



Faculty of Engineering
Department of Textile Engineering

Study on Basic Motion Study & Motion Improvement
Course code: TE-4214 Course title: Project (Thesis)

Submitted by:
Hanjala Bin Abdul Hannan
ID: 191-23-5567
Md Ebrahim Khalil
ID: 191-23-5530

Supervised by:
Mr. Md. Mominur Rahman
Assistant Professor
Department of Textile Engineering
Daffodil International University

A thesis submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in Textile Engineering
Advance in Apparel Manufacturing Technology

1March, 2023

LETTER OF APPROVAL

February 13, 2023

To

The Head

Department of Textile Engineering

Daffodil International University

Daffodil Smart City, Ashulia, Savar

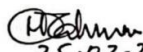
Subject: Approval of Thesis Report of B.Sc. in TE Program

Dear Sir,

I am just writing to let you know that this report titled as “**Study on Basic Motion Study & Remove Unnecessary Motion**” has been prepared by the student bearing ID: 191-23-5567 and 191-23-5530 is completed for final evaluation. The whole report is prepared based on the factory data with required belongings. The students were directly involved in their thesis activities and the report become vital to spark of many valuable information for the readers.

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

Yours Sincerely,


25.02.2023

Md. Mominur Rahman

Assistant Professor

Department of Textile Engineering

Faculty of Engineering

Daffodil International University

DECLARATION

We hereby declare that the work which is being presented in this thesis entitled, “**Study on Basic Motion Study & Motion Improvement**” is original work of my own, has not been presented for a degree of any other university and all the resource of materials uses for this thesis have been duly acknowledged.

Prepared By:



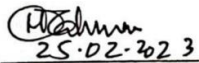
- Hanjala Bin Abdul Hannan ID: 191-23-5567



- Md Ebrahim Khalil ID: 191-23-5530

This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

Supervisor:


25.02.2023

Md. Mominur Rahman

Assistant Professor

Department of Textile Engineering

Faculty of Engineering

Daffodil International University

ACKNOWLEDGEMENT

We really offer my supervisor, my sincere gratitude and appreciation. For his advice and assistance in developing this study effort, Md. Mominur Rahman, Assistant Professor of the Textile Engineering Department at Daffodil International University, is grateful. Working with him allowed us to gain not only useful knowledge but also inspiration from his creativity, which really enhanced our experience. His methods of thinking and working were simply amazing. We think that without his constant assistance, this research could not have been completed.

We are appreciative of their generous assistance, we thankful to Md. Mominur Rahman, Assistant Professor, Department of Textile Engineering, Daffodil International University, as well as a few of my friends from DIU.

We also want to express our gratitude to everyone who took the time to reply to our questionnaires and interviews, which enabled us to conduct this study.

We appreciate the support of all of our colleagues in this research effort.

Finally, we would like to convey our deep gratitude to our parents, brother, sister, and sister-in-law for their unwavering love and support during our academic careers.

**Hanjala Bin Abdul Hannan
Md Ebrahim Khalil**

ABSTRACT

This project is on “Study on Basic Motion study & Motion Improvement”. Presently, the garment industry is one of the highest-earning foreign currency sectors in Bangladesh. Here, garment operators must contend with a variety of motion issues. Processing. Generally operated garment industries face issues such as low productivity, longer production lead time, and rejection, poor line balancing, and low flexibility of style changeover, among others; therefore, we must develop a technique for providing better performing methods to a manufacturer, as better performing methods are the key to improving efficiency. The garment industry's productivity depends on a variety of factors. Time and motion analysis a crucial aspect in determining the productivity of the garment industry. In the garment industry, it is crucial to set a goal for the sewing area in order to ensure on-time shipping. The entire stitching part is performed by a separate operator. Therefore, without a defined aim, it is difficult to achieve the objective. A time and motion analysis must be conducted before establishing a target benchmark. This document describes the garment industry's time and motion study methodology. By conducting a time and motion analysis, it is possible to estimate the entire time required to produce a given product or garment, which is essential for ensuring on-time delivery. Time study, motion study, productivity, and allowance are included in the index.

TABLE OF CONTENT

LETTER OF APPROVAL	ii
DECLARATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT.....	v
CHAPTER-1: INTRODUCTION.....	1
1.1 Objectives of The Study/ Project.....	2
1.2 Aim of The Report	2
1.3 Limitations of Motion Study	2
CHAPTER 2: LITERTURE REVIEW	3
2.1 Motion Study.....	4
2.2 Basic Motions.....	4
2.3 Objects of Motion Study	4
2.4 Classification of Body Movement.....	4
2.5 Motion Analysis Tools	5
2.6 Importance of Motion Study	5
2.7 The Basic Purpose of Motion Study	5
2.8 Principle of Motion Study	5
2.9 Workstation Rules	5
2.10 Principles Involving to Tools and Equipment.....	6
2.11 Principles of Goods Transportation.....	6
2.12 Principles of Goods Transportation:	6
2.13 Benefits of Motion:	6
2.14 Principles of Motion Economy:	6
2.15 Use of Videotape:.....	7
2.16 Tracking:	7
2.17 Faster Standards Creation:	7
2.18 Benchmarking/Standard Work Analysis:.....	8
2.19 Work Analysis:.....	8
2.20 Motion Analysis:	8
2.21 Standard Time:	8
CHAPTER 3: EXPERIMENTAL DETAILS/ METHOD DETAILS	10
3.1 The Role of An Industrial Engineers in Garments:.....	11
3.1.1 Key Task:	11
3.2 Line Balancing:	11
3.2.1 Capacity/ Time Study:	11
3.2.2 Time Study Sheet:.....	12

3.2.3	Purpose of Time Study:	12
3.2.4	LCL & UCL:.....	13
3.3	Bottleneck:	14
3.3.1	Reduce Bottleneck:	14
3.4	Motion Improvement:	14
3.4.1	Basic Motions:	15
3.5	Motion Improvement:	15
3.6	Improvement (1):.....	15
3.6.1	Basic Information:	15
3.6.2	BOL:	16
3.6.3	Improvement Area:	18
3.6.4	Before Motion Pictures:	18
3.6.6	Motion Reduce:.....	19
3.7	Improvement (2):.....	20
3.7.1	Basic Information:	20
3.7.2	BOL:	21
3.7.3	Improvement Area:	23
3.7.4	Before Motion Pictures:	23
3.7.5	After Motion Pictures:	24
3.8	Improvement (3):.....	25
3.8.1	Basic Information:	25
3.8.2	BOL:	26
3.8.3	Improvement Area:	28
3.8.4	Before Motion Pictures:	28
3.8.5	After Motion Pictures:	30
3.8.6	Motion Reduce:.....	31
CHAPTER 4: DISCUSSIONS OF RESULTS		32
4.1	Motion Improvement Result and Discussion:	33
4.2	Improvement (1):.....	33
4.2.1	Problem (1):	33
4.2.2	Solution (1):	33
4.3	Improvement (2):.....	34
4.3.1	Problem (2):	34
4.3.2	Solution (2):	34
4.4	Improvement (3):.....	35
4.4.1	Problem (3):	35
4.4.2	Solution (3):	35

CHAPTER 5: PROFESSIONAL RESPONSIBILITIES, SAFETY, SOCIAL, CULTURAL AND ENVIRONMENTAL COORDINATION.....	37
5.1 Professional Responsibilities, Health, Safety, Social Cultural, And Environmental Consideration:	38
5.2 Codes and Standards Used:	38
5.3 Ethical Principles and Professional Commitment:	38
5.4 Impact on Society, Health, Safety, Legal and Cultural Issues:	38
5.5 Impact on Environment:	39
CHAPTER 6: CONCLUSION	40
REFERENCES	42

CHAPTER-1: INTRODUCTION

1.1 Objectives of The Study/ Project

Motion analysis is a method for analyzing the body movements used to do a task in order to eliminate or reduce unproductive movements and enhance effective ones. Motion analysis is a very powerful thinking and business efficiency technique in the garment industry. By using proper productive motion, the capacity of production will be increased. It is one of the first subfields of work-study and a component of method study. Every piece includes some kind of motion. These motions are used efficiently in the workplace to optimize the performance of a job.

Motion research is the science and practical ways of lowering wastefulness resulting from the use of unnecessary, misdirected, and inefficient motion. On the other hand, it is the systematic documentation and analysis of present and proposed techniques of accomplishing labor in order to build and implement a methodology that is simpler, more efficient, and less expensive.

1.2 Aim of The Report

A time and motion study increase the productivity and efficiency of employees. By eliminating unnecessary movements, people may execute jobs more efficiently. This allows them to do more duties throughout their shift. So, the IE department always works toward this goal and tries not to waste the things below. At the same time, they try to use time well. Industrial engineering is a department that has everything to do with how much money a factory makes.

Without this division, factory profits won't go up. So, for these reasons, we chose this part of IE as the subject of our thesis. Here, we try to show what each department does and how they work together to help the factory grow. Use all of the following things in the right way, as quickly and cheaply as possible, and they will make money.

1.3 Limitations of Motion Study

- They (IE officer) can't offer us enough time for this study.
- Also, this is not possible to learn fully about IE.
- It is not possible to learn a hundred percent about IE within 6 weeks.
- Limitation of accurate data.

CHAPTER 2: LITERTURE REVIEW

2.1 Motion Study

Motion studies is the study of work actions such lifting, putting, sitting, and moving position. Removing unnecessary motions speeds up work completion.

Motion study analyzes the basic movements like

- i. Hand,
- ii. Arm,
- iii. Body

movements of workers. Motion studies analyzes body motions to remove or minimize useless movements and improve effective movements.

2.2 Basic Motions

There are six types of basic motion available for sewing section

1. Pick Up
2. Put under the pressure foot
3. Align
4. Stitch
5. Remove from pressure foot
6. Dispose/ Quality Check

2.3 Objects of Motion Study

- To improve the work process
- To identify the best technique to accomplish the job
- To improve the work process
- Reduced unnecessary movements
- Use material, machines, and labor more effectively
- Train workers on standard methods

2.4 Classification of Body Movement

- Knuckle -Finger
- Wrist - Hand &Finger
- Elbow - Forearm, hand &finger
- Shoulder-upper arm, fore-arm, hand &finger
- Trunk - Torso, upper arm, forearm, hand &finger.

2.5 Motion Analysis Tools

Industrial engineering requires various tools and equipment for motion study.

2.6 Importance of Motion Study

Motion studies analyzes and improves body and hand motions to boost work production. Human effort engineering includes motion studies, which is microsystem enhancement.

In today's workplace, motion studies reduce ergonomic stress.

- Time and motion analyses increase worker productivity.
- By removing unnecessary motions, they can work faster.
- This helps them perform more work during a time.

2.7 The Basic Purpose of Motion Study

Increasing work and reducing waste are the main goals.

- Motion analysis.
- Time-study method.
- Time standard use.

2.8 Principle of Motion Study

Human movement principles:

- The worker must move quickly to complete a task. Without adequate movement, work speed cannot be enhanced.
- To work faster, use two hands.
- All essential supplies, tools, spare parts, etc. must be kept close at hand to minimize movement.
- Energy and time may be saved by minimizing body movement while working.
- Resting between tasks increases work speed and productivity.
- To avoid boredom, plan recreation.
- Health and first aid are important. Drugs must stay in the industry.

2.9 Workstation Rules

- All workstation materials, tools, spare parts, etc. should be within two hands of the workers.
- If necessary, work should be visible and very well.
- Before starting, prepare all inputs.
- Workstation space should be sufficient for efficiency.
- Clean, well-lit workstations are important.

2.10 Principles Involving to Tools and Equipment

Worker tools and equipment must be within range. Workers must utilize their legs if they require their hands for critical steps. Use assembly lines or automatic systems to move input between workstations. To save time, all equipment and machines should be in good condition.

2.11 Principles of Goods Transportation

- A good system to transport goods between places or workstations, possibly fully automatic, is necessary.
- A great system should receive raw material from truck and quickly deliver completed items into truck.

2.12 Principles of Goods Transportation:

Study time for each activity to reduce waste. The equipment will be high-quality and human movements must be quick.

2.13 Benefits of Motion:

- Observing necessary requirements, using suitable instruments, and avoiding unnecessary motions increases worker efficiency. Man-machine efficiency is ensured.
- The best succession of important activities reduces current activities. It reduces both time and money.

2.14 Principles of Motion Economy:

Through the pioneering work of Gilbreth, Ralph M. Barnes and other investigators, certain rules for motion economy and efficiency have been developed. Some of the more important of these principles are the following:

- The movements of the two hands should be balanced and the two hands should begin and end their motions simultaneously.
- The hands should be doing productive work and should not be idle at the same time except during rest periods.
- Motions of the hands should be made in opposite and symmetrical directions and at the same time.
- The work should be arranged to permit it to be performed with an easy and natural rhythm.
- Momentum and ballistic-type movements should be employed wherever possible in order to reduce muscular effort.

- There should be a definite location for all tools and materials, and they should be located in front of and close to the worker.
- Bins or other devices should be used to deliver the materials close to the point of use.
- The workplace should be designed to ensure adequate illumination, proper workplace height, and provision for alternate standing and sitting by the operator.
- Wherever possible, jigs, fixtures, or other mechanical devices should be used to relieve the hands of unnecessary work.
- Tools should be prepositioned wherever possible in order to facilitate grasping them.
- Objects should be handled, and information recorded. Only once.

2.15 Use of Videotape:

The experienced techniques engineer discovered that motion pictures were one of the most helpful aids. It's hard to in many circumstances. Because of the operation's speed or difficulty. We've seen slow-motion movies, so we know they can film at high speed and screen them at normal speed to slow the action. Similarly, we can take photographs at slow speed and present them at rapid speed. Time and motion analysis solution: IEES (Industrial Engineering Execution System) helps the sewing industry and our industrial engineers create time standards and optimize work practices to reduce operating costs and increase production. We can examine and plan every machine and manual stitching process. IEES eliminates guessing in garment pre-production.

2.16 Tracking:

- Create and store detailed work procedures and labor norms
- Cost estimates,
- Procedures,
- Methods

2.17 Faster Standards Creation:

- Search organizational-wide IE data
- Benchmark standards based on MTM-2
- Update standards across the organization.

2.18 Benchmarking/Standard Work Analysis:

- **Collect motion and time data:** Industrial engineers use video camcorders to measure workers' time and motion before mass production.
- **Upload for analysis:** Work GP RO's analysis solution categorizes digital motion videos and time data.
- **Define and work breakdown:** A video of work motions is studied, and time and work elements are identified. Deriving standard time. Machine RPM, material handling time, etc.
- **Analyze and summarize:** Before-and-after charts. Simplify. Review operator methods.
- **Improve:** Find ways to improve. Gains, check-in, reuse.

2.19 Work Analysis:

Repeating styles? Thousands of repeated processes for hundreds of ordered styles

Leaner production: Optimized work to eliminate motion wastage the key to hours of operations. Wastes lower production efficiency and cost. Work analysis done well lets you take charge, work smarter, and learn more. Develop 21st-century sewing methods. GP RO's work analysis solution can save 25% by reducing tasks.

2.20 Motion Analysis:

Motion analysis creates a better method that reduces superfluous motion and maximizes human effort.

Motion analysis includes:

- Choose the operation to study.
- Chart operator motions.
- Determine productive and idle motions
- Avoid unproductive motions.
- Redesign the operating procedure using the fewest motions in the best order and motion economy.

2.21 Standard Time:

Standard Time may be defined as the amount of time required to complete a unit of work under existing conditions, using the specified method & machinery, by an operator able to do the work in a proper manner and at a standard pace.

OT	PRF	PA	RPA	SA	POA
Normal Time		Allowances %			
Standard Time					

Figure 1 Standard Time Chart

OT- Observed Time

PRF - Performance Rating Factor

PA- Process Allowances

SA - Special Allowances

POA - Policy allowances

Standard Time = (Average Observed Time X Rating %) + Allowances %

Normal Time = (Average Observed Time X Rating %)

CHAPTER 3: EXPERIMENTAL DETAILS/ METHOD DETAILS

3.1 The Role of An Industrial Engineers in Garments:

- (IE) plays an important role to reduce costs and improve work efficiency in the garment industry. In this competitive era maximum productivity with minimum cost in optimum duration is very big challenge for apparel industry. That's why an industrial engineer is a key person in garment factory.
- The roles of the Industrial Engineer is to effectively and efficiently utilize software technologies, machine tools, math and scientific concepts, and human resources in order to solve problems, provide products or services at minimal cost, and produce on time at the optimum output level to satisfy customer demands.

3.1.1 Key Task:

- Line Balancing
- Material Utilization
- Quality – Operation control
- Training – how to train new employees
- Operator output – maintains high output and improves abilities of those with low output.
- Loss control – minimize off-standard loss
- Waste control – in materials, supplies and machinery
- Standard conditions – in the workplace, in sewing method, in the machines

3.2 Line Balancing:

For line balancing firstly IE ensure that the operator assessment is correct or not. Then maintain the time/ capacity study for identify the LBR%. IE identify the bottle neck process of that line by capacity study. Reduced bottle neck is the first priority as an IE.

3.2.1 Capacity/ Time Study:

Continuous supply chain time analysis. Time study increased a textile factory's garment production capacity.

- It mostly measures operator capacity.
- Time research identifies line bottlenecks.
- Operators utilize 5-time cycles.

$$\Rightarrow \text{LBR \%} = \frac{\text{SMV X 60 X BNP MP}}{\text{Total MP X BNP Avg. Cycle Time}}$$

$$\Rightarrow \text{Capacity Per Hour} = \frac{3600}{\text{Cycle Time}}$$

3.2.2 Time Study Sheet:

Time Study Sheet													
Line: 909		Buyer: George UK		Style: GJSPL1233		SMV: 3.036		LBR% 63%		Capacity: 1792 Pcs		Date: 8-11-2022	
Sl No.	Name	ID	Operation Description	M/C Type	1st	2nd	3rd	4th	5th	Actual	Average	Capacity	Total Capacity
1	Disha moni	L629481	Join right shoulder	OL	5	7	7	6	8		7	514	
2	Nargis	L45321	Attach piping at neck	FL	22	22	17	18	21		20	180	
3	Sharmin	L49091	" " " "	FL	15	18	24	15	19		18	200	380
4	Mahmuda	L62916	cut excess thread	Manual	8	10	8	7	8		8	450	
5	Shyamoli	L49380	Join Left shoulder	OL	17	21	14	12	14		16	225	
6	Bonna	L45197	Attach piping at armhole	FL	16	16	26	18	15		18	200	
7	Nazma	L42816	" " " "	FL	15	19	18	19	18		18	200	400
8	Rekha	L44035	cut excess thread	Manual	8	10	7	10	5		8	450	
9	Chomela	L44785	Join Both side seam with Garment	OL	19	21	21	25	24		22	163	
10	Minoti	L4904	" " " " " " " "	OL	21	23	21	24	22		22	163	326
11	Sweety	L45234	Leach backstitch at side seam and shoulder	SNLS	17	17	19	20	17		18	200	
12	Sumi	L45277	" " " " " " " "	SNLS	22	19	16	19	18		19	189	389
13	Sohamni	L65043	cut excess thread	Manual	20	23	22	18	19		20	180	
14	Rabeza	L629165	" " " "	Manual	18	17	16	17	19		17	211	
15	Shyamoli	L44796	prepare elastic for waist	Manual	7	8	8	7	8		8	450	661
16	Tuli	L46860	Attach elastic at waist	B/G	23	20	18	16	17		19	189	
17	Sharmin	L49038	" " " "	B/G	27	34	25	27	28		30	120	309
18	Jashna	L45287	cut excess thread	Manual	11	10	14	8	10		11	327	
19													
20													
21													

Figure 2 Capacity Study Sheet

- SMV = 3.036
- LBR % = 63%
- Capacity = 2845 (100%)
= 1792 (76%)

3.2.3 Purpose of Time Study:

- Time study is done to identify the bottleneck process of a particular line.
- To identify the capacity of each operator.
- For visible the working flow of that particular line.
- To identify the operator's skills / capability.
- Determine the average time of skilled work required to complete a task.
- To estimate labour costs and to create time management among the employees.
- Identify the LBR%.

3.2.4 LCL & UCL:

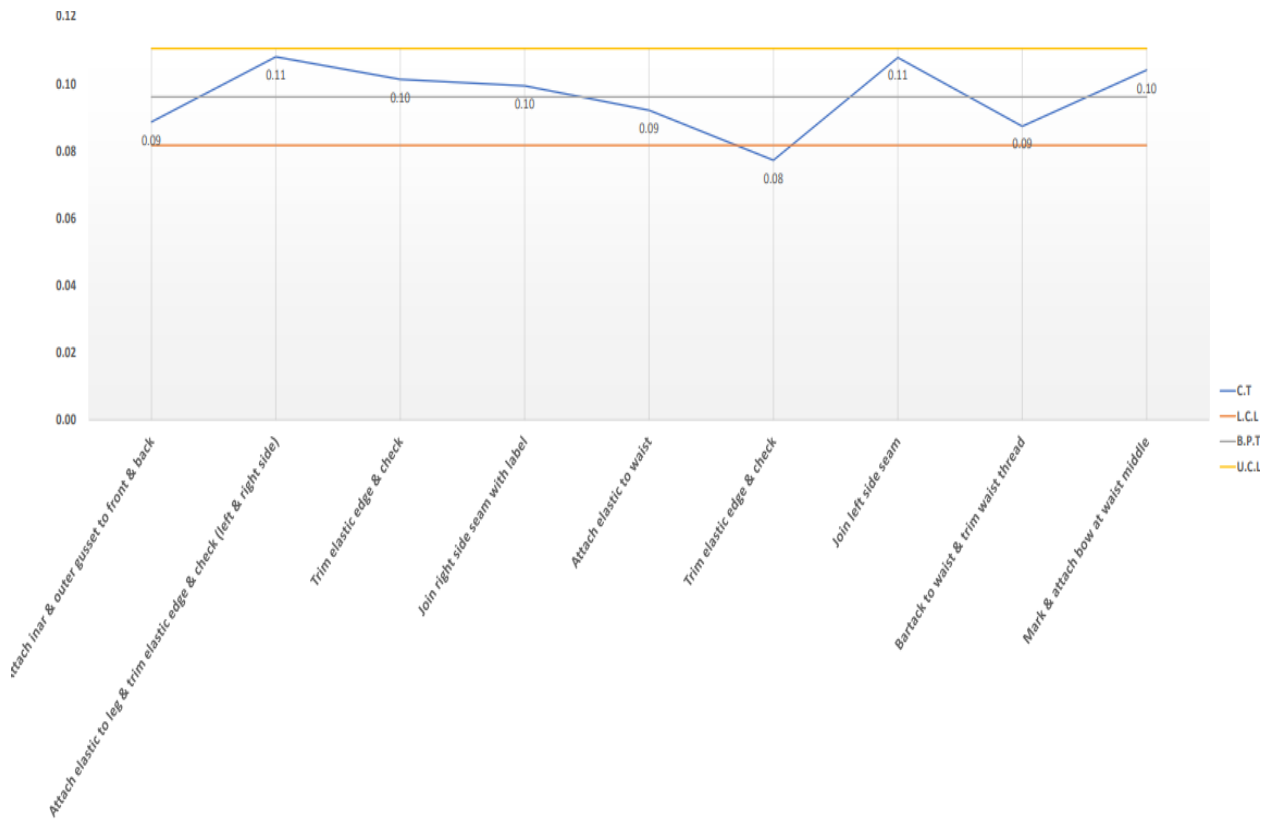


Figure 3 Pitch Diagram Graph

LCL= Lower Control Limit

UCL= Upper Control Limit

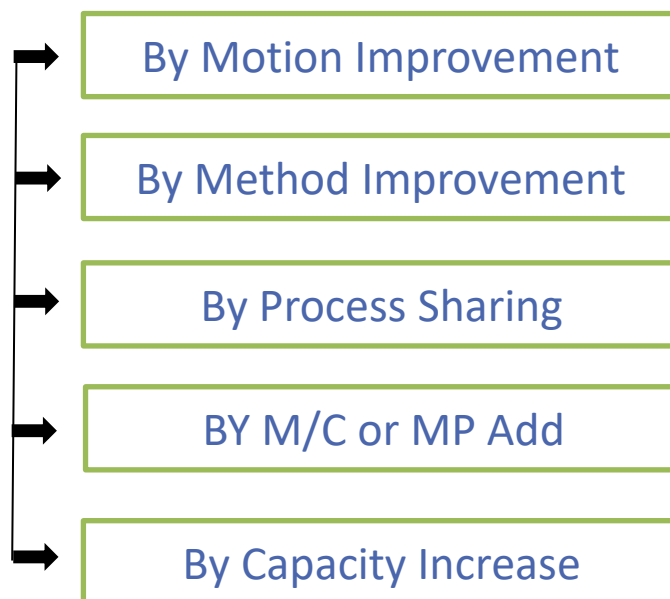
B.P. T= Basic Pitch Time

CT= Capacity Time

3.3 Bottleneck:

- Production line bottlenecks are low-output points.
- Supply and production meet at the bottleneck.
- Chain working systems feed the next operator.
- Therefore, the minimum supply from bottleneck point will feed the following operator, and production will not surpass bottleneck point output.

3.3.1 Reduce Bottleneck:



For reduce bottleneck motion improvement is one of the major facts. By motion improvement excuses or unnecessary motion will be removed. The line will be more balanced. Also, the efficiency % will increase. So, motion improvement one of the main improvement field for line balancing.

3.4 Motion Improvement:

Motion studies increases apparel business efficiency and thinking. It is the part of method study and is one of the oldest branches of work-study. Every work involves motion. These motions organize work better in the workplace.

Motion is changing position. Speed, acceleration, distance, and time describe motion.

Motion is usually described as:

1. Distance
2. Displacement
3. Speed
4. Time

3.4.1 Basic Motions:

There are six types of basic motion available for sewing section

1. Pick Up
2. Put under the pressure foot
3. Align
4. Stitch
5. Remove from pressure foot
6. Dispose/ Quality Check

3.5 Motion Improvement:

3.6 Improvement (1):

3.6.1 Basic Information:

Information About the Product	
Buyer	Decathlon
Item Name	T-Shirt
Style No.	338740
Product SMV	5.398



Figure 4 T-Shirt (Decathlon)

This is the basic T-shirt. The buyer of this t-shirt is Decathlon. Here the item style no is 338740. The product SMV (Standard minute Value) is 5.398. Decathlon buyer is one of the major buyers of Liz Fashion Industry LTD & also LIDA.

3.6.2 BOL:

2/1/23, 11:36 AM

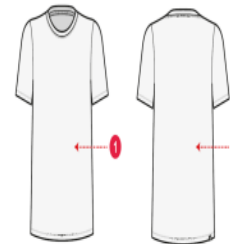
BOL Details

LIZ Fashion Industry Limited

Bill of Labour (Initial)

Buyer: **Decathlon**
 Style No: **338740/8736398**
 Product Category: LS/SS T-Shirt - All (Basic/Sleepwear Top)
 Item Description: Short Sleeve T-Shirt
 Style Indicator: Short Sleeve T-Shirt
 Fabric Specification: 55% Cotton+37% Polyester+8% Elastane
 Gender: Ladies
 Creation Date: 03-Nov-2022
 Last Update Date: 01-Feb-2023
 BOL Status: **Completed (03-Nov-2022)**
 Difficulty Level: B-Semi Critical

Revise Summary				Manpower		SMV
Revise No	Revise Date	Revise No	Revise Date	Operator	25.012	5.098
				Helper	1.981	0.300
				Quality		
				Total	26.993	5.398
Target Summary						
Efficiency	Per Hour	Per Day	Efficiency	Per Hour	Per Day	
50%	150	1500	100%	300	3000	
40%	120	1200	90%	270	2700	
30%	90	900	80%	240	2400	
20%	60	600	70%	210	2100	
10%	30	300	60%	180	1800	



Operation Breakdown:

Operation Details						Balance On	98%	294	Technical Information		
Operation Sequence	Machine Type	Operation Description	Skill	Total SMV	Pcs/Hr	Required Machine	Required Man	Balance Capacity/HR	SPI	Attachment	Needle Size
1	Manual	MATCH ALL CUT PANELS. . .	Helper	0.200	300.00	0.000	0.981	294.3	N/A	N/A	N/A
2	1N/2T/LS/PM	ATTACH SEVERAL LABELS FOR SIDES X1. . .	Operator	0.259	231.66	1.271	1.271	294.43986	11/12	N/A	DBX1
3	2N/4T/OL	ASSEMBLE SHOULDERS X2. . .	Operator	0.348	172.41	1.707	1.707	294.30387	13/14	Guide	DCX127
4	1N/2T/LS/PM	CLOSE COLLAR X1. . .	Operator	0.130	461.54	0.637	0.637	294.00098	11/12	Paper Pattern	DBX1
5	1N/2T/LS/PM	FOLD & STAY STITCH COLLAR BAND X1. . .	Operator	0.220	272.73	1.079	1.079	294.27567	11/12	N/A	DBX1
6	2N/4T/OL/NJ	ASSEMBLE COLLAR BAND AT NECKLINE. . .	Operator	0.400	150.00	1.963	1.963	294.45	13/14	Roller	DCX127
7	1N/2T/FL/CB	TOP STITCH ON NECKLINE & INSERT BAR CODE LABEL AT BACK X1. . .	Operator	0.456	131.58	2.237	2.237	294.34446	13/14	Guide	UYX128
8	2N/4T/OL	ASSEMBLE SLEEVES / ARMHOLES X2. . .	Operator	0.550	109.09	2.699	2.699	294.43391	13/14	Guide	DCX127
9	2N/4T/OL	CLOSE SIDES INSERT SMALL PIECE OF FABRIC X2. . .	Operator	0.696	86.21	3.415	3.415	294.40715	13/14	Guide	DCX127
10	2N/3T/FL/NHM	HEMMING BOTTOM OPENING ROUND (HEM WIDTH 1.50CM) AUTO++TRIM X1. . .	Operator	0.460	130.43	2.257	2.257	294.38051	13/14	Guide	UYX128
11	2N/3T/FL/NHM	HEMMING SLEEVE OPENING ROUND (HEM WIDTH 1.50CM) AUTO++TRIM X2. . .	Operator	0.750	80.00	3.680	3.680	294.4	13/14	Guide	UYX128
12	1N/2T/LS/PM	STOP STITCH AT HEM JOIN STITCH X3. . .	Operator	0.300	200.00	1.472	1.472	294.4	11/12	N/A	DBX1
13	1N/2T/LS/PM	ATTACH LABEL WITH SMALL PIECE OF FABRIC X1. . .	Operator	0.184	326.09	0.902	0.902	294.13318	11/12	N/A	DBX1
14	1N/2T/LS/PM	POINT & TACK D LOGO AT BOTTOM HEM X1. . .	Operator	0.345	173.91	1.693	1.693	294.42983	11/12	Pattern	DBX1
15	Manual	EXTRA PROCESSES (IR) FOR SHINING MARK	Helper	0.100	600.00	1.000	1.000	600			
Total				5.398		25.012	26.993			25.012	

Comments

Required Machine Table						
SN	Type	Quantity	Attachments	Quantity	Total Middle Cone	Total Looper Cone
1	1N/2T/FL/CB	2.237	Guide	2.237	2.237	2.237
2	1N/2T/LS/PM	4.724	N/A	4.724	4.724	0
3	1N/2T/LS/PM	0.637	Paper Pattern	0.637	0.637	0
4	1N/2T/LS/PM	1.693	Pattern	1.693	1.693	0
5	2N/3T/FL/NHM	5.937	Guide	5.937	11.874	5.937
6	2N/4T/OL	7.821	Guide	7.821	15.642	15.642
7	2N/4T/OL/NJ	1.963	Roller	1.963	3.926	3.926
Total		25.012		25.012	40.733	27.742

Technical IE: Mahbubur Rahman/A. Momin Production IE: _____ Technical Team: _____ Production Team: _____

Figure 5 BOL of T-shirt (Decathlon)

This is the BOL of this particular t-shirt item of Decathlon buyer. The full form of BOL is Bill of Labour. Here the no. of process is shown. Also the process SMV(Standard minute Value) is included here. Machine types is also included with how many needle and thread.

The total SMV (Standard minute Value) of the process is included. Per hour Standard target is give also.

1. For 1st process SMV is 0.200
2. For 2nd process SMV is 0.259
3. For 3rd process SMV is 0.348
4. For 4th process SMV is 0.130
5. For 5th process SMV is 0.220
6. For 6th process SMV is 0.440
7. For 7th process SMV is 0.456
8. For 8th process SMV is 0.550
9. For 9th process SMV is 0.696
10. For 10th process SMV is 0.460
11. For 11th process SMV is 0.750
12. For 12th process SMV is 0.300
13. For 13th process SMV is 0.184
14. For 14th process SMV is 0.345
15. For 15th process SMV is 0.100

The total SMV is for this process is 5.398. The required machine no & required manpower is also included here.

1. For 1st process 1 manpower.
2. For 2nd process 1 manpower.
3. For 3rd process 2 manpower.
4. For 4th process 1 manpower.
5. For 5th process 1 manpower.
6. For 6th process 1 manpower.
7. For 7th process 1 manpower.
8. For 8th process 2 manpower.
9. For 9th process 2 manpower.
10. For 10th process 1 manpower.
11. For 11th process 2 manpower.
12. For 12th process 3 manpower
13. For 13th process 1 manpower
14. For 14th process 1 manpower
15. For 15th process 1 manpower

Total manpower: 21

The SPI & needle size is also included. As like for flatlock machine needle is UY-9. For OL needle size is DC-9. For PM needle size is DB-9 is used here. So BOL is the each & every details about the product and also the mechanism, Materials details about this particular product.

3.6.3 Improvement Area:

Information About the Improvement	
Process	Fold & Stay Stitch Collar Band
Process SMV	0.220
Line No.	LC 304
Floor No.	Liz 3; 3 rd Floor

3.6.4 Before Motion Pictures:



Figure 6 Pickup



Figure 7 Alignment



Figure 8 Put Under the pressure Foot



Figure 9 Stitching

Here,

1. Pickup – 2.14
2. Align – 3.85
3. Re-Align -3.85
4. Re- Align-1.48
5. Put under the pressure foot- 0.85
6. Stich-2.08
7. Remove under the pressure foot 0.83
8. Re -Align-2.25
9. Put under the pressure foot-0.91
10. Stich-2.17
11. Remove under the pressure foot and Dispose- 0.19

3.6.5 After Motion Pictures:



Figure 10 Pickup



Figure 11 Align



Figure 12 Put Under the Pressure Foot Figure



13 Stitching

Here,

1. Pickup- 0.13
2. Align-3.97
3. Put under the pressure foot-1.54
4. Stitch-1.79
5. Remove under the pressure foot -1.37
6. Align-2.4
7. Put under the pressure foot-0.08
8. Stitch-1.67
9. Remove under the pressure foot and dispose-0.77

3.6.6 Motion Reduce:

Here, the product is Decathlon T-Shirt, Style no 338740, product SMV 5.398. The process of the product of Fold & Stay Stitch Collar Band. Process SMV 0.220. In this process we have done motion improvement and some process are reduced. Here after improvement she took 20.6 sec to done the process. Before we can see she used 11 times of motion, pickup – 2.14, align – 3.85, re-align - 3.85, re-align-1.48, put under the pressure foot- 0.85, stitch-2.08, remove under the pressure foot 0.83, re-align-2.25, put under the pressure foot-0.91, stich-2.17, remove under the pressure foot and dispose- 0.19. We saw the process and find out some excess motion. We study it and reduce the motion. After improving she took only 13.72 sec to done the process. After improving she used 9 times of motion, pickup- 0.13, align-3.97, put under the pressure foot-1.54, stitch-1.79, remove under the pressure foot -1.37, align-2.4, put under the pressure foot-0.08, stitch-1.67, remove under the pressure foot and dispose-0.77.

So here, reduced re-alignment problem and took less time another motion.

3.7 Improvement (2):

3.7.1 Basic Information:

Information About the Product	
Buyer	Clover Collection
Item Name	Short Pant
Style No.	U84769N
Product SMV	5.655



Figure 14 Short Pant

This is the Short Pant. The buyer of this Short Pant is Clover Collection. Here the item style no is U84769N. The product SMV (Standard minute Value) is 5.855. Clover Collection buyer is one of the major buyers of Liz Fashion Industry LTD & also LIDA.

3.7.2 BOL:

2/1/23, 11:39 AM

BOL Details

LIZ Fashion Industry Limited

Bill of Labour (Initial)

Buyer: **Clover Collection**
 Style No: **U84769N**
 Product Category: **LSISS Half-Zip Top - All (Performance Wear Top)**
 Item Description: **3PK SFRI ANIMAL RUST**
 Style Indicator: **Boys Short Sleepwear bottom**
 Fabric Specification: **100% CTN**
 Gender: **Boys**
 Creation Date: **04-Oct-2022**
 Last Update Date: **01-Feb-2023**
 BOL Status: **Completed (04-Oct-2022)**
 Difficulty Level: **B-Semi Critical**

Revise Summary				Manpower	SMV	
Revise No	Revise Date	Revise No	Revise Date	Operator	22.783	5.155
				Helper	3.210	0.700
				Quality		
				Total	25.993	5.855
Target Summary						
Efficiency	Per Hour	Per Day	Efficiency	Per Hour	Per Day	
50%	133	1330	100%	266	2660	
40%	107	1070	90%	240	2400	
30%	80	800	80%	213	2130	
20%	53	530	70%	186	1860	
10%	27	270	60%	160	1600	



Operation Breakdown:

Operation Details					Balance On	100%	266	Technical Information			
Operation Sequence	Machine Type	Operation Description	Skill	Total SMV	Pcs/hr	Required Machine	Required Man	Balance Capacity/HR	SPI	Attachment	Needle Size
1	Manual	Match all cut parts ...	Helper	0.300	300.00		0.884	265.2	N/A	N/A	N/A
2	1N2T/OL	Servicing back fly edge -X1 ...	Operator	0.150	400.00	0.663	0.663	265.2	13/14	Guide	DC-9
3	1N2T/LS/PM	Stay stitch on fly with front part -X1 ...	Operator	0.130	481.54	0.574	0.574	264.92396	11/12	N/A	DGX1
4	2NHT/OL	Assemble front rise with back fly -X1 ...	Operator	0.232	258.62	1.025	1.025	265.0855	13/14	Guide	DC-9
5	1N2T/LS/PM	Tack at back fly -X1 ...	Operator	0.115	521.74	0.508	0.508	265.04382	11/12	Guide	DGX1
6	2N3T/FLCB	Mark & J-stape stitch at back fly -X1 ...	Operator	0.255	235.29	1.127	1.127	265.17183	13/14	N/A	UY-9
7	1N2T/LS/PM	Tack security at J-stape stitch -X1 ...	Operator	0.100	600.00	0.442	0.442	265.2	11/12	N/A	DGX1
8	2NHT/OL	Assemble back rise -X1 ...	Operator	0.255	235.29	1.127	1.127	265.17183	13/14	Guide	DC-9
9	2NHT/OL	Assemble side seam -X2 ...	Operator	0.500	120.00	2.210	2.210	265.2	13/14	Guide	DC-9
10	2NHT/OL	Close inseam -X1 ...	Operator	0.300	200.00	1.326	1.326	265.2	13/14	Guide	DC-9
11	1N2T/OT	Make bartack at inseam -X1 ...	Operator	0.100	600.00	0.442	0.442	265.2	36/38	N/A	DP-11
12	2N3T/FLHM	Hemming leg & trim -X2 ...	Operator	0.750	80.00	3.315	3.315	265.2	13/14	Guide	UY-9
13	Manual	Turn garment inside to out side & open cutting sticker ...	Helper	0.150	400.00		0.663	265.2	N/A	N/A	N/A
14	1N2T/LS/PM	Close waist band(for mark use cutting mark) -X1 ...	Operator	0.200	300.00	0.884	0.884	265.2	11/12	Pachine pattern	DGX1
15	1N2T/LS/PM	Close waist elastic -X1 ...	Operator	0.200	300.00	0.884	0.884	265.2	11/12	N/A	DGX1
16	Manual	Mark waist elastic 3 position ...	Helper	0.150	400.00		0.663	265.2	N/A	Powder	N/A
17	1N2T/LS/PM	Insert elastic & tack lid stitch at waist 4position -X6 ...	Operator	0.545	110.09	2.429	2.429	265.20881	11/12	N/A	DGX1
18	1N2T/OL	Servicing at waist band lower edge -X1 ...	Operator	0.315	190.48	1.382	1.382	265.14816	13/14	Guide	DC-9
19	2NHT/OL	Attach waist band with body waist & trim -X5 ...	Operator	0.400	150.00	1.768	1.768	265.2	13/14	Guide	DC-9
20	1N2T/LS/PM	Tack label at back waist -X1 ...	Operator	0.100	600.00	0.442	0.442	265.2	11/12	N/A	DGX1
21	1N2T/LS/PM	Fold & tack hanger loop at back waist -X1 (including cutting time) ...	Operator	0.174	344.83	0.769	0.769	265.17427	11/12	N/A	DGX1
22	2N3T/FLCB	Top stitch at waist -X1 ...	Operator	0.334	179.64	1.476	1.476	265.14864	13/14	Guide	UY-9
23	Manual	Scissoring bottom	Helper	0.200	300.00	0.000	1.000	300	0	Cutter	
Total				5.856			22.783	25.993			22.783

Comments

Technical IE: [sps@syseng1.liz.com](#) Production IE: _____ Technical Team: _____ Production Team: _____

Required Machine Table						
SN	Type	Quantity	Attachments	Quantity	Total Needle Case	Total Looper Case
1	1N2T/OT	0.442	N/A	0.442	0.442	0
2	1N2T/LS/PM	0.508	Guide	0.508	0.508	0
3	1N2T/LS/PM	5.520	N/A	5.520	5.52	0
4	1N2T/LS/PM	0.884	Pachine pattern	0.884	0.884	0
5	1N2T/OL	2.055	Guide	2.055	2.055	4.11
8	2N3T/FLCB	1.476	Guide	1.476	2.952	1.476
7	2N3T/FLHM	3.315	Guide	3.315	6.63	3.315
8	2NHT/OL	7.456	Guide	7.456	14.912	14.912
9	2N3T/FLCB	1.127	N/A	1.127	3.381	2.254
Total		22.783		22.783	27.284	26.997

syseng1.liz.com/pm/pm-bol-print.php?StyleID=25403&BOLReference=4126

Figure 15 BOL of Short Pant

This is the BOL of this particular t-shirt item of Clover Collection buyer. The full form of BOL is Bill of Labour. Here the no. of process is shown. Also, the process SMV (Standard minute Value) is included here. Machine types is also included with how many needle and thread.

Example: 2N/3T/FL.

Here, the machine name is Flatlock. The needle no is 2 & thread no is 3. Here looper no is 1.

The total SMV (Standard minute Value) of the process is included. Per hour Standard target is give also.

1. For 1st process SMV is 0.200
2. For 2nd process SMV is 0.150
3. For 3rd process SMV is 0.130
4. For 4th process SMV is 0.232
5. For 5th process SMV is 0.115
6. For 6th process SMV is 0.255
7. For 7th process SMV is 0.100
8. For 8th process SMV is 0.255
9. For 9th process SMV is 0.500
10. For 10th process SMV is 0.300
11. For 11th process SMV is 0.100
12. For 12th process SMV is 0.750
13. For 13th process SMV is 0.150
14. For 14th process SMV is 0.200
15. For 15th process SMV is 0.200
16. For 16th process SMV is 0.150
17. For 17th process SMV is 0.545
18. For 18th process SMV is 0.315
19. For 19th process SMV is 0.400
20. For 20th process SMV is 0.100
21. For 21th process SMV is 0.174
22. For 22th process SMV is 0.334
23. For 23th process SMV is 0.200

The total SMV is for this process is 5.855. The required machine no & required manpower is also included here.

The balance capacity/HR is

1. For 1st process 1 manpower.
2. For 2nd process 1 manpower.
3. For 3rd process 1 manpower.
4. For 4th process 1 manpower.
5. For 5th process 1 manpower.
6. For 6th process 1 manpower.
7. For 7th process 1 manpower.
8. For 8th process 1 manpower.
9. For 9th process 2 manpower.
10. For 10th process 1 manpower.
11. For 11th process 1 manpower.
12. For 12th process 2 manpower.
13. For 13th process 1 manpower.
14. For 14th process 1 manpower.
15. For 15th process 1 manpower.
16. For 16th process 1 manpower.
17. For 17th process 4 manpower.
18. For 18th process 1 manpower.

- 19. For 19th process 1 manpower.
- 20. For 20th process 1 manpower.
- 21. For 21th process 1 manpower.
- 22. For 22th process 1 manpower.
- 23. For 23th process 1 manpower

Total manpower: 28

The SPI & needle size is also included. As like for flatlock machine needle is UY-9. For OL needle size is DC-9. For PM needle size is DB-9 is used here. So BOL is the each & every details about the product and also the mechanism, Materials details about this particular product.

3.7.3 Improvement Area:

Information About the Improvement	
Process	Assemble front rise with Fake fly
Process SMV	0.232
Line No.	LB604
Floor No.	6th floor

3.7.4 Before Motion Pictures:



Here,

1. Pickup-0.95
2. Unnecessary Shoulder movement-1.7
3. Pickup-0.94
4. Align- 6.04
5. Put under the pressure foot-1.52
6. Stitch-2.6
7. Align-1.19
8. Stitch- 2.08
9. Remove under the pressure foot-0.55
10. Dispose-1.9

3.7.5 After Motion Pictures:



Pickup



Put Under the Pressure Foot



Alignment



Stitching

Here,

1. Pickup-3.07
2. Align-2.29
3. Put under the pressure foot-0.87
4. Stitch-1.66
5. Align-1.81
6. Stitch-1.52
7. Remove under the pressure foot-0.46
8. Dispose-1.63

3.7.6 Motion Reduce:

Here, the product is Clover Collection, Style no: U84769N, product SMV 5.655. The process of the product of Assemble front rise with Fake Fly. Process SMV 0.232. In this process we have done motion improvement and some process are reduced. Here after improvement she took 19.47 sec to done the process. Before we can see she used 10 times of motion, pickup-0.95,

unnecessary Shoulder movement-1.7, pickup-0.94, align- 6.04, put under the pressure foot-1.52, stitch-2.6, align-1.19, stitch- 2.08, remove under the pressure foot-0.55, dispose-1.9. We saw the process and find out some excess motion. We study it and reduce the motion. After improving she took only 13.31 sec to done the process. After improving she used 8 times of motion, pickup-3.07, align-2.29, put under the pressure foot-0.87, stitch-1.66, align-1.81, stitch-1.52, remove under the pressure foot-0.46, dispose-1.63.

So here, reduced unnecessary Shoulder movement problem and took less time another motion.

3.8 Improvement (3):

3.8.1 Basic Information:

Information About the Product	
Buyer	Decathlon
Item Name	Short Pant
Style No.	340523
Product SMV	11.448



This is the basic Short Pant. The buyer of this Short Pant is Decathlon. Here the item style no is 340523. The product SMV (Standard minute Value) is 10.584. Decathlon buyer is one of the major buyers of Liz Fashion Industry LTD & also LIDA.

3.8.2 BOL:

2/1/23, 11:41 AM

BOL Details

LIZ Fashion Industry Limited
Bill of Labour (Initial)

Buyer: **Decathlon**
 Style No: **340523**
 Product Category: Knit & Woven Short - All (Basic/Sleepwear Bottom)
 Item Description: Short Pant (Boy's)
 Style Indicator: Short Pant
 Fabric Specification: 65% Cotton+35% Polyester
 Gender: Boy's
 Creation Date: 13-Dec-2022
 Last Update Date: 01-Feb-2023
 BOL Status: **Completed (13-Dec-2022)**
 Difficulty Level: C-critical

Revise Summary				Manpower	SMV
Revise No	Revise Date	Revise No	Revise Date	Operator	23.615
				Helper	2.373
				Quality	1.690
				Total	25.988
				Total	11.448

Target Summary					
Efficiency	Per Hour	Per Day	Efficiency	Per Hour	Per Day
50%	68	680	100%	136	1360
40%	54	540	90%	123	1230
30%	41	410	80%	109	1090
20%	27	270	70%	95	950
10%	14	140	60%	82	820



Operation Breakdown:

Operation Details					Balance On	100%	136	Technical Information			
Operation Sequence	Machine Type	Operation Description	Skill	Total SMV	Pcs/Hr	Required Machine	Required Man	Balance Capacity/Hr	SPI	Attachment	Needle Size
1	Manual	MATCH ALL CUT PARTS ...	Helper	0.300	200.00	0.678	135.6	N/A	N/A	N/A	N/A
2	1N2T/LS/PM	ASSEMBLE SEVERAL LABELS ...	Operator	0.258	232.56	0.583	0.583	135.58248	11/12	N/A	DBX1
3	1N2T/LS/PM	ASSEMBLE UPPER POCKET BAG WITH FRONT PART (BY PATTERN) X2 ...	Operator	0.800	75.00	1.809	1.809	135.675	11/12	T. Pattern	DBX1
4	2N4T/OL	TRIM POCKET CORNER X4 & OVERCAST X2 ...	Operator	0.634	94.64	1.433	1.433	135.61912	13/14	Guide	DC-9
5	1N2T/LS/PM	TOPSTITCH AT POCKET OPENING (ROLL EDGE) X2 ...	Operator	0.600	100.00	1.356	1.356	135.6	11/12	Guide	DBX1
6	1N2T/LS/PM	TOPSTITCH AT POCKET OPENING (2nd Top Stitch) X2 ...	Operator	0.600	100.00	1.356	1.356	135.6	11/12	Guide	DBX1
7	2N4T/OL	ASSEMBLE POCKET BAGS TOGETHER X2 ...	Operator	0.600	100.00	1.356	1.356	135.6	13/14	Guide	DC-9
8	1N2T/LS/PM	TACK LOWER POCKET BAG / FRONT POCKET OPENING SIDE X2 ...	Operator	0.600	100.00	1.356	1.356	135.6	11/12	N/A	DBX1
9	1N2T/LS/PM	TACK TOP SIDE OF POCKET BAG / FRONT ...	Operator	0.300	200.00	0.678	0.678	135.6	11/12	N/A	DBX1
10	2N4T/OL	ASSEMBLE SIDES X2 ...	Operator	0.600	100.00	1.356	1.356	135.6	13/14	Guide	DC-9
11	1N2T/BT	MAKE 4 BARTACKS AT POCKETS ENDS (1 CM) X4 ...	Operator	0.300	200.00	0.678	0.678	135.6	36/38	N/A	DP-11
12	2N4T/OL	CLOSE INSIDE LEG X2 ...	Operator	0.418	143.54	0.945	0.945	135.6453	13/14	Guide	DC-9
13	2N4T/OL	ASSEMBLE CROTCH ONE TIME X1 & TURN INSIDE TO OUTSIDE BODY ...	Operator	0.580	103.45	1.311	1.311	135.62256	13/14	Guide	DC-9
14	1N2T/SH	POINT & MAKE 2 BUTTONHOLES/FRONT WAIST X2 ...	Operator	0.300	200.00	0.678	0.678	135.6	100/120	Machine Pattern	DP-11
15	1N2T/LS/PM	CLOSE WAIST ELASTIC (TWO TIMES SCM) X1 ...	Operator	0.200	300.00	0.452	0.452	135.6	11/12	N/A	DBX1
16	Manual	POINT QUARTERS OF CLOSED ELASTIC X4 ...	Helper	0.150	400.00	0.339	0.339	135.6	N/A	Powder	N/A
17	2N4T/OL	ATTACH ELASTIC RING AT BODY WAIST X1 ...	Operator	0.400	150.00	0.904	0.904	135.6	13/14	Roller	DC-9
18	1N2T/LS/PM	FOLD & TACK FALSE AT WAIST X4 ...	Operator	0.460	130.43	1.040	1.040	135.6472	11/12	N/A	DBX1
19	1N6T/KS	TOP STITCH WAISTBAND X1 ...	Operator	0.464	129.31	1.049	1.049	135.64619	41609	Roller	UD-11
20	Manual	PULL ON FALSE STITCH FROM WAISTBAND ...	Helper	0.600	100.00	1.356	1.356	135.6	N/A	Opener	N/A
21	1N2T/LS/PM	TACK SMALL PIECE OF FABRIC AT BACK WAIST MIDDLE X1 ...	Operator	0.200	300.00	0.452	0.452	135.6	11/12	N/A	DBX1
22	1N2T/LS/PM	ATTACH LABEL WITH SMALL PIECE OF FABRIC X1 ...	Operator	0.184	326.09	0.416	0.416	135.65344	11/12	N/A	DBX1
23	Auto DM/C	INSERT DRAWDISTING AT WAIST ...	Operator	0.300	200.00	0.791	0.791	158.2	N/A	Auto Inserter	N/A
24	1N2T/BT	ADJUST DRAWSTRING LENGHT = MAKE BARTACK TO FIX IT X1 ...	Operator	0.250	240.00	0.565	0.565	135.6	36/38	N/A	DP-11
25	2N3T/FL/PM	HEMMING LEG ENDS (Item with 1.5 CM)& TRIM THREAD+RAW EDGE X2 ...	Operator	0.750	80.00	1.695	1.695	135.6	13/14	Guide	UV-9
26	1N2T/LS/PM	MAKE STOP STITCH AT HEM & KANSAI JOIN STITCH END X5 ...	Operator	0.400	150.00	0.904	0.904	135.6	11/12	N/A	DBX1
27	1N2T/LS/PM	POINT & PATCH WL CAVALIER PLAIN D SYMBOL AT LEFT BOTTOM LEG X1 ...	Operator	0.200	300.00	0.452	0.452	135.6	11/12	Pattern	DBX1
Total				11.448		22.824	25.988			22.824	

Comments

Technical IE: rabubur.ratna Production IE: _____ Technical Team: _____ Production Team: _____

Required Machine Table						
SN	Type	Quantity	Attachments	Quantity	Total Needle Cone	Total Looper Cone
1	1N2T/SH	0.678	Machine Pattern	0.678	0.678	0
2	1N2T/BT	1.243	N/A	1.243	1.243	0
3	1N2T/LS/PM	2.712	Guide	2.712	2.712	0
4	1N2T/LS/PM	5.881	N/A	5.881	5.881	0
5	1N2T/LS/PM	0.452	Pattern	0.452	0.452	0
6	1N2T/LS/PM	1.809	T. Pattern	1.809	1.809	0
7	2N3T/FL/PM	1.695	Guide	1.695	3.39	1.695
8	2N4T/OL	6.401	Guide	6.401	12.802	12.802
9	2N4T/OL	0.904	Roller	0.904	1.808	1.808
10	1N6T/KS	1.049	Roller	1.049	3.147	3.147
Total		22.824		22.824	33.922	19.402

syseng1.liz.com/pm/pm-bol-print.php?StyleID=26266&BOLReference=4306

This is the BOL of this particular Short pant item of Decathlon buyer. The full form of BOL is Bill of Labour. Here the no. of process is shown. Also, the process SMV (Standard minute Value) is included here. Machine types is also included with how many needle and thread.
 Example: 2N/3T/FL.

Here, the machine name is Flatlock. The needle no is 2 & thread no is 3. Here looper no is 1.

The total SMV (Standard minute Value) of the process is included. Per hour Standard target is give also.

Here,

1. For 1st process SMV is 0.300
2. For 2nd process SMV is 0.258
3. For 3rd process SMV is 0.800
4. For 4th process SMV is 0.634
5. For 5th process SMV is 0.600
6. For 6th process SMV is 0.600
7. For 7th process SMV is 0.600
8. For 8th process SMV is 0.600
9. For 9th process SMV is 0.300
10. For 10th process SMV is 0.600
11. For 11th process SMV is 0.300
12. For 12th process SMV is 0.418
13. For 13th process SMV is 0.580
14. For 14th process SMV is 0.300
15. For 15th process SMV is 0.200
16. For 16th process SMV is 0.150
17. For 17th process SMV is 0.400
18. For 18th process SMV is 0.460
19. For 19th process SMV is 0.464
20. For 20th process SMV is 0.600
21. For 21th process SMV is 0.200
22. For 22th process SMV is 0.184
23. For 23th process SMV is 0.300
24. For 24th process SMV is 0.250
25. For 25th process SMV is 0.750
26. For 26th process SMV is 0.400
27. For 27th process SMV is 0.200

The total SMV is for this process is 11.448. The required machine no & required manpower is also included here.

The balance capacity/HR is

1. For 1st process 1 manpower.
2. For 2nd process 2 manpower.
3. For 3rd process 2 manpower.
4. For 4th process 2 manpower.
5. For 5th process 2 manpower.
6. For 6th process 2 manpower.
7. For 7th process 2 manpower.
8. For 8th process 2 manpower.
9. For 9th process 1 manpower.
10. For 10th process 2 manpower.
11. For 11th process 4 manpower.
12. For 12th process 2 manpower.
13. For 13th process 1 manpower.
14. For 14th process 2 manpower.
15. For 15th process 1 manpower.
16. For 16th process 4 manpower.

17. For 17th process 1 manpower.
18. For 18th process 4 manpower.
19. For 19th process 1 manpower.
20. For 20th process 1 manpower.
21. For 21th process 1 manpower.
22. For 22th process 1 manpower.
23. For 23th process 1 manpower.
24. For 24th process 1 manpower.
25. For 25th process 2 manpower.
26. For 26th process 5 manpower.
27. For 27th process 1 manpower.

Total manpower 51.

The SPI & needle size is also included. As like for flatlock machine needle is UY-9. For OL needle size is DC-9. For PM needle size is DB-9 is used here. So BOL is the each & every details about the product and also the mechanism, Materials details about this particular product.

3.8.3 Improvement Area:

Information About the Improvement Area	
Process	Assemble upper pocket bag with front part (by pattern)
Process SMV	0.800
Line No.	LC 103
Floor No.	Liz 3; 1st floor

3.8.4 Before Motion Pictures:





Here,

1. Pickup – 0.52
2. Align – 0.91
3. Put under the pattern– 0.91
4. Re Align (2)– 6.76
5. Pickup– 2.1
6. Re Align (3)– 1
7. Put under the pattern– 0.07
8. Re Align (4)– 7.97
9. Shoulder Movement – 0.64
10. Close the Pattern– 3.47
11. Pickup – 1.05
12. Re Align (5)– 0.71
13. Put under the pattern– 1.73
14. Re Align (6)– 6.93
15. Pickup – 3.05
16. Put under the pattern– 1.25
17. Re Align (7)– 5.53
18. Close the Pattern– 2.35
19. Put under the pressure foot– 2.5
20. Re Align (8)– 3.49
21. Stitch (1)– 3.24
22. Re Align (8)– 3.6
23. Stitch (2)– 5.38
24. Re Align (9)– 2.23
25. Stitch (3)– 1.67
26. Move the pattern– 4.93
27. Stitch (4)– 4.4
28. Move the pattern– 2.06
29. Stitch (5)– 3.79
30. Re Align (10)– 1.61
31. Stitch (6)– 2.8
32. Open the pattern– 2
33. Remove the fabrics– 22.52
34. Dispose– 0.78

3.8.5 After Motion Pictures:



Here,

1. Pickup – 0.43
2. Align – 0.34
3. Put under the pattern– 0.69
4. Re Align (2)– 5.39
5. Pickup– 1.22
6. Re Align (3)– 0.55
7. Put under the pattern– 0.7
8. Re Align (4)– 5.17
9. Close the Pattern– 2.16
10. Pickup – 2.46
11. Put under the pattern– 3.21
12. Re Align (5)– 3.2
13. Pickup – 1.58
14. Put under the pattern– 1.17
15. Re Align (6)– 3.7
16. Close the Pattern– 1.07
17. Put under the pressure foot– 3.97
18. Stitch (1)– 6.01
19. Re Align (7)– 2.08
20. Stitch (2)– 4.31
21. Re Align (8)– 1.55
22. Stitch (3)– 1.86
23. Stitch (4)– 13.36
24. Stitch (5)– 1.32
25. Stitch (6)– 4.5
26. Open the pattern– 0.37
27. Remove the fabrics– 9.45
28. Dispose– 1.1

3.8.6 Motion Reduce:

Here, the product is Decathlon, Style no: 340523, product SMV 11.448. The process of the product of Assemble upper pocket bag with front part (by pattern). Process SMV 0.800. In this process we have done motion improvement and some process are reduced. Here after improvement she took 114 sec to done the process. Before we can see she used 34 times of motion, Pickup – 0.52, Align – 0.91, Put under the pattern– 0.91, Re Align (2)– 6.76, Pickup– 2.1, Re Align (3)– 1, Put under the pattern– 0.07, Re Align (4)– 7.97, Shoulder Movement – 0.64, Close the Pattern– 3.47, Pickup – 1.05, Re Align (5)– 0.71, Put under the pattern– 1.73, Re Align (6)– 6.93, Pickup – 3.05, Put under the pattern– 1.25, Re Align (7)– 5.53, Close the Pattern– 2.35, Put under the pressure foot– 2.5, Re Align (8)– 3.49, Stitch (1)– 3.24, Re Align (8)– 3.6, Stitch (2)– 5.38, Re Align (9)– 2.23, Stitch (3)– 1.67, Move the pattern– 4.93, Stitch (4)– 4.4, Move the pattern– 2.06, Stitch (5)– 3.79, Re Align (10)– 1.61, Stitch (6)– 2.8, Open the pattern– 2, Remove the fabrics– 22.52, Dispose– 0.78. We saw the process and find out some excess motion. We study it and reduce the motion. After improving she took only 82 sec to done the process. After improving she used 28 times of motion, Pickup – 0.43, Align – 0.34, Put under the pattern– 0.69, Re Align (2)– 5.39, Pickup– 1.22, Re Align (3)– 0.55, Put under the pattern– 0.7, Re Align (4)– 5.17, Close the Pattern– 2.16, Pickup – 2.46, Put under the pattern– 3.21, Re Align (5)– 3.2, Pickup – 1.58, Put under the pattern– 1.17, Re Align (6)– 3.7, Close the Pattern– 1.07, Put under the pressure foot– 3.97, Stitch (1)– 6.01, Re Align (7)– 2.08, Stitch (2)– 4.31, Re Align (8)– 1.55, Stitch (3)– 1.86, Stitch (4)– 13.36, Stitch (5)– 1.32, Stitch (6)– 4.5, Open the pattern– 0.37, Remove the fabrics– 9.45, Dispose– 1.1

So here, reduced excess picks up time and remove problem. Now took less time another motion.

CHAPTER 4: DISCUSSIONS OF RESULTS

4.1 Motion Improvement Result and Discussion:

Motion improvement is important for capacity increase of an operator. The main reason of motion improvement is reducing the extra/ unnecessary motions. Like the shoulder and trunk movement.

- Shoulder-upper arm, fore-arm, hand &finger
- Trunk - Torso, upper arm, forearm, hand &finger.

It is also called forbidden movement. Motion studies analyzes and improves body and hand motions to boost work production. Human effort engineering includes motion studies, which is microsystem enhancement. Motion studies reduce ergonomic stress. Time and motion analyses increase worker productivity. By removing unnecessary motions, they can work faster. This helps them perform more work during a time. Increasing work and reducing waste are the main goals.

- Motion analysis.
- Time-study method.
- Time standard use.

4.2 Improvement (1):

4.2.1 Problem (1):

Here, the product is Decathlon T-Shirt, Style no 338740, product SMV 5.398. The process of the product of Fold & Stay Stitch Collar Band. Process SMV 0.220. Her pick up motion and also process motion is too much time consuming. For that reason, her capacity is low. She is doing her process so slowly. In this process we have done motion improvement and some process are reduced.

4.2.2 Solution (1):

In this particular process operator is doing align again and again. That is the most unnecessary movement here. So firstly, we recorded her process motion video. Then made is slow motion. After that we analysis this video and find the solution. We organized her work station so that she can pick up easily the garments. After that she fold that garments and directly stitch the garments. Where before her pick up motion time is 2.14 sec. But after improvement her pick up motion is 0.13.

Factor	Before	After	Improvement %
Cycle Time (Sec)	20	13	35%
Capacity (Pcs)	180	277	54%

No. Of Line Duplicated	Quantity Produced Under these Duplicated Lines (Pcs)	Minute Save Per Pcs (Minute)	Total Minute Save (Minute)
1	1230	0.116	143

Here, her before cycle time is 20 sec. Her capacity per pcs is 180pcs. But After Improvement her cycle time is 13 sec. The capacity is 227 pcs. So the capacity increase 47 pcs.

Here, Quantity produced Under these Duplicated Lines (Pcs) = 1230

Minute save per pcs (minute) = 0.116

Total minute save = 143.

4.3 Improvement (2):

4.3.1 Problem (2):

This is the Short Pant. The buyer of this Short Pant is Clover Collection. Here the item style no is U84769N. The product SMV (Standard minute Value) is 5.855. Clover Collection buyer is one of the major buyers of Liz Fashion Industry LTD & also LIDA. Her pick up motion and also process motion is too much time consuming. Here for pick up motion her two shoulder have to move. That's why we can see here unnecessary motion. For that reason, her capacity is low. She is doing her process so slowly. In this process we have done motion improvement and some process are reduced.

4.3.2 Solution (2):

In this particular process operator picks garments from both side of her. That is the most unnecessary movement here. So firstly, we recorded her process motion video. Then made is slow motion. After that we analysis this video and find the solution. We organized her work station so that she can pick up easily the garments. After that she directly stitch the garments. Where before there is some unnecessary motion. Which time is 1.7. sec. But after improvement there is no unnecessary motion. Also, her capacity increase.

Factor	Before	After	Improvement
Cycle Time (Sec)	19.48	13.31	32%
Capacity (Pcs)	185	270	46%

No. Of Line Duplicated	Quantity Produced Under these Duplicated Lines (Pcs)	Minute Save Per Pcs (Minute)	Total Minute Save (Minute)
1	7851	0.103	809

Here, her before cycle time is 19.48 sec. Her capacity per pcs is 185 pcs. But After Improvement her cycle time is 13.31 sec. The capacity is 270 pcs. So, the capacity increases 85 pcs.

Here, Quantity produced Under these Duplicated Lines (Pcs) = 7851

Minute save per pcs (minute) = 0.103

Total minute save = 809.

4.4 Improvement (3):

4.4.1 Problem (3):

This is the basic Short Pant. The buyer of this Short Pant is Decathlon. Here the item style no is 340523. The product SMV (Standard minute Value) is 10.584. Decathlon buyer is one of the major buyers of Liz Fashion Industry LTD & also LIDA.

Her pick up motion and also process motion is too much time consuming in Assemble upper pocket bag with front part (by pattern). Here she has to pick up garment's parts from right side. For this here is a shoulder movement motion. Which is a forbidden motion. In this process we have done motion improvement and some process are reduced.

4.4.2 Solution (3):

In this particular process operator picks every garments part from left side of her. That is the most unnecessary movement here. So firstly, we recorded her process motion video. Then made is slow motion. After that we analysis this video and find the solution. We organized her work station so that she can pick up easily the garments from her both sides. After that she directly stitch the garments. Where before there is some unnecessary motion. By this motion improvement she have to move pattern clock wise. SO, by using this motion there is no excess motion. So, for this reason her capacity increased. Here the before cycle time is 114 sec. After cycle time is 82 sec.

Here the improvement percentage is 28%. And also, the capacity increase percentage is 42%. The before capacity is 31 pcs and after capacity is 44 pcs.

Factor	Before	After	Improvement %
Cycle Time (sec)	114	82	28%
Capacity (pcs)	31	44	42%

No. Of Line Duplicated	Quantity Produced Under these Duplicated Lines (Pcs)	Minute Save Per Pcs (Minute)	Total Minute Save (Minute)
1	15280	0.533	8144

Here, her before cycle time is 114 sec. Her capacity per pcs is 31 pcs. But After Improvement her cycle time is 82 sec. The capacity is 270 pcs. So, the capacity increases 44 pcs.

Here, Quantity produced Under these Duplicated Lines (Pcs) = 15280

Minute save per pcs (minute) = 0.533

Total minute save = 8144.

Here the improvement percentage is 28%. And also, the capacity increase percentage is 42%.

**CHAPTER 5: PROFESSIONAL RESPONSIBILITIES,
SAFETY, SOCIAL, CULTURAL AND
ENVIRONMENTAL COORDINATION.**

5.1 Professional Responsibilities, Health, Safety, Social Cultural, And Environmental Consideration:

In this project, we are done Liz Fashion Industry. This is multinational company which is highly maintained professional responsibilities, health issue, safety concern, socio-cultural and environmental consideration.

5.2 Codes and Standards Used:

Liz Fashion Industry is one of Bangladesh's reputable clothing companies. The majority of Liz Fashion Industry's clients are globally renowned and environmentally conscientious. Signet, George UK, Peak Performance, 2XU, Clover Collection, Walmart Canada, NEXT, Handcraft, Lidl, RAW, Target Australia, and Decathlon are reputable purchasers.

Therefore, adherence to all international norms of behavior is a must for their order. BSCI and CSR regulations must be adhered to. Zero tolerance for kid work, in order to avoid unexpected difficulties. Additionally, uphold ISO 9001, the international standard for quality management. The ETP procedure must be maintained. So that, beginning with sample manufacturing and continuing through mass production, the amount of water required has no negative impact on the environment.

5.3 Ethical Principles and Professional Commitment:

The fundamental idea and commitment are to operate in a manner that preserves a healthy environment for future generations. Try to make eco-friendly goods. There is a technique of constructing clothing from organic cotton yarn. Utilizing high-quality dye compounds that are neither harmful to the environment or the human body. Avoid harassment and abuse during working hours. After the primary obligation, one is not required to work part-time for an extended period of time. The practice of gender discrimination must end. A monthly fire drill is required.

5.4 Impact on Society, Health, Safety, Legal and Cultural Issues:

The BSCI guidelines, for instance, all worker benefits are assured. No more employees may be added to overtime after stipulated duties. The standards of the Business Social Compliance Initiative (BSCI) include prompt payment of salaries, a prohibition on the use of child labor, and the close monitoring of any abuse or harassment of female employees. Currently, BSCI principles are required by the majority of purchasers. By doing so, workers are receiving their rightful benefits, which has a good impact on society. CSR activities are the norms of another international organization. Here, all social concerns are addressed. For instance, guarantee maternity leave and benefits for female employees. Construct a mosque or school in the vicinity of industrial zones. In turn, this has a favorable effect on society. As a result of keeping ISO standards, clients are receiving items of the appropriate quality. Social audits are used to check the safety concerns of industries. As a result, industries are constantly prepared to extinguish a

fire, with fire alarms fitted everywhere, some emergency exits constructed, and personnel always on hand to put out fires. In addition, the social audit assesses whether or not workers have access to standard restrooms and whether or not the workplace is suitable. Here, both worker safety and the working environment are taken into consideration.

5.5 Impact on Environment:

ETP is now a common word in the textile industry. We are aware that a great deal of water is required to create clothing. And if these waters are returned to the ecosystem in the same state as when they were consumed, this has a significant detrimental impact on the environment. ETP Process is implemented to eliminate this.

The water is treated and then released into the environment without harming the ecosystem. This ETP procedure has a substantial positive effect on the environment. On the other side, the industry strives to manufacture environmentally friendly products.

CHAPTER 6: CONCLUSION

Here is the last part of our project. In our project we are discuss about Basic Motion Study and Motion improvement.

- Motion study is a method to improve capacity. It is very important factor to operate a particular line. By reducing motion capacity will be increased. It is also very important to reduce the NPT (Non-Productive Time). Also increase the productive time.
- In motion study we observe operator how they work and how many motions they have used to complete a particular process. If we find any unnecessary or forbidden motion, we have to observe and remove those motion.
- We have to instruct operator for reduce those excess motion. In the workplace setting, motion analysis also includes reducing the corresponding ecological demands.
- By using motion have to improve the work process. By using motion, we can identify the best technique to accomplish the job. We can improve the work process to maintain the motion improvement. By motion we can also use material, machines, and labor more effectively which is more beneficial for a company. By using motion, we can train workers on standard methods.
- A motion study increases the productivity and efficiency of your employees. By eliminating unnecessary motions, they may perform tasks more effectively. The we can provide the right path to improve her motion. Without motion study we cannot increase the production capacity. So we can say that motion study is a very important factor for textile industry.

REFERENCES

- To Reduce Non-Productive Time in Garment Industry Sapna Jain.
(International Journal on Textile Engineering and Processes, ISSN: 2395-3578, Vol 1, Issue 2, April 2015).
- A Statistically Significant Analysis of Dynamic Effect of Non-Production Time (NPT) on Apparel Manufacturing.
(Southeast University Journal of Textile Engineering, Vol. 1, No. 2, July 2021).
- Effect of time and motion study on productivity in garment sector.
Mst. Murshida Khatun
(International Journal of Scientific & Engineering Research, Volume 5, Issue 5, May-2014).

Turnitin Originality Report

Processed on: 13-Feb-2023 11:35 +06

ID: 2012847078

Word Count: 8898

Submitted: 1

5530,5567 By Ebrahim Hajala

Similarity by Source	
Similarity Index	
14%	
Internet Sources:	14%
Publications:	2%
Student Papers:	11%

exclude quoted	include bibliography	exclude small matches	mode: quickview (classic) report	print	refresh	download
3% match (Internet from 18-Mar-2020)						
https://es.scribd.com/document/403640398/Time-and-motion-study-docx						
2% match (Internet from 21-Nov-2022)						
http://dspace.daffodilvarsity.edu.bd:8080						
2% match (student papers from 09-Apr-2018)						
Submitted to Daffodil International University on 2018-04-09						
1% match (Internet from 11-Oct-2022)						
http://dspace.daffodilvarsity.edu.bd:8080						
1% match (Internet from 26-Oct-2022)						
http://dspace.daffodilvarsity.edu.bd:8080						
1% match (Internet from 28-Dec-2016)						
http://textilelearner.blogspot.com.tr						
1% match (Internet from 05-Feb-2023)						
https://www.measimba.ac.in/pdf/course-materials/PMF2L.pdf						