity	M/C
0.134	448	Over lock

3.1.4 Micro motion Analysis of Inseam Join

Micro Motion Analysis												
Inseam Join												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.669	4	reach to back part	reach to front back	4	0.669	No						
1.007	3	reach to front part				No						
1.448	2	Align	Align	2	1.448	No						
1.103	2	Re-align	Re-align	2	1.103	yes	Unnecessary		√			1.103
1.079	4	Position	Position	4	1.079	No						
1.691	4	Sewing	Sewing	4	1.691	No						
0.720	4	Release				No						
7.717					**5.990**							**1.103**
					7.717							6.614
											IR	14%

From this table we can see that, 7.717 second time need to complete inseam join operation. After eliminating unnecessary movement I am able to reduce 1.103 second time from the operation and the improvement is 14%.

3.1.5 Micro motion analysis of Side Seam Join

Micro Motion Analysis												
Side Seam Join												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.695	4	Reach to body	Reach to body	4	0.695	No						
0.353	2	Grasp	Grasp	2	0.353	No						
0.771	4	Take position	Take position	4	0.771	yes	Unnecessary		√			0.868
2.650	4	Sewing 1st Leg	Sewing 1st Leg	4	2.650	No						
1.637	3	Turn	Turn	3	1.637	No						0.341
3.137	4	Sewing 2nd Leg	Sewing 2nd Leg	4	3.137	Discrete						
0.580	4	Release										
9.823					**9.243**							**1.209**
					9.243							8.034
											IR	13%

From this table we can see that, 9.243 second time need to complete side seam join operation. After eliminating unnecessary movement I am able to reduce 1.209 second time from the operation and the improvement is 13%.

3.1.6 Micro motion analysis of Leg Elastic Attach

Micro Motion Analysis												
Leg Elastic Attach												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.695	5	reach to body	reach to body	5	0.695	No						
0.353	2	Grasp	Grasp	2	0.353	No						
0.771	4	Take position	Take position	4	0.771	No						
2.650	4	Sewing 1st side	Sewing 1st side	4	2.650	No						
1.637	3	Turn	Turn	3	1.637	No						
3.137	4	Sewing 2nd Leg	Sewing 2nd Leg	4	3.137	Discrete						0.487
0.580	3	Release				No						
9.823					**9.243**							**0.487**
					9.823							9.336
											IR	5%

From this table we can see that, 9.823 second time need to complete leg elastic join operation. After eliminating unnecessary movement I am able to reduce 0.487 second time from the operation and the improvement is 5%.

3.1.7 Micro motion analysis of Leg Elastic Top Stitch

Micro Motion Analysis												
Leg Elastic Top Stitch												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.453	5	reach to body				No						
0.308	2	Grasp				No						
0.720	3	Get Control	Get Control	3	0.720	No						
0.672	4	Position	Position	4	0.672	No						
3.445	4	Sewing 1st Leg	Sewing 1st Leg	4	3.445	No						
0.506	3	Move	Move	3	0.506	No						0.305
1.434	4	Position	Position	4	1.434	No						
3.750	4	Sewing 2nd Leg	Sewing 2nd Leg	4	3.750	Discrete						
0.642	3	Release				No						
11.930					**10.527**							**0.305**
					11.930							11.625
											IR	3%

From this table we can see that, 11.930 second time need to complete leg elastic top stitch operation. After eliminating unnecessary movement I am able to reduce 0.305 second time from the operation and the improvement is 3%.

3.1.8 Micro motion analysis of Elastic Round Make

Micro Motion Analysis												
Elastic Round Make												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.461	4	Reach to elastic				No						
0.919	3	Get Control	Get Control	3	0.919	No						
0.728	2	Grasp	Grasp	2	0.728	No						
0.458	4	Position	Position	4	0.458	No						
2.799	4	Sewing 1st side	Sewing 1st side	4	2.799	Discrete						1.502
0.885	3	Move	Move	3	0.885	No						
1.297	4	Sewing 2nd side	Sewing 2nd side	4	1.297	No						
0.620	3	Release				No						
8.167					**7.086**							**1.502**
					8.167							6.665
											IR	18%

From this table we can see that, 8.167 second time need to complete elastic round make operation. After eliminating unnecessary movement I am able to reduce 1.502 second time from the operation and the improvement is 18%.

3.1.9 Micro motion analysis of Waist Elastic Join

Micro Motion Analysis												
Waist Elastic Join												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.565	5	Reach to body				yes	Unnecessary		√			0.565
0.459	2	Grasp	Grasp	2	0.459	yes	Unnecessary		√			0.459
0.685	3	Release	Release	3	0.685	yes	Unnecessary		√			0.685
0.900	2	Grasp	Grasp	2	0.900	No						
0.782	2	Re-grasp	Re-grasp	2	0.782	No						
0.707	4	Reach to body	Reach to body	4	0.707	No						
0.774	4	Position	Position	4	0.774	No						
5.893	4	Sewing 1st side	Sewing 1st side	4	5.893	Discrete						2.171
3.722	4	Sewing 2nd side	Sewing 2nd side	4	3.722	No						
0.947	3	Release										
15.434					**13.922**							**3.88**
					15.434							11.554
											IR	25%

From this table we can see that, 15.434 second time need to complete side seam join operation. After eliminating unnecessary movement I am able to reduce 3.88 second time from the operation and the improvement is 25%.

3.1.10 Micro motion analysis of Label Attach

Micro Motion Analysis												
Label Attach												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.448	3	Reach to body				No						
0.832	3	Position				No						
			Reach to label	4	0.575	No						
0.573	4	Position Label	Position Label	4	0.573	No						
0.376	3	Move	Move	3	0.376	yes	Unnecessary		√			0.376
0.547	4	Sewing	Sewing	4	0.547	No						
0.498	3	Release	Release	3		No						
3.274					**2.071**							**0.376**
					3.849							3.473
											IR	10%

From this table we can see that, 3.849 second time need to complete label attach operation. After eliminating unnecessary movement I am able to reduce 0.376 second time from the operation and the improvement is 10%.

3.1.11 Micro motion analysis of Waist Elastic Top Stitch

Micro Motion Analysis												
Waist Elastic Top Stitch												
Time	**BMC**	**Left Hand**	**Right Hand**	**BMC**	**Time**	**Availability of waste**	**Reason**	**Remedy**				**Possible Savings in CT**
								Simplify	Eliminate	Reduce Distance	Combine	
0.577	4	Reach to body				No						
0.365	2	Grasp	Grasp	2	0.365	No						
0.556	2	Get Control	Get Control	2	0.556	No						
1.029	3	Position	Position	3	1.029	No						
3.181	4	Sewing 1st side	Sewing 1st side	4	3.181	No						
4.002	4	Sewing 2nd side	Sewing 2nd side	4	4.002	Discrete						0.821
0.602	3	Check body	Check body	3	0.602	yes	Unnecessary		√			0.602
0.658	3	Release				No						
10.970					**9.735**							**1.423**
					10.970							9.547
											IR	13%

From this table we can see that, 10.970 second time need to complete side seam join operation. After eliminating unnecessary movement I am able to reduce 1.423 second time from the operation and the improvement is 13%.

3.1.12 Result

Result						
Process Name	No. Operation	Previous Cycle Time	New Cycle Time	Reduce Time (sec)	Reduce Time (min)	Improvement %
Inseam Join	1	7.717	6.614	1.103	0.01838	14.00%
Side Seam Join	1	9.243	8.034	1.209	0.02015	13.00%
Leg Elastic Attach	1	10.31	9.823	0.487	0.00812	5.00%
Leg Elastic Top Stitch	1	11.93	11.625	0.305	0.00508	3.00%
Elastic Round Make	1	8.167	6.665	1.502	0.02503	18.00%
Waist Elastic Join	1	15.434	11.554	3.88	0.06467	25.00%
Label Attach	1	3.849	3.473	0.376	0.00627	10.00%
Waist Elastic Top Stitch	1	10.97	9.547	1.423	0.02372	13.00%
				10.285	0.17142	12.63%

This table shows I am able to reduce 10.285 second time from the total process and the average improvement is 12.63%. Finally, the production of this line increase and eliminate non value added work from the processing time.

3.1.13 Value Stream Mapping (VSM)

Value stream mapping is very helpful tool in Lean principles were first used at Toyota Motor Company. VSM is a tool that helps us to find out our current state of the process and identify improvement opportunities. Already some company start to implement VSM in their factory but they can't sustain this tool. As a result, they can't benefited for long term. Because lean is a culture that focus on continuous improvement.

3.1.14 Current State of VSM

In current state,

Cycle time of the value stream = 4 min.

Unnecessary activities with cycle time = 1.09 min.

Excess motion within the cycle time = 0.17 min.

Waiting time within the process = 139 min.

Process time = 146 min.

Actual processing time = 6.315

Lead time (Input transport to sewing) = 182.1

Percentage of processing time = 3.47%

Percentage of waiting time = 96.53%

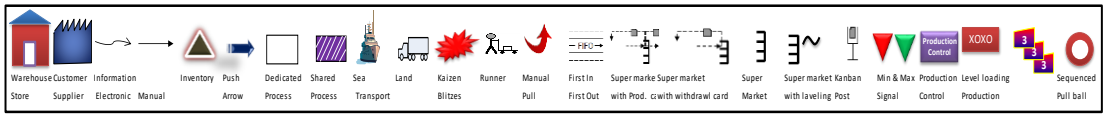
Total inventory = 4926pcs

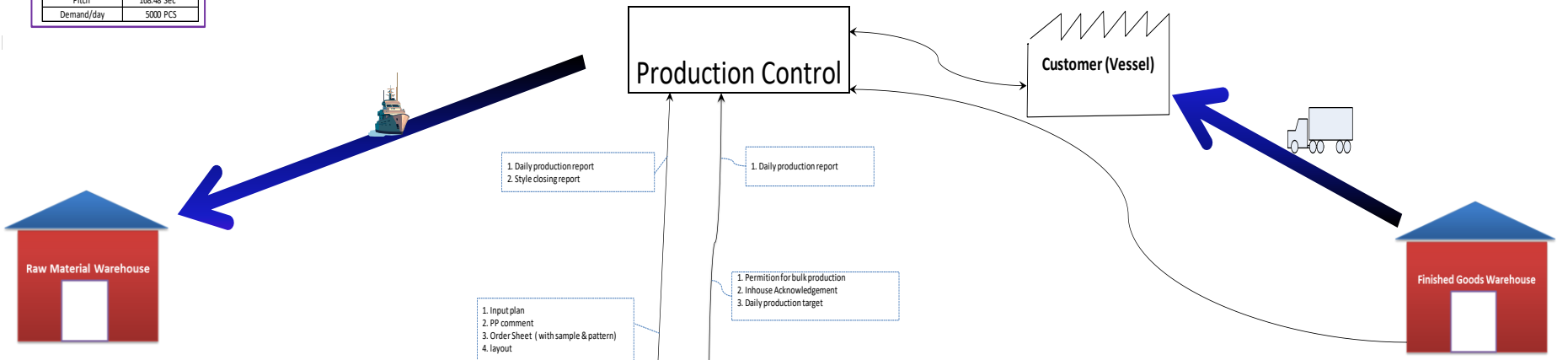
Here, processing time only 3.47% and waiting time 96.53% that non-value added work. This non value added work increase lead time of the product and process inventory 4926 pcs that too much inventory to increase waiting time in process time.

3.1.15 Value Stream Mapping (Current State)

Date of the Mapping	4-Apr-12
Value Stream	
Project Leader	
Mapping Members	
Lean Forum Members	

Takt Time	9.360 Sec
Pitch	168.48 Sec
Demand/day	5000 PCS





CUTTING	
NOT UNDER STUDY	
WASTE	

3245

TRANSPORT INPUT TO SEWING	
Cycle Time	2.18
Workers	2
Quantity (pcs)	3245
NO. of operations	1
Actual time	27.83
WASTE	
Retention time	25.65
Unnecessary Activity	0
Excess Motion	

706

FRONT & BACK PART ASSEMBLY	
Cycle Time	0.732
Workers	4
Quantity (pcs)	1
NO. of operations	4
Actual time	44.243
WASTE	
Retention time	42.556
Unnecessary Activity	0.955
Excess Motion	0.0515

400

ELASTIC ROUND MAKE	
Cycle Time	0.116
Workers	1
Quantity (pcs)	1
NO. of operations	1
Actual time	10.432
WASTE	
Retention time	10.133
Unnecessary Activity	0.183
Excess Motion	0.025

575

WAIST ELASTIC JOIN	
Cycle Time	0.97
Workers	4
Quantity (pcs)	1
NO. of operations	4
Actual time	62.998
WASTE	
Retention time	60.849
Unnecessary Activity	0.766
Excess Motion	0.09465

FINISHING	
Cycle Time	
Workers	
Quantity (pcs)	NOT UNDER STUDY
NO. of operations	
Actual time	
WASTE	
Retention time	
Unnecessary Activity	
Excess Motion	

25.65 0.316 10.316 0.283 36.565 Waiting time in between two processes

25.65 42.556 10.133 60.849 139.188 Retention/ waiting time within processes

27.83 44.243 10.432 62.998 145.503 Processing time

3.998 Cycle time of the value stream

1.904 Unnecessary activities with the cycle time

0.17115 Excess motion within the cycle time

Performance Measure	Criteria	Lead Time	Inventor & WIP	Cycle Time	Wasteful Motion
		Sewing	Sewing	Sewing	Sewing
	Current	182.068	4926	3.998	0.17115
	Future	73	740	3.3736	0
	Improvement %	-60%	-85%	-16%	-100%

6.315	Actual processing time
182.068	Lead time (Cut - Sewing)
3.47%	Percentage of Processing Time
96.53%	Percentage of Waiting Time

3.1.16 Future State of VSM

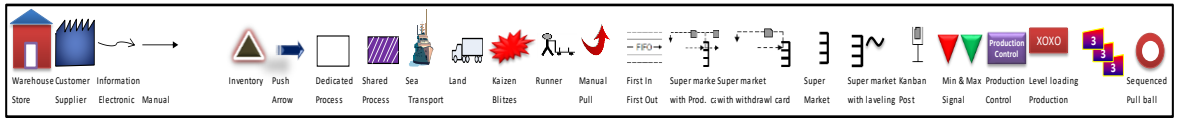
In future state,

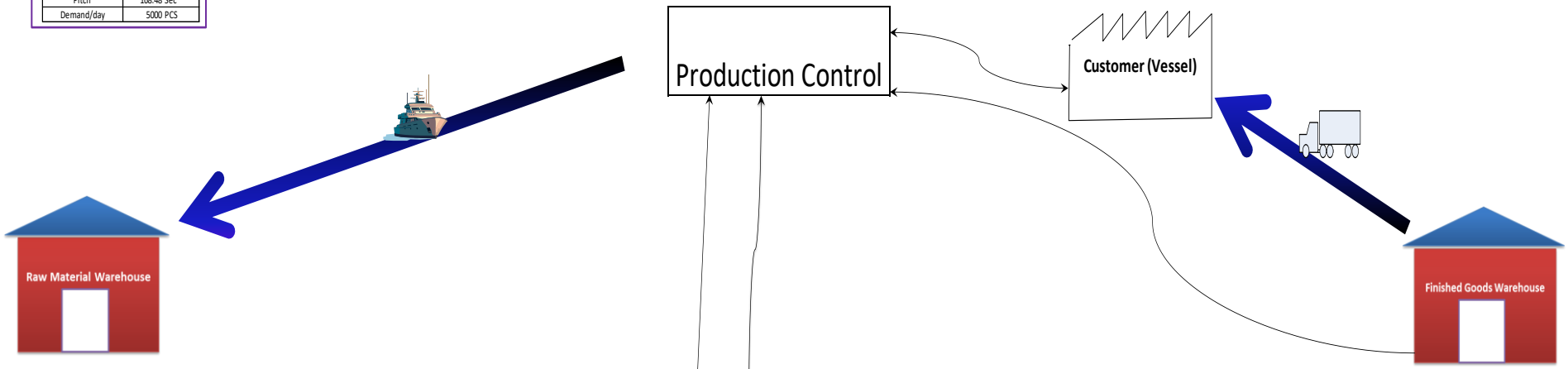
- Implement Kanban super market system to reduce inventory of sewing line.
- Remove bundling system and apply 10 pcs flow of ready input to reduce unnecessary activities and to reduce process inventory from process.
- Allow maximum 400 pcs and minimum 200 pcs in sewing input rack that control inventory level of the sewing line.
- Remove wasteful motion from processing time that reduce lead time of the style.

3.1.17 Value Stream Mapping (Future State)

Date of the Mapping	4-Apr-12
Value Stream	
Project Leader	
Mapping Members	
Lean Forum Members	

Takt Time	9.360 Sec
Pitch	168.48 Sec
Demand/day	5000 PCS





CUTTING	
NOT UNDER STUDY	
WASTE	

XOXO

400

TRANSPORT INPUT TO SEWING	
Cycle Time	1.852
Workers	2
Quantity (pcs)	400
NO. of operations	1
Actual time	742.652
WASTE	
Retention time	740.8
Unnecessary Activity	0
Excess Motion	0

Max 400 pcs
Min 200 pcs

FRONT & BACK PART ASSEMBLY	
Cycle Time	0.6016
Workers	3
Quantity (pcs)	1
NO. of operations	3
Actual time	12.6336
WASTE	
Retention time	12.032
Unnecessary Activity	0
Excess Motion	0

Max 30 pcs
Min 10 pcs

FIFO

ELASTIC ROUND MAKE	
Cycle Time	0.111
Workers	1
Quantity (pcs)	1
NO. of operations	1
Actual time	2.331
WASTE	
Retention time	2.22
Unnecessary Activity	0
Excess Motion	0

Max 30 pcs
Min 10 pcs

WAIST ELASTIC JOIN	
Cycle Time	0.809
Workers	4
Quantity (pcs)	1
NO. of operations	4
Actual time	16.989
WASTE	
Retention time	16.18
Unnecessary Activity	0
Excess Motion	0

FINISHING
NOT UNDER STUDY
WASTE

5 | 60 | 4 | 4

740.8 | 12.032 | 2.22 | 16.18

742.652 | 12.6336 | 2.331 | 16.989

3.3736 Cycle time of the value stream
0 Unnecessary activities with the cycle time
0 Excess motion within the cycle time

73 Waiting time in between two processes

771.232 Retention/ waiting time within processes
774.606 Processing time

Performance Measure	Criteria	Lead Time Sewing	Inventor & WIP Sewing	Cycle Time Sewing	Wasteful Motion Sewing
	Current	182.068	4926	3.998	0.17115
	Future	73	740	3.3736	0
	Improvement %	-60%	-85%	-16%	-100%

3.3736	Actual processing time
847.6056	Lead time (Cut - Sewing)
0.40%	Percentage of Processing Time
99.60%	Percentage of Waiting Time

3.1.18 Result

	Criteria	Lead Time	Inventor & WIP	Cycle Time	Wasteful Motion
		Sewing	Sewing	Sewing	Sewing
Performance Measure	Current	182.068	4926	3.998	0.17115
	Future	73	740	3.3736	0
	Improvement %	60%	85%	16%	100%

After implement VSM reduce 60% lead time from total time and 4186 pcs inventory reduce from sewing line. Total 0.6244 min reduce from cycle time and improvement percent is 16%. Total wasteful motion reduce time is 0.17115 min. and improvement percent is 100%.

3.2 Application of Generic and Industry specific courses during internship

In PGD-KIM, I have learned many important topics in Generic Course. In generic course, we learned about Communication skill, Business operational management skill, Analytical & critical thinking skill, Human resource management, Industrial engineering and so other soft skill like supply chain management and Marketing & Merchandising. I find the practical applications of the following Generic Course in this Internship period-

3.2.1 Find good practice of managerial skills and followership

- Manage team members
- Leadership styles
- Thinking strategically
- Practice of ethics in team
- Good relationship build with team members
- Practice corporate culture
- Provide freedom to take any decision making
- Role of a charismatic leader
- Build up trust and commitment

3.2.2 Find practice of good interpersonal leadership skills

- Being Effective communicator
- Self-motivated
- Self-confident
- People oriented
- Integrity
- Innovative
- Decision making skill
- Being problem solving skill
- Critical

3.2.3 Analytical Skills & Competencies:

- Cost benefit analysis
- Characteristics analysis through graph
- Fixed cost, variable cost
- Breakeven point analysis

3.2.4 Communication Skills:

From the communication Skill I have learnt a communication can be effective. Communication is very important for business as well as for maintaining proper relation. In work place etiquette is very much essential to maintain. Proper addressing, mailing etiquette, choosing proper language, presentation were practiced in our business communication class. During my internship it helped me to make myself more organized and professional. I have learnt how ethical communication is important for business communication

3.2.5 Business Operations:

Though I am working is a garments industry Business operations skill helps to grow myself in an organization. Business Operation skills is very important for aligning the goals with organizational goals. I learnt sustainable growth,

- SWOT analysis,
- GAP analysis,
- Corporate appraisal
- Analytical skill & find out proper.
- Crafting strategy is very much effective for future plan
- How to build up an organizational structure
- Different types of business Model
- Business strategy (Competitive strategy, Product/Market Strategy, Development Strategy)

I believe it will help me to improve in my professional career.

3.2.6 Application of Industry Specific Course

I have learned theoretically many important topics in my Industry Specific Course. I have found the practical applications of the following Industry Specific Course in this Internship period-

3.2.7 Get practical knowledge of IE

- Prepare operation breakdown
- Make SMV
- To get factory efficiency
- CM calculation
- Target sheet prepare
- CPM calculation

- KPI report
- Lean tools and techniques, 5S, 7 wastages
- Micro-motion analysis
- Calculate man, machine and required staff

3.2.8 Understand the whole supply chain management

- To know about forward and backward linkage of knitwear industry
- Supply chain network design
- Supply chain philosophies
- Drivers of supply chain
- Demand forecasting in supply chain
- Aggregate planning
- Managing uncertainty in supply chain
- Transportation
- Warehousing
- Pricing and revenue management
- Sustainability in supply chain

3.2.9 Get practical knowledge of marketing and merchandising

Methods study is the systematic approach for examine the various activities associate with the problem which ensure the systematic and critical evaluation of existing factors

Steps of Methods Study

- Select the work which need to study
- Record all relevant information about that work
- Examine the recorded information
- Develop an improved way of doing things
- Install the new method as standard practice
- Maintain the new standard proactive

3.3 Suggestion for industry improvement

Negative finding 01:

There is no modern cutting machine in cutting section that's why cutting capacity, efficiency very poor and need extra manpower for manual cutting.

Example:

To complete one lay cutting lay man used 6 person

Scissor man= 2 people

Cutter man= 2 people

Fly only = 55

Marker- 80 pcs, so cutting capacity=55*80=4400pcs

Recommendation-01:

Capacity & efficiency of cutting section will increase by purchasing computerized auto cutting machine. And cutting section manpower will reduce also.

After purchasing modern equipment-

Only 2 peoples need to complete 1 lay cutting, here save 4 people.

No need scissor man= 0, here save 2people

No need cutter man=0, here save 2 people.

Possible to fly-90, extra fly 35

Marker-80pcs, so cutting capacity=90*80=7200pcs.

Ultimately gainer will company.

NB: modern machine cost only one time but worker cost will remain continue.

Negative finding 02:

In sewing section, there is no any modern trimmer machine. For trimming manually, a style need 7 helpers that added extra time for sewing and as well as extra manpower also.

Example:

To complete a boxer need 20 machines and 7 helpers and SMV of the product 4.36

Machine SMV = 3.27

Manual SMV= 1.09

Production= 2400 pcs/day

Working hour= 10 hr.

Efficiency= (2400*4.36)/ (10*60*27)*100 = 64.59%

Recommendation-02:

Capacity & efficiency of sewing section will increase by purchasing modern trimmer machine. And sewing section manpower will reduce also.

After purchasing modern equipment-

No need helper= 0, here save 7people

Product SMV= 3.27, here save 1.09 minute

Ultimately gainer will company.

NB: modern machine cost only one time but worker cost will remain continue.

Negative finding 03:

There is no pull production system in sewing floor. As a result, more WIP create in sewing line and create bottle neck in sewing line that reduce line production and line efficiency.

Recommendation-03:

Need to apply Kanban super market system to reduce sewing line inventory.

Negative finding 04:

There are no 5S in sewing floor

Figure 8: Sewing floor scenario

Recommendation-04:

Top management should arrange audit team to maintain 5S properly that create good working environment.

3.4 Learning for self- improvement

If I talk about my learnings, I have learned many theoretical skills and practical skills from this course. And this skills are very help for my professional carrier. Here I describe some points that are really important-

- Practice of HRM in garments industry
- Improvement of communication skills
- Understand the backward linkage of garments industry
- Realize the difference between managerial skills and Leadership skills.
- Learn about working sequences of different departments.
- Learn the activities of merchandising, IE, planning, quality assurance, and production departments.
- Learn about supply chain network design
- To know about cash flow statement of an organization.
- Cost drivers and CM calculation procedure

Chapter 4
Conclusion

The course is designed very well and it also very help for building a promising carrier in knit wear industry. All the session of this course is interesting but the last session of this course is most challenging and interesting. I always try to learn from all the sessions but specially focused on internship session. Actually, I feel interesting to work in lean manufacturing tools like kanban, kaizen and 5S. The internship session increase my knowledge about total view of knit wear industry and also boost up my skills.

References

[1] http://www.hamsgroup.com

[2] Annual Report of HAMS Group

[3] https://en.wikipedia.org/wiki/C%26A

[4] https://en.wikipedia.org/wiki/Next_plc

[5] https://en.wikipedia.org/wiki/H%26M

[6] https://en.wikipedia.org/wiki/Marks_%26_Spencer

[7] https://en.wikipedia.org/wiki/S.Oliver

[8] https://en.wikipedia.org/wiki/Kmart

[9] https://www.onlineclothingstudy.com/2015/10/functions-of-cutting-department-in.html