

LB/DCN/49/C8

14



HIGH FABRIC UTILIZATION THROUGH CUTTING ROOM MANAGEMENT

LIBRARY
UNIVERSITY OF MORATUWA, SRI LANKA
MORATUWA



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
N. R. JAYAWARDENA
www.lib.mrt.ac.lk

This dissertation was submitted to the Department of Textile and Clothing Technology of the University of Moratuwa, in partial fulfillment of the requirements for the Degree of Master of Science.

DEPARTMENT OF TEXTILE & CLOTHING TECHNOLOGY
UNIVERSITY OF MORATUWA

University of Moratuwa

SRI LANKA

CD-Rom Includes J.



91202

AUGUST-2007

91202

I

91202

677 57
671(043)
74

DECLARATION

I hereby certify that this work incorporated in this dissertation was solely carried out by me under the supervision of Mr. Nihal Wanigatunge, and this dissertation or any material incorporated in it, has not been submitted for any other academic qualification at any institution.


UOM Verified Signature



University of Moratuwa, Sri Lanka.
Nandika Roshantha Jayawardena.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk (Candidate)

To the best of my knowledge the above statement is correct.

UOM Verified Signature

 Nihal Wanigatunge.
(Supervisor)

ABSTRACT

“High Fabric Utilization Through Cutting Room Management”

One of the growing trends of customer service is to reduce the total operational cost that has to bear when supplying services or goods. As a customer service trade, the garment industry which is a high caliber expanding and fast growing fashionable Industry, is also looking for the reduction of production cost. Hence the fabric plays a vital role in the garment trade; it represents a high percentage of the garment cost. Therefore through getting high fabric utilization will provide a better customer service. The Cutting Room is the place that consumes the fabric to make a value addition as cut panels. Therefore a proper planning and carrying out of cutting room operation is a must to reduce the fabric consumption. Collecting data while working in a cutting room is the method used by me to find the best and effective cutting operational methods. The results benefit to the Cutting Managers and related people to get a decision in advance. Therefore this dissertation can be used as a Management tool in garment industry.

ACKNOWLEDGEMENT

It is a great pleasure to thank those who helped me in various aspects in this effort, especially the project Supervisor Mr. Nihal Wanigatunge, who directed and encouraged me to do this dissertation. My heartfelt gratitude goes to Mrs. Sriyani Patikiriarachchi, the Senior Cutting Room Manageress, at Hirdaramani Mercury (Pvt) Limited, Katunayake, who has given a vast support, with her vast knowledge and the experience for more than 25 years in the cutting room. Mr. Ajith Samantha the Pattern maker at Hirdaramani Mercury (Pvt) Limited at Katunayake gave his heartiest cooperation by drawing patterns and preparing markers and the Senior Supervisor at Cutting room at Hirdaramani Mercury (Pvt) Limited, Katunayake Mr. Sudesh Chandrasinghe who helped me in layering and cutting practices. The Fabric Inspection team with Mr. Michel Lawrence at Hirdaramani Mercury (Pvt) Limited, Katunayake also gave a good support to collect details from suppliers and the history of fabric data. The Cutting room Managers Mr. Serasinghe, at Hirdaramani Industries at Kahathuduwa Mr. Isuru Abeysinghe at Hirdaramani Mercury (Pvt) Limited at Seethawake also gave a good support by giving facts and figures as per my request. The all supports given to me are greatly appreciated. If not for their whole-hearted co-operation this study would not have succeeded so easily. As such I would like to say a very sincere "thank you".

CONTENTS

Content	Page No.
• Declaration.....	ii
• Abstract.....	iii
• Acknowledgement.....	iv
• Contents.....	v
• List of illustrations.....	vii
a) List of figures	vii
b) List of tables.....	ix
c) List of graphs.....	x
• Chapter 1.....	1
1. Introduction.....	1
• Chapter 2.....	2
2. Objectives and Methodology.....	2
• Chapter 3.....	5
3. Factors affecting fabric utilization.....	5
3.1 Customer Requirements	5
3.2 Supplier Specifications	8
3.3 Chemical and Physical Properties of Fabrics..	10
3.4 Fabric Types and Structures	14
3.5 Fabric Faults	17
3.6 Pattern Engineering	21
3.7 Marker Types	23
3.8 Costing Methods	25
3.9 External Process	26
3.10 Internal Process	27
3.11 Resource Utilization	30
3.12 Reducing Wastages	31
• Chapter 4.....	32
4. Data Analysis.....	32
4.1 Why customer requirements are important in the cutting room?.....	32
4.2 Why supplier specifications are important in the cutting room?.....	35
4.3 How does the fabric GSM help the cutting room?.....	37
4.4 What is the importance of fabric width?.....	39
4.5 Dealing with inconsistent and narrow widths....	46
4.6 Is fabric weight important for cutting room?..	50
4.7 Is it necessary to know the fabric length of a roll?	51
4.8 The effect of the fabric colour and quality for	

	cutting room operations.....	52
4.9	Importance of fabric shrinkage.....	53
4.10	The importance of Chemical and physical Properties.....	55
4.11	The importance of fabric types and structure in cutting operations.....	57
4.12	Does the fabric fault make a significant damage to the cutting room?.....	59
4.13	How to go ahead with fabrics with high fault rate?	64
4.14	Calculation of the amount of fabric waste by fabric fault.....	68
4.15	The role of shortage at cutting room.....	71
4.16	The role of the pattern engineering for “higher fabric utilization”.....	73
4.17	Does the marker making play a vital role in fabric saving?.....	81
4.18	What are the advantages and disadvantages of costing marker methods?.....	86
4.19	The type of external reasons, which will disturb the cutting room process.....	94
4.20	Way of reducing fabric and overall cost through pattern and marker making process.....	96
4.21	How to deal with excess and shortage fabrics at lay planning?.....	99
4.22	What is the best ratio marker?.....	102
4.23	How to select the fabric for marker making and cutting operations?.....	110
4.24	How to achieve higher fabric utilization through spreading.....	112
4.25	The main cutting errors and how to overcome them.	119
4.26	The methods that can be used to store the cut panels securely before stitching.....	120
4.27	Method to utilize the existing resources by Over coming the day to-day problems.....	122
4.28	The avoidable wastages.....	124
•	Chapter 5.....	128
	5. Application.....	128
•	Chapter 6.....	142
	6. Conclusion.....	142
•	List of References.....	147

LIST OF ILLUSTRATIONS

a) List of Figures

Number	Name of the figure	Page No.
Figure 3.1	Flow chart from Designer to End-user.	5
Figure 3.2	Some fabric labels	9
Figure 3.3	Structure of Woven fabric	14
Figure 3.4	Structure of Knitted fabric	15
Figure 3.5	An example for Skew-ness	17
Figure 3.6	An example for Bowing	18
Figure 3.7	An example for Bowing in both sides	18
Figure 3.8	Two examples for Barre	18
Figure 3.9	A crease line in a fabric	20
Figure 3.10	An overlapping point in a Marker	21
Figure 3.11	Sewing allowance of a Marker	21
Figure 3.12	How to turn a part	22
Figure 3.13	Panel Separation and Merging	22
Figure 3.14	An example of slipping of layers	23
Figure 3.15	Inter-department connections	26
Figure 3.16	The Cutting room process should be	26
Figure 3.17	Internal process flow chart	27
Figure 3.18	Cutting process	31
Figure 4.1	Marker of piping	32
Figure 4.2	Marker of circular panels of scarves	39
Figure 4.3	A piece of fabric with inconsistent width	46
Figure 4.4	How to utilize a smallest waste panel	53
Figure 4.5	Panels with stripes	57
Figure 4.6	Acceptable defects in a panel	65
Figure 4.7	Getting smaller parts from defect panels	66
Figure 4.8	A fabric piece with shade variations	66
Figure 4.9	A fabric piece with uneven repeats	67
Figure 4.10	A fabric piece with crease lines	67
Figure 4.11	Some panels that can round the corners	74
Figure 4.12	Buffer allowance	79
Figure 4.13	Sectional marker	83
Figure 4.14	A single normal marker	86
Figure 4.15	A single one-way marker	87
Figure 4.16	Fabric classification	110
Figure 4.17	Joints in a normal marker	113
Figure 4.18	Joints in a sectional marker	113
Figure 4.19	Joints in an interlock marker	113
Figure 4.20	Pining positions	116
Figure 4.21	A pattern placing method for skew fabric	117
Figure 4.22	Pinning position of a skew layer	117

Figure 4.23	Shirt panels cut by a skewed check fabric	118
Figure 4.24	Bowing effect	118
Figure 4.25	A mirror cutting	119
Figure 4.26	Numbering sticker placement	120
Figure 4.27	A method of avoid defects	126
Figure 5.1	A sketch for fleece stripe top (night wear)	128



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

b) List of Tables

Number	Name of the table	Page No.
Table 4.1	Fabric types & highest number of plies can be laid	37
Table 4.2	Values for style number T78/3254	40
Table 4.3	Values for style number T87/4629	41
Table 4.4	Values for style number T87/4600	42
Table 4.5	Values for style number T87/2058	43
Table 4.6	Values for style number T78/3262	44
Table 4.7	Variation between ordered and received widths and shortage occurred	47
Table 4.8	The behavior of fabric supplies of width variation	48
Table 4.9	Lengths of fabric rolls and the number of plies can be laid	51
Table 4.10	Points system – Ten points	60
Table 4.11	Shortage calculation for style number 4416	72
Table 4.12	Values taken by rounding corners	73-74
Table 4.13	Values taken by reducing sewing allowances	76
Table 4.14	Values taken by turning of hidden parts	77
Table 4.15	Values taken by adjusting dimensions	78
Table 4.16	Values taken by parts separation and merging	78
Table 4.17	Values taken by removing buffer	79
Table 4.18	Values for half garment marker	81
Table 4.19	Some single size markers	82
Table 4.20	Figures of a same size set drawn sectional interlock and mixed markers	83
Table 4.21	Comparison of cost and actual ratio markers	89-93
Table 4.22	Additional cost that has to spent	97
Table 4.23	Quantity calculation before cut	99
Table 4.24	Savings and Additional profits	101
Table 4.25	Comparison of set of ratio marker A and B for style 0974	102
Table 4.26	Comparison of set of ratio marker A and B for style 2254	105
Table 4.27	Comparison of set of ratio marker A and B for style 8013	107
Table 4.28	List of all 148cm width fabric received for style 0424	114-115
Table 4.29	The results of spreading Manual vs. Auto	115
Table 4.30	A method of cut issues	121
Table 5.1	Order quantity requirement in colour wise and size wise	128
Table 5.2	Shipment requirement in colour wise	128
Table 5.3	Possible marker and marker length for style T86-2913D	129-135
Table 5.4	The best marker set for style T86-2913D	135
Table 5.5	Inspection list of the fabric received for style T86-2913D	136
Table 5.6	Pattern engineered marker sets for production of style T86-2913D	137-138
Table 5.7	The best markers for all available widths	138
Table 5.8	Lay plan for style T86-2913D	139

c) **List of Graphs**

Number	Name of the graph	Page No.
Graph 4.1	GSM vs. number of plies per lay	38
Graph 4.2	Marker Efficiency vs. Width for style number T78/3254	40
Graph 4.3	Marker Efficiency vs. Width for style number T87/4629	41
Graph 4.4	Marker Efficiency vs. Width for style number T87/4600	42
Graph 4.5	Marker Efficiency vs. Width for style number T87/2058	43
Graph 4.6	Marker Efficiency vs. Width for style number T78/3262	44
Graph 4.7	Handling cost vs. Weight of a fabric roll	50
Graph 4.8	Defects percentage vs. Number of panels per garment	62
Graph 4.9	Cost of defects removing vs. Number of defects	65
Graph 4.10	Defect garments vs. Consumption	70
Graph 4.11	Value of garment cut pieces vs. Number of garments cut	97
Graph 4.12	Value / Cost vs. Number of garments cut	98
Graph 4.13	Additional profit	100
Graph 4.14	Cost vs. Number of markers	111



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk