



Faculty of Engineering
Department of Textile Engineering

Project on

**STUDY ON THE APPLICATION OF INDUSTRIAL ENGINEERING IN WOVEN
GARMENTS**

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Bachelor of Science in Textile Engineering
Advanced in Apparel Manufacturing Technology
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LETTER OF APPROVAL

To
The Head
Department of Textile Engineering
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Subject: Application for Approval of Thesis Report B.Sc in TE Program

Dear, Sir

We just write to let you know that the student is carrying the title of this project report is Industrial Engineering Review in Woven Garments. For Final assessment, **Md.Mojibor Rahman Khan, ID:192-23-5705 & Nusrat Jahan, ID:192-23-5671** are done. The whole proposal is ready based on an exact examination and an impedance by essential assessing scientific discoveries with fundamental components, the student has been dynamic in its exercises by and by and the report is critical to furnish the peruses with numerous helpful subtleties.

It is also welcome if you accept this thesis paper and consider it in the final assessment.

Yours Sincerely



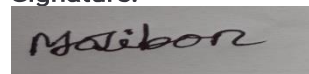
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DECLARATION

We express that, under the direction of **Abdullah Al Mamun (Associate Professor)** , Faculty of Engineering, Department of Textile Engineering, Daffodil International University, we have done this Industrial Thesis connection. We also express that, with the exception of where the important reference was made in the archive, no such industrial connection and no part of such Industrial connection was introduced somewhere else for graduation or confirmation.

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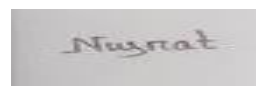
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DEDICATION

We might want to say thanks to Allah most importantly, all-strong. By the grace of Allah, our Thesis paper is finish effectively. We might want to thanks, **Abdullah Al Mamun Sir**, Department of Textile Engineering, Daffodil International University and his most noteworthy commitment to our advancement. We, thusly pronounce that all data of this report is valid. What's more, we likewise pronounce that the data contained in the Industrial Preparation Report is right. We gather data during our entry level position period from "Maxcom International (BD) Ltd of Pionner Group." And some data are gathered from web.

ACKNOWLEDGEMENT

At first We might want to say thanks to All-powerful Allah for invigorating us complete this report by this brief time frame. We confronted many of issues to set up this thesis paper due to lack of data. Then, at that point, we might want to thanks and appreciative to our **Honorable supervisor, Associate Professor ,Abdullah Al Mamun** who urge us to appropriately set up this report. Truly it's an effective method for expanding our proficiency, expertise and information about the Production, efficiency and efficiency improvement by watching different branch of the association. We might want to say thanks our **Honorable Md.Mominur Rahman, Assistant Professor and Head of (In-charge)** Department of Textile Engineering, Daffodil International University. We might want to say thanks **Moynul Islam ,Head of R&D at Maxcom International(BD) Ltd of pioneer Group**. Who allow us the opportunity to execute our internship level position at his association. What's more, we are particularly grateful to **Aminul Islam HR & Admin at Maxcom International (BD) Ltd of Pioneer Group**, Who regulated and trained us in a respectable manner.

Then on account of my companions who additionally acted mindfully and dependably together and every one of the individuals from each branch of **Maxcom International (BD) Ltd of Pioneer Group**. They have been a genuine assistance in the hour of our entry level position,

ABSTRACT

Garments training can't be finished without thesis paper. Since this industrial preparation limits the hole among hypothetical and viable information and make, we familiar with garments climate.

We are grateful to be able to finish two-month long Industrial preparation.

We, first, concentrated on the general status of the business. Finding out about their efficient work the executives and managerial framework was the following errand. We had begun our specialized works by the concentrate on obtaining and assembling of Natural substances and Capacity and Stock Control Arrangement of the garments.

We attempted to focus more on that part by taking thought of significant specialized boundaries, as indicated by the guidelines of directing teacher. Floor arranging, machine execution and controlling focuses, producing techniques and activity process, component of working, assessment and navigation, critical thinking and examining these were the crucial errand.

We have acquired some thought regarding man, machine support and natural substances determination for individual materials, Organogram of industry and the obligation of a few post.

This report will attempt to mirror the general fundamental specialized idea about the assembling chain of **Maxcom International (BD) Ltd.** A few specialized information, ideas and boundaries will enhance the general articulation of this report.

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CHAPTER -1: INTRODUCTION

1.1 Introduction:

Industrial Engineering is connected with the productive utilization of machines, labor, material and energy. The IE group is participated in cutting, sewing and completing work to decrease labor and to expand the machine ability to finish the work underway. Time exploration of the assembling system is allotted to the extent of progress. The time it makes to finish each stride in article of clothing producing is estimated by averaging cycles per process. Setting the creation in roundabout format can further develop work proficiency, efficiency. It is finished by request gauging, foster new plans, foster formats by utilizing different quality apparatuses and mix item and preparing advancement.

An Industrial Engineer work is to deal with the proficiency, wages and pay estimation, machine activity, booking, limit examination, creation line balance, creation arranging. Computation of NPT manages the social, numerical and actual parts of incorporated.

1.2 Nature of the work in Industrial Engineering:

Industrial engineers conclude the most proficient manners by which an organization might fabricate or deal with an item or make a help utilizing the basic assembling components - people, machine, assets, information and energy. They are the connection between the executives needs and authoritative accomplishment. Modern specialists guarantee potential for creation and how to make on time, cost reserve funds, SMV detailing and so on.

1.3 Objective of the Thesis:

- ❖ Improving productivity.
- ❖ Motion decrease upgrade of the activity.
- ❖ Remove bottlenecks and diminish process capability.
- ❖ Improving working quality.
- ❖ Reduce the proportion of PC.
- ❖ Improved instrument for cost reserve funds, squander the executives and reject Limit waste and deformities.
- ❖ Complete the objective for the Fundamental Indicator of Progress (KPI).

1.4 Day to day Exercises and Obligations of an Industrial Engineer in the apparel industry:

- ❖ Gather the line stacking plan from the planning Office.
- ❖ Co-appointment with planning division for further developing the pre-creation exercises.
- ❖ Co-appointment with head of creation for cut plan and completing arrangement based conveyance need.
- ❖ Examine with Upkeep head in regards to the machine, organizer, connection, and specialized
- ❖ people for specialized issues.
- ❖ Make conversation with a story Creation director about design as indicated by paperlayout.
- ❖ Really look at each style SMED (Arrangement Time Decrease) report and lessen abundance time for make vital moves.
- ❖ Actually look at Day to day Non-useful time (NPT) all segment and show important drive for decrease machine breakdown time.
- ❖ Labor adjusting, target setting, and checking accomplishments.
- ❖ Strategies improvements and examination as a side of value and amount.
- ❖ Refreshing the SMV Data set in light of strategy improvement.
- ❖ Checking consistently last QC pass creation.
- ❖ Regular make line wise proficiency report of all part (Cutting, Sewing, Wrapping up.
- ❖ Pilot run, Bartack and Cutting Segment).
- ❖ Office wise Labor necessity justification in view of target strength spending plan.
- ❖ Observing explanation of tumble down effectiveness and efficiency and make fundamental moves.
- ❖ During Enrollment period checking all of creation stuffs (Boss, line boss, in control, and PM) specialized and hypothetical information for working capacity.
- ❖ Consistently observing all segments working hour plan with tiffin.
- ❖ Checking execution report of people and direct gathering to work on their exhibition.
- ❖ Regular observing robot use status
- ❖ Train up creation staff on productivity, target and accomplishment.
- ❖ Observing leader IE and Jr.IE exercises in his own unit

1.5 Importance of the thesis

A blend of various papers, reports and conclusion with respect to our fundamental instruction and down to earth life.

- ❖ The dress and piece of clothing industry procure around (75-85) percent of enormous unfamiliar monetary forms
- ❖ The materials and their subsectors are utilized in tremendous numbers by modern specialists.
- ❖ Bangladesh is presently a non-industrial country with for the most part unfamiliar trade reliance.

1.6 Scope of the thesis:

- ❖ Magnificent opportunities to accomplish something in the IE Textile business division.
- ❖ One day IE mentioned supply to increment.
- ❖ Essentially all RMG production line and perceive IE's result development position.
- ❖ Scholars of RMG businesses will fulfill the current prerequisite for the IE portion to expand their yields.
- ❖ Essentially all RMG production line and perceive IE's result development position.
- ❖ Scholars of RMG businesses will fulfill the current prerequisite for the IE portion to expand their yields

CHAPTER -2: LITERATURE REVIEW

2.0 Definition of Industrial Engineering

Industrial Engineering is a designing area connected with the enhancement of dynamic designs or strategies. There is no doubt about the creation, improvement and execution of included faculty frameworks, cash, information, see precisely, power and appraisal of the speculations and builds of designing plan, notwithstanding numerical, body and sociology, that it expects and evaluates the outcomes from specific primary styles.

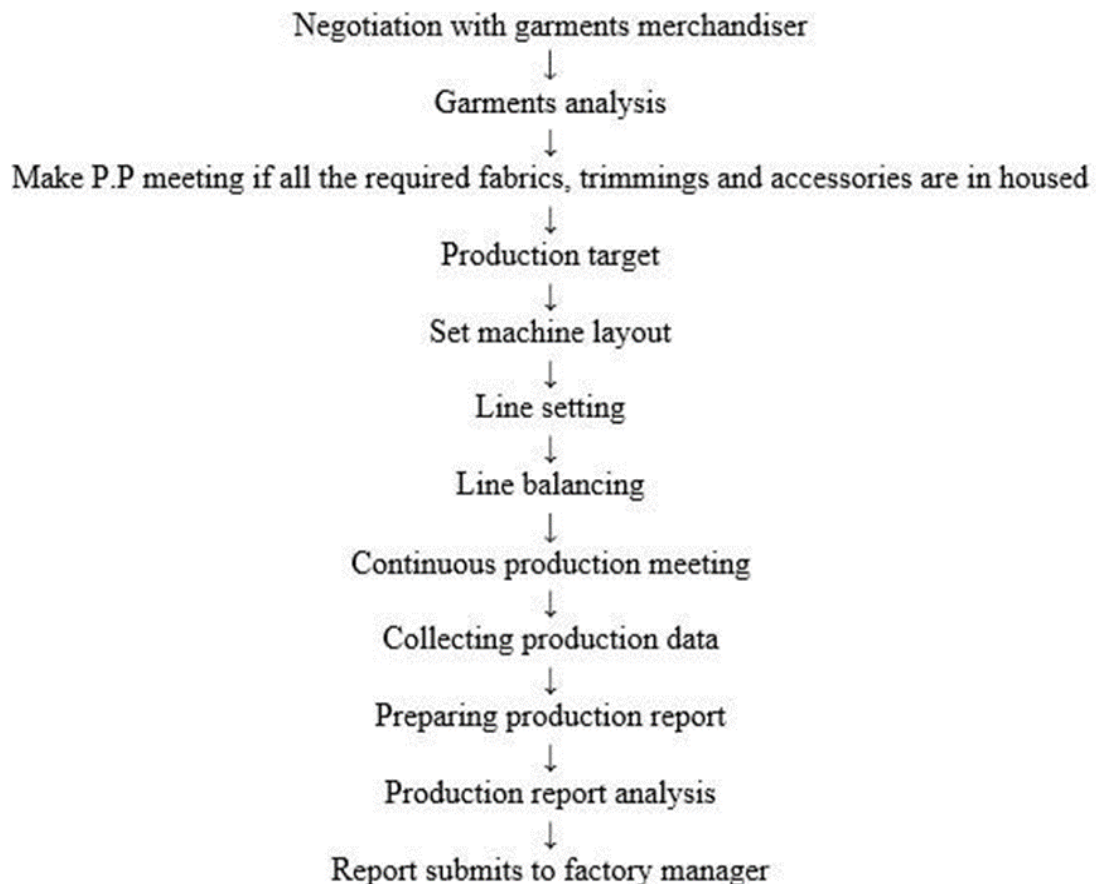
2.1 Concept of Industrial Engineering:

The business fabricating approach wants concentrated assembling and yet, consolidating specific elements: individuals, time, machinery and assembling region, organization and textures in a planned and useful system is fundamental. The specialized contraption for the assembling of pieces of clothing ought to empower expected item quality, basic creation distance, the transportation of arranged garments inside the time span predicted and the most use with least expenses of capacity.

2.1.1 Objective of Industrial Engineering:

- ❖ Assemble systems for ceaseless improvement and assembling costs the board.
- ❖ Creating cost-cutting developers.
- ❖ Reduce nonproductive time and reduce that
- ❖ Increase Production and Productivity
- ❖ 5s maintaining
- ❖ Prepare man machine report
- ❖ Reduce WIP(Work in Process)

2.1.2 Flow Chart of Industrial Engineering:



2.1.3 Functions of Industrial Engineer:

- ❖ To foster the right type of painting and to orchestrate a pleasant approach to painting. Arranging the rules for progress as indicated by normal methods.
- ❖ Planning sound pay rates and advantages.
- ❖ Planning markdown and charge frameworks to take advantage of and make a stylish costing plan.

2.1.4 Activities of Industrial Engineer:

- ❖ Technique determination and procedure gathering.
- ❖ Arrangement of cost administration.
- ❖ Task evaluation gadget execution and establishment.
- ❖ Concentrate on a medical procedure.
- ❖ Concentrate on in polynomial math and measurements.
- ❖ Evaluation of results.
- ❖ Cycles and construction

2.1.5 Role of Industrial Engineer in Garments Industry:

- ❖ Protection.
- ❖ Balancing of the lines
- ❖ Perfect - controls process
- ❖ Training - preparing of new laborers
- ❖ Operator efficiency - holds overflow effectiveness and expands the limits of low execution people.
- ❖ Manipulating Misfortune - alleviating off-general misfortune

As a pioneer, it tends to be an incredible model for everybody to show initiative. Every supervisor addresses the association, and its developments are all an augmentation of the organization

- ❖ Upkeep
- ❖ Towards occupations of greatness
- ❖ Towards effectiveness

2.1.6 Technique of Industrial Engineering:

- 1.) **Method Study:** Method study is an efficient technique for examining the strategy for finishing a work incorporating human developments engaged with it. Thus, it is the most common way of examining the techniques engaged with a work process to increment efficiency. It manages accomplishing the work in a superior manner, with less time and exertion

- 2.) **Why need method study in garments Industry:** Method study is an efficient strategy for dissecting the technique for finishing a work incorporating human developments engaged with it. In this way, it is the most common way of breaking down the techniques engaged with a work process to increment efficiency. It manages accomplishing the work in a superior manner, with less time and exertion.

- 3.) **Importance of the Method Study:**
 - ❖ To concentrate on the current/propose a strategy for finishing a work.
 - ❖ To-foster a superior technique to further develop efficiency and to lessen cost.
 - ❖ To decrease inordinate material dealing with
 - ❖ Work on the usage of assets
 - ❖ Normalize work strategy, working condition, apparatus, and devices.
 - ❖ Further developed working environment format.
 - ❖ Further develop work process
 - ❖ Better labor supply and limit usage

- 4.) **Time Study (Work Measurement):** Time study is the strategy for estimating work for recording the hours of playing out a specific explicit errand or its components done under determined condition. Time concentrate on assists with characterizing how long essential for an administrator to do the errand at a characterized pace of execution.

Motion Study: Motion study is a procedure of dissecting the body movements utilized in doing an errand to kill or diminish ineffectual developments and works with powerful movements. It is characterized as a deliberate and basic investigation of existing strategy for doing an undertaking so as to advance the most effective and monetary technique for making it happen.

- ❖ It is a technique for setting up representative efficiency principles where:
- ❖ A complicated occupation is separated into little or basic advances.
- ❖ The succession of developments taken by the IE in playing out those means is painstakingly seen to identify and kill inefficient movement.
- ❖ Exact time taken for every development is estimated and propelled to specialist's decrease for superfluous movements.
- ❖ Directing movement concentrate on record past and present history.

Financial and non-financial Incentives: This will generally help the endeavors of individuals by guaranteeing normal pay

Work evaluation: This is method for evaluating the overall great exhibition of the organization's laborers through adjusting position and staff and getting a sound compensation cover.

Material Handling Analysis: To study concentrate on the progression of material dealing with substances. to annihilate inefficient developments through various divisions to enliven the general material effectiveness.

Human Engineering: The investigation of the connection among man and his running circumstances diminishes mental and body strain is particularly involved. The man-contraption PC is involved.

2.2 Line Balancing:

Line Equilibrium levels the working burden across all cell or worth developments to dispose of bottlenecks and excess power. A constraint delayed down the component and happens on the off chance that the downstream tasks are identified and additional power results are prepared and ceaseless estimating ingested.

2.2.1 Objective of line balancing:

Regardless, squanders are erased at any cost in consistence with the result charge anytime.

- ❖ Consistent substance development.
- ❖ Labor and framework capacity full purposes.
- ❖ Least length of activity.
- ❖ Decrease slow time.
- ❖ The workstation is limited.
- ❖ At the ideal second, ideal presentation.
- ❖ Bring down the expense of creation.

2.2.2 Importance of line balancing:

- ❖ It likewise assists with evaluating the requirement for occupations.
- ❖ Strong blend diminishes the hour of result.
- ❖ By legitimate line balance, the advantage of a plant can be guaranteed.
- ❖ Adequate line balance guaranteed greatest result at the arranged quality.
- ❖ The result wipes out mistakes.

2.2.3 Efficiency:

In the pieces of apparel industry, productivity or efficiency is the proportion of created minutes to go through minutes duplicated by 100. The equation to ascertain Administrator Proficiency, Sewing Line productivity, Sewing Floor or Unit Effectiveness and whole Manufacturing plant Proficiency are something very similar.

Efficiency Calculation: To solve the productivity or efficiency of a line for a day, you will require the accompanying information (data) from the line manager or line recorder.

- 1) **Number of Manpower:** The number of Labor/OT holder as like administrator, partner, iron man worked in the line in a day.
- 2) **Working Hour:** (Customary and extra time hours as per punch report) how long every one of the administrators worked or how long the line run in a day. This report get from finance office.
- 3) **Production in pieces:** The number of pieces that are created or complete line yield by the day's end.
- 4) **Garments SMV:** What is the specific standard moment of the style (piece of apparel)
When you have above information you need to ascertain following utilizing above data.

Total minutes produces by the Line: Get complete delivered minutes, increase creation pieces by piece of clothing SMV.

Total minutes attended by all operators in line: Multiply the quantity of administrators by day to day working hours and convert absolute hours into complete minutes (Multiply by 60).

- 5) In the event that a line finishes the result of more than one style around the same time, the produce minutes of each style will be determined independently and added together to work out the all out produce minutes.

2.2.4 Cycle Checks:

A circle is a quick period to look for an objective immediately, or to check whether an administrator can or can not presently hit a cutting-edge second.

The process duration is the time the administrator expects to carry out the methodology in one cycle, for example the time between the assortment and removal.

Direct a cycle test in consistence with the accompanying advances:

- ❖ Pick the examination activity/s and enter the best shape detail.
- ❖ Watch 5 movement periods, nothing time for every contest cycle.
- ❖ Measure every activity's all out process duration.
- ❖ Measure process duration at the underlying time given.

2.3 Standard Minute Value (SMV)

What is SMV.?- Standard Time ("Standard Minute Value" or "SMV"), is the time expected for a certified specialist working at "Standard Execution" to play out a given task. The SMV incorporates extra remittances for rest and unwinding, machine delay and expected possibilities.

SMV calculation ways: We can compute article of apparel SMV involving SMV estimation programming as like **GSD, Sew Simple, Pro SMV, Time SSD or through time concentrate on technique**. Standard moment esteem estimation strategy utilizing Time Study is made sense of in this article with a model. To start with, you measure activity wise SMV. Then SMV of all tasks in style are consolidated to compute complete SMV of a piece of clothing.

In time study, you catch the noticed season of the chose activity. You rate administrator execution in the work. You utilize standard remittances for various sorts of machines, group stipend and possibility recompenses.

2.3.1 Factors of Standard Minute Value in Industry:

- ❖ Sorts of pieces of clothing.

- ❖ Sorts of textures.
- ❖ Pieces of clothing size.
- ❖ Piece of clothing plan.

2.3.2 SMV Calculation method in Apparel Industry:

The estimation of SMV in the industry shifts as per the expansive state of nonlife-life, sort of fabric, enormous number of staff, normal execution of contraptions, and so forth.

$$\color{red}{+} \text{ SMV} = \text{Basic time} + \text{Allowance}$$

$$\color{red}{+} \text{ Where Basic time} = \text{Average cycle time} \times \text{Rating} / 60$$

$$\text{Average cycle time} = \text{Total cycle time} / \text{Number of cycle}$$

Allowance = rest allowance + quota permit + deferred allowance unit. Score = the speed or speed of the operator at which the obstacle is reached.

2.3.2 Bottleneck:

The least result point in the creation line is known as a bottleneck. In pieces of clothing industry bottleneck implies the least limit of at least one tasks which brings about most minimal creation and at last least benefit.

Assuming we contemplate a sewing line of pieces of clothing industry, the bottleneck is an activity of the most reduced limit of that line. Say, for instance, that line has an all out 30 tasks. The limit of 29 tasks is close going to 120 pieces each hour yet the limit of I activity is 95 pieces each hour. Thus, for that behind this most minimal limit activity occupations will be stuck 25 pieces each hour. This activity is known as the bottleneck activity. After the bottleneck activity, the last result is equivalent to the limit of the bottleneck activity.

2.3.4 Bottleneck in the production line:

In the production line, the base handling component is a bottleneck. This is the bottleneck locale of which result and conveyance are able.

2.3.5 Aries of Bottleneck:

In a sewing line, the bottleneck might happen because of the accompanying reasons-

- ❖ Unfortunate line adjusting
- ❖ Wrong laborer choice for the specific activity
- ❖ Basic activity
- ❖ Laborer carelessness
- ❖ Running administrator truancy
- ❖ Abrupt infection of administrator
- ❖ Machine issue
- ❖ High modification all the while (Quality issue) adolescent
- ❖ Absence of production network

2.3.6 How to minimize bottleneck:

- ❖ Doing appropriate line adjusting by limit investigation of every administrator
- ❖ Keeping up with the ability network of all administrator to choose competently administrator
- ❖ Concentrate on the pieces of clothing prior to going to mass creation due to recognize basic activity and train administrator
- ❖ Choosing the right administrator for the right activity
- ❖ Persuade administrator not to disregard any activity
- ❖ Lessening abundance tension from the administrator
- ❖ Lessening deformity from the line and not sending surrendered

2.4 Pitch time:

Pitch-time is a proportion of an enormous SMV of clothing and a sort of mode-explicit cycle in market designing.

Period of pitch=SMV of clothing operation number

Pitch time is in many cases used to situate the line and to gauge the road creation aim. Work Study:

Occupations sports are led by the monetary designing area in the piece of clothing and dress industry. Pictures are absolutely used to quantify works of art. for certain. The area is answerable for the work completed in the article of clothing business. Work is the best instrument for make following and efficiency upgrade. A novel thought in the piece of clothing and attire industry is miles away. In the accompanying manner, we can portray work sees.

2.4.1 Purpose of Work Study:

- ❖ The target or priorities of the work study are commonly-
- ❖ Set up the least demanding method for finishing the work.
- ❖ Set the time expected for a job at a specific achievement level.
- ❖ Support effectiveness and efficiency
- ❖ More straightforward to work.
- ❖ Set up equivalent tasks for everybody

2.4.2 Importance of work-study:

- ❖ Job review is a method for working on the efficiency of the organization by eliminating duplication and exercises that are repetitive.
- ❖ It is the methodology to arrange non-esteem additional items by investigating every one of the factors influencing position.

2.4.3 Role of Work study:

Six possible lines of activity on issues of intensity can be recorded as follows:

- ❖ Boost crucial science and creation strategies.
- ❖ Improving existing techniques, further developing plant, and apparatus arrangement.
- ❖ Simplify, diminishing and normalizing the item range.
- ❖ Enhance profession planning and labor force use.
- ❖ Enhance current plant working systems.
- ❖ Increase the efficiency, everything being equal.

2.4.4 Objective of work study:

- ❖ Productivity improvement.
- ❖ Further developed consistency of the things.
- ❖ Pick the quickest method for finishing a mission.
- ❖ Help the strategy for working.
- ❖ Professionals and staff had less weariness.
- ❖ Fruitful work survey

2.5 Method Study:

Method study is an efficient strategy for dissecting the technique for finishing a work incorporating human developments engaged with it. In this way, it is the most common way of examining the strategies engaged with a work process to increment efficiency. It manages accomplishing the work in a superior manner, with less time and exertion.

Why need method study in Apparel Industry: Method study is a deliberate technique for dissecting the technique for finishing a work incorporating human developments engaged with it. In this way, it is the most common way of dissecting the techniques engaged with a work process to increment efficiency. It manages accomplishing the work in a superior manner, with less time and exertion. That's why method study is very needed.

Importance of the method study:

- ❖ To concentrate on the current/propose a strategy for finishing a work.
- ❖ To-foster a superior strategy to further develop efficiency and to diminish cost.
- ❖ To decrease extreme material dealing with
- ❖ Work on the use of assets
- ❖ Normalize work strategy, working condition, apparatus, and devices.
- ❖ Further developed working environment format.
- ❖ Further develop work process

- ❖ Better labor supply and limit

2.5.1 The major aims of method Study:

- ❖ Worked on working practices and working/representative environment.
- ❖ Expanded utilization of materials, apparatus and laborers and money.
- ❖ Incredible norm.
- ❖ Speedy and solid apparatus for taking care of things.
- ❖ Normalize, smooth out, robotize, and determination directions.
- ❖ Effective fragment readiness.
- ❖ Work processes are smoothed out.
- ❖ More noteworthy wages.
- ❖ Further develop homestead and office design.
- ❖ Predominant wellbeing and wellbeing rehearses.
- ❖ Improve the work process.
- ❖ Viable capacity of items.
- ❖ Endlessly process quality.
- ❖ Boost the right utilization of capital.
- ❖ Ideal effectiveness.
- ❖ Improve the board.
- ❖ Excusal of contamination.

2.5.2 Steps of Method Study:



2.6 Time Study:

Time perception is a limited scale strategy for the hour of a major special test, or for specifying a cycle that is completed in objective situations and survey of the subtleties so an administrator can get an opportunity to keep it at a depicted achievement point.

2.6.1 Steps of Making Time Study:

- ❖ Standard cycle research. Study.
- ❖ Document authoritative and natural prerequisites for the exploration right now, which might affect how the work is performed and in this manner the time taken to make it happen.
- ❖ Record a full outline of the work in progress and separate the undertaking or activity into freely characterized time parts.
- ❖ Sample size appraisal

2.6.2 Notes of Time Study:

- ❖ Be warm and inviting; simply do not address the administrator unreasonably.
- ❖ Try not to be in a less off-kilter position, like on the hand or toward the rear of the administrator.
- ❖ None of the time research plunks down.
- ❖ Measure the impacts of the period learn at the finish of the date set.

2.6.3 Operator Performance:

Fundamentally, the administrator execution can be observed with the assistance of three proficiency factors.

- ❖ Single cycle productivity.
- ❖ On-standard productivity.
- ❖ Global productivity

2.6.4 off Standard Time:

The time an administrator spends on his work in a useless circumstance. Off-standard assortments,

- ❖ Breakdown of the unit.
- ❖ Time to pause.
- ❖ Issues of consistency.
- ❖ Try not to eat.
- ❖ Family-accommodating position.
- ❖ Preparing.

2.7 Capacity Study:

Capacity study is one of the action step for line adjusting; limit study demines the greatest efficiency of a specialist each hour.

List down all tasks (with administrator name) full line according to activity succession in specific configuration. Utilizing stop watch process duration for every activity for five successive cycles.

With normal process duration work out hourly limit of the administrators.

Capacity = 3600 / Observe time (1 hour=3600 second)

2.8 Capacity and Time study calculation:

Maxcom International (BD) Ltd.
Capacity Study & Time Study Sheet

Buyer # _____ Date # 21.03.2023
Style # _____ Line # _____

Total cycle time _____
Number of cycle _____
Depend on experience _____
of worker _____
Average cycle time _____
60
Basic + Allowance (Basic 80% 15% 5%)
60
SMV
O/Qty # _____
SPX 25
Average cycle time _____

S/L	Name	Card No.	Operation	M/C	Cycle Time					Total	Avg Cycle	Avg Rating	Basic	S.M.V	Avg. Target Per Hour	Capacity Per Hour
					2	3	4	5	6							
1	Sobi Akther		Loop make & cut	2N,3T	5	6	5	5	6	27	5.4	85%	7.8	8.97	6.87	666.66
2	Arman		Back pocket over look	1N,3T	7	8	6.5	7	7	35.5	7.1	85%	10.05	11.56	5.19	507.04
3	Rohima		Front pocket rolling	2N,3T	12	11	12	13	11	59	11.8	86%	16.91	19.45	3.08	305.08
4	Sewly Akther		Zipper attach	1N,2T	19	20	18	17	20	94	12.8	80%	25.06	28.31	2.08	194.59
5	Hamida		Double fly attach	1N,2T	6	6	6	6	6	30	6	80%	7.8	9.2	6.5	600
6	Bhantona		Inseam tiling tuck	1N	8	8	8	9	7	40	8	90%	12	13.8	4.34	450
7	Rozina Akther		Tuck top stitch	1N	7	6	6	7	6	34	6.8	90%	10.2	11.73	5.11	529.41
8	Arizo Begum		Welt pocket bag 1/4 stitch	1N	30	28	29	30	28	144	28.8	86%	41.28	47.49	1.34	125
9	Nor Islam		Front rise Top stitch 1/4 & 1/2	2N	15	16	17	17	15	80	16	86%	22.99	26.34	2.027	225
10	Borobi		pocket tuck	1N	6	7	6	5	6	30	6	87%	8.7	10.09	5.99	600
11	Bipasa		Back pocket rolling	1N	7	8	7	7	7	36	7.2	88%	10.56	12.34	4.95	500
12	Jannat Akther		Back pocket attach & cut thread	1N	30	29	30	28	29	146	29.2	80%	38.03	44.76	1.34	123.28
13	Mita Khanom		Back pocket 1/4 top stitch	1N	8	6	7	8	8	37	7.4	79%	9.74	11.20	5.35	486.48
14	Atikur Rahman		Thai pocket facing attached	2N,6T	6	8	7	8	6	35	7	78%	9.1	10.44	5.73	514.28
15	Asma Begum		Thai pocket rolling	2N,5T	18	17	17	18	18	88	17.6	80%	23.44	26.97	2.22	204.54
16	Sirina khator		Thai pocket over look	2N,4T	25	24	24	24	25	122	24.4	85%	34.54	39.74	1.50	147.54
17	Sauful		Side seam over look	1N,2T	30	30	30	29	30	149	29.8	90%	44.7	51.40	1.16	120.80
18	Nuruzzaman		Side top stitch	1N,1T	32	32	32	33	34	163	32.6	90%	48.3	56.23	1.06	110.42
19	Biplop		Thai pocket attach	1N,1T	60	60	60	59	61	300	60	90%	90	103.5	0.57	60
20	Jasmin		Thai pocket 1/4 stitch	1N,2T	60	60	60	60	60	300	60	90%	90	103.5	0.57	60

sw Easy S.M.V _____
timate S.M.V _____

Total Operator _____ Total M/C _____ Actual S.M.V _____
Total Asst. Operator _____ Target _____

11/05/2023 13:38
HOP

Work Study Officer

Maxcom International
(BD)Ltd
Capacity Study & Time
Study Sheet

Date:

Buyer#
Style#

S/L	Name	Operation	M/C	Cycle time					Total	Average
1	Sobi	Loop make & cut	2N,3N	5	6	5	5	6	27	5.4
2	Arman	Backpocket ol	1N,3T	7	8	6.5	7	7	35.5	7.1
3	Rohima	FP rolling	2N,3T	12	11	12	13	11	59	11.8

4	Sewly	Zipper attatch	1N2T	19	20	18	17	20	94	18.8
5	Hamida	Dble fly attatch	1N2T	6	6	6	6	6	30	6
6	Shantona	Inseam tiking	1N	8	8	8	9	7	40	8
7	Rozina	Tack top stitch	1N	7	6	6	7	6	34	6.8
8	Arzo	1/4 stitch	1N	30	28	29	30	28	144	28.8
9	Norislam	1/4 & 1/16 FTS	2N	15	16	17	17	15	80	16
10	Sorobi	pocket tack	1N	6	7	6	5	6	30	6
11	Bipasa	BKP Rolling BK Join&cut	1N	7	8	7	7	7	36	7.2
12	Jannat	threa	1N	30	29	30	28	29	146	29.2
13	Mita	BKP1/4 TS THP facing	1N	8	6	7	8	8	37	7.4
14	Atikur	attach	2N6T	6	8	7	8	6	35	7
15	Asma	THP rolling	2N5T	18	17	17	18	18	88	17.6
16	Sirina	THP OI	2N4T	25	24	24	24	25	122	24.4
17	Saiful	Side seam OI	1N2T	30	30	30	29	30	149	29.8
18	Nurojjam	Side top Stitch	1N1T	32	32	32	33	34	163	32.6
19	Biplop	THP Attach	1N1T	60	60	60	59	61	300	60
20	Jasmin	THP1/4 stitch	1N2T	60	60	60	60	60	300	60

Rating%	Basic	SMV	Capacity
85	7.8	8.97	666.66
85	10.05	11.56	507.04
86	16.91	19.45	305.08
80	25.06	28.81	194.59
80	8	9.2	600
90	12	13.8	450
90	10.2	11.73	529.41
86	41.28	47.47	125
87	22.93	26.36	225
88	8.7	10.01	600
80	38.93	12.14	500
79	9.74	44.76	123.28
78	9.1	11.2	486.48
80	23.4	10.46	514.28
85	34.56	26.97	204.54
90	44.7	39.74	147.54
90	10.56	51.4	120.8
90	48.9	56.23	110.42
90	90	103.5	60

Calculation method for Sewing line Limit in garments Industry:

A modern designer expected the accompanying subtleties to gauge the sewing lines of a material processing plant capacity

- ❖ No. on the line of sewing machines.
- ❖ How much the specialist missing from the lines.
- ❖ Processing plant's everyday working hours.
- ❖ The processing plant's line execution.
- ❖ Ordinary allowed (SAM) minutes for the assembling part

2.9 Allowance:

It is critical to make a main positive remittance quicker than the ideal time for interest will be accomplished.

It was on the grounds that the artworks have an eye on the designer that the proficiency compositions of the administrator were respected at top notch and the time of rest, which might be expected to utilize the working framework to urge the administrator to outperform its power, has not currently required into account the investment that it means to permit side interest to satisfy individual necessities.

Machines	Stitch Types	% PA	%RA	%TA	% Allow
Single needle	Lock stich	5	8	6	19
2-Needle	Lock stich	5	8	8	21
J-Stich	Lock stich	5	8	6	19
Single needle	Chain stich	5	8	4	17
2-needle	Chain stich	5	8	6	19
Bartack	Lock stich	5	8	4	17
Bartack	Single Chain stich	5	8	4	17
Overlock	2-Thread	5	8	4	17
Overlock	3-Thread	5	8	5	18
Overlock	4-Thread	5	8	7	20
Safety	5-Thread	5	8	5	18
Cover stich	3-Thread	5	8	6	19
Cover stich	4-thread	5	8	6	19
Button Hole	Lock stich	5	8	6	19
Button Hole	Chain stich 3-Thread.	5	5	6	16
Button Hole	Chain stich 1-Thread.	5	8	4	17
Button Attach	1 Thread.	5	8	4	17
Blind stich	1 thread.	5	8	3	16
Handcraft		5	8	1	14
Hand iron		5	8	1	14
Machain iron.		5	10	1	16
Press		1	10	1	12
PA=Personal Allowance				TA=Technical Allowance	
RA- Recover Allowance				Total Allowance	

13/05/2023 10:11

Machines	Stitchtype	%PA	%RA	%TA	Total Allowance
Single Needle	Lock Stitch	5	8	6	19
2Needle	Lock Stitch	5	8	8	21
J-Stitch	Lock Stitch	5	8	6	19
Single Needle	Chain Stitch	5	8	4	17
2Needle	Chain Stitch	5	8	6	19
Bartack	Lock Stitch	5	8	6	19
Bartack	2-Thread	5	8	4	17
Overlock	3-Thread	5	8	4	17
Overlock	4-Thread	5	8	4	17
Overlock	5-Thread	5	8	5	18
Safety	3-Thread	5	8	6	20
Cover Stitch	4-Thread	5	8	6	18

Cover Stitch	Lock Stitch	5	8	6	19
	Chain Stitch				
Button Hole	3T	5	5	4	19
	Chain				
Button Hole	Stitch1T	5	8	4	16
Button Attatch	1 Thread	5	8	3	17
Blind Stitch	1 Thread	5	8	1	17
Handcraft		5	8	1	16
Hand iron		5	8	1	14
Machne iron		5	10	1	14
Press		1	10	1	12

PA= Personal Allowance

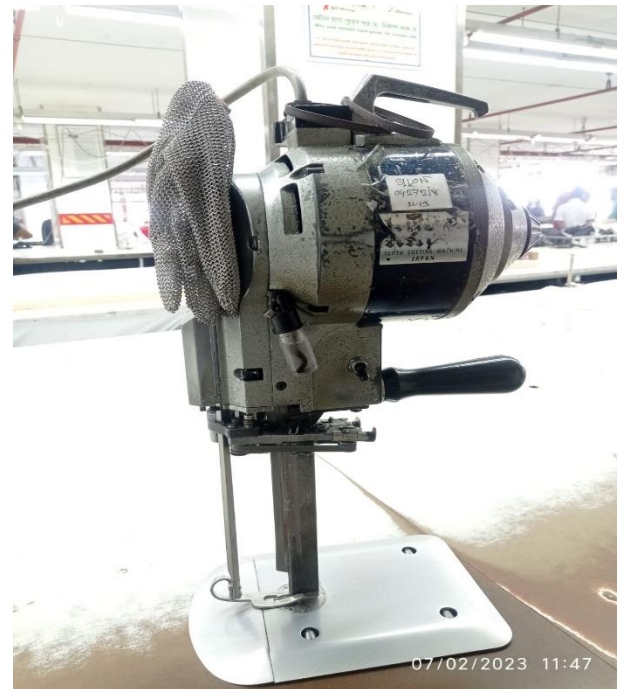
RA=Recovery Allowance

TA=Total Allowance

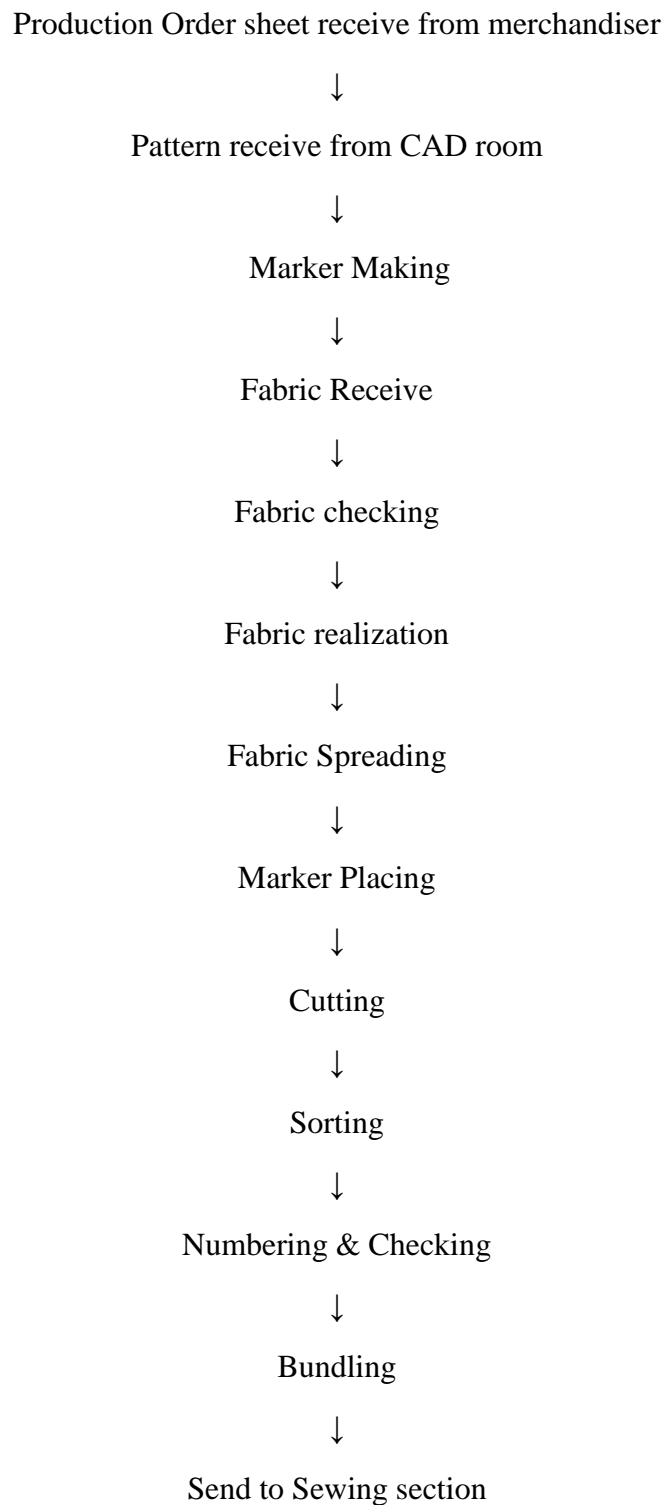
CHAPTER -3: METHODOLOGY

3.0 Introduction of cutting process

Cutting is one of the significant cycles in pieces of clothing fabricating. Here articles of clothing parts are slicing as indicated by the example. In the pieces of clothing cutting division, a cycle stream diagram must be kept up with to send the right estimation parts in the following system for making quality articles of clothing. As its significance in pieces of clothing producing, a cycle stream diagram for the articles of clothing cutting division is introduced in this article.



3.1 Process Flowchart of Cutting Section:



3.2 Common Cutting errors:

- ❖ Wrong size proportion cutting
- ❖ Texture got without earlier quality assessment or leeway in light of experimental outcome
- ❖ No score mark
- ❖ Numbering blunder
- ❖ Following the wrong cutting arrangement
- ❖ Postpone underway beginning
- ❖ Setting up a long queue
- ❖ High lost time
- ❖ Creation arranging changes often
- ❖ Absence of data
- ❖ Cutting streams in the pieces of clothing
- ❖ Over cutting the harmony

3.3 Role of IE Department in cutting Section:

A Industrial Engineer (IE) segment assumes a fundamental part in slicing areas to save utilization, cutting productivity expanding, and legitimate use of textures. As cutting is the beginning of the articles of clothing producing process, costing saving essentially relies upon the best use of textures and texture use. Slicing creation ought to be equivalent to sewing or considerably more to sewing, so like the sewing and completing area, the articles of clothing industry ought to have IE dependable individual in the cutting segment. There is no huge change in cutting modern designing work, work doing like others segment. Assuming Sewing productivity is 70%, cutting effectiveness should be 85% if not line will be inactive

3.4 Duties and Responsibilities of an IE executive in Cutting section:

- ❖ Setting the cutting man proportion according to floor wise a month to month creation plan.
- ❖ Day wise slicing effectiveness computation and work to increment proficiency.
- ❖ Ascertain SMV as indicated by the style-wise activity by activity.
- ❖ Cutting segment week by week and month to month KPI revealing and execution follow-up.
- ❖ Preparing about for the SMV, labor supply diminishes, productivity increment, creation creates, and wastage work lessen.
- ❖ Hourly creation observing and day wise Objective creation figure and accomplish.
- ❖ Cutting limit study
- ❖ Make week after week and everyday cutting plans.
- ❖ Creation increment reason will be organized instruments and devices and utilized high innovation.
- ❖ Record the Non-useful Time(NPT)
- ❖ If conceivable utilize the kaizen, Kanban framework.
- ❖ Follow the cutting WIP and printing, weaving too. Since weaving and printing are connected with cutting.
- ❖ Control the Additional Extra time.
- ❖ Consistently examines the running style and next style least of 20 minutes of the day in the part.
- ❖ Figure out the issue and give the super durable arrangement all together (Capable individual of IE, Cutting QA, cutting SV, cutting in-control, Cutting chief, Store official, PM)
- ❖ Follow up and guarantee legitimate numbering, conceal gathering, design number-wise cutting, and size breakdown.
- ❖ Making style-wise cutting activity announcement.
- ❖ Style-wise utilization checking and affirming. Legitimate cutting wastage the executives.
- ❖ Appropriate packaging and recut the board.

3.5 SMV Analysis for cutting section:

Process	Total SMV		
	Shell	Pocketing	Fusing Cutting
Prepare for Laying	0.066	0.00	0.07
Laying	0.162	0.00	0.02
Cutting	0.052	0.00	0.10
Band Knife	0.000	0.00	0.00
Cut Panel inspection	0.760	0.00	0.00
Numbering	0.190	0.00	0.00
Panel Inspection	0.490	0.00	0.00
Bundling	0.570	0.00	0.18
Module SMV	2.290	0.00	0.36
Fusing (Large)	0.000	0.00	0.00
Fusing (Small)	0.000	0.00	1.21
Module SMV	0.000	0.000	1.211

Total SMV **2.65** **1.25** **1.40**

Scissoring **0.00** **Final SMV** **1.40**

Executive.IE

Sr.Executive.IE

Cutting Manager

Sr.GM.IE

For understanding purpose:

SMV Analysis for cutting			
Buyer	H&M		
Order QTY	19534		
	pcs		
	Total SMV		
Process	Shell	pocketing	Fusing cutting
Prepare for laying	0.0006	0	0.07
Laying	0.162	0	0.02
Cutting	0.052	0	0.1
Band knife	0	0	0
Cut panel inspection	0.76	0	0
Numbering	0.19	0	0
Panel Inspection	0.49	0	0
Bundling	0.57	0	0.18
Module SMV	2.29	0	0.36
Fusing(Large)	0	0	0
Fusing(small)	0	0	1.21
Module SMV	0	0	1.211
Total SMV	2.65	1.25	1.4
Scissoring	0	Final SMV	1.4

3.6 Experimental Details (IE in Sewing Section): We gathered this activity breakdown and arrangement sheet from Maxcom International (BD) Ltd. The gathered date 7th March 2023. We completed a record via following advances like organization examine, limit, SMV, creation target, and so on

3.6.1 Operation Breakdown of Short Sleeve Shirt:

Buyer: **GU.COM. LTD**

Fabric: **Cotton Denim**

Item: **Short Sleeve Shirt**

Order Quantity: **19534 pcs**

Line No: **12** & Pitch Time: **0.31**

MAXCOM INTERNATIONAL (BD) LTD.

OPERATION ANALYSIS REPORT	
STYLE NO	: 333N013B/13A (EACH COLOR) M SIZE
FABRIC	: COTTON DENIM
QMT TYPE	: SHORT SLEEVE SHIRT
BUYER	: GU. COM. LTD
ORDER QTY	: 19534 PCS
LINE	: 12
DATE	: 07-03-2023
PITCH TIME	: 0.31

OPERATION BULLETIN

TARGET/HOUR	10 HOURS
100%	193
90%	174
85%	164
80%	155

INPUT DATE : 10-03-2023

OUTPUT DATE : 11-03-2023

TARGET PER HOURS= Pcs

OP NO	OPERATION	MC TYPE	SMV	TGT / HR	MANING	M/C	BALANCING	DAY	TAG%	TAG/H	TAG-10
COLLAR MAKE											
1	✓ COLLAR MAKE MARK+EDGE CUT & TURN							1st	40	77	773
2	✓ COLLAR FUSING REMOVE	HEL	0.63	95	3			2nd	70	135	1353
3	✓ COLLAR MAKE WITH INNER THREAD	SNL	0.50	120	2	2		3rd	80	155	1547
4	✓ COLLAR MOUTH EDGE TACK	SNL	0.32	188	1	1					
5	✓ COLLAR 1/16 TOP STC	SNL	0.46	130	1.5	1.5					
6	✓ COLLAR 1/4 TOP STC	SNL	0.36	167	1	1					
7	✓ COLLAR BAND MATCHING & NOSE EDGE CUT & TURN	SNL	0.43	140	2	2	VERTICAL M/C				
8	✓ COLLAR BRAND FUSING REMOVE	SNL	0.30	200	3	3	PATER USE				
9	✓ COLLAR BAND ATC WITH COLLAR	SNL	0.83	72							
10	✓ COLLAR BAND 1/16 TOP STC	SNL	0.36	167	1	1					
IRON SECTION											
11	✓ COLLAR+COLLAR BAND & FRONT PKT IRON	IRN	0.94	64							
12	✓ BUTTON PLACKET FUSING PRESS	IRN	0.28	214	4						
13	✓ FRONT PKT MOUTH FUSING TROUGH & IRON	IRN	0.36	167							
FRONT PART											
14	✓ BOX PLACKET ROLLING	KSP	0.29	207	1	1	FOLDER USE				
15	✓ BUTTON PLACKET ROLLING	KSP	0.30	200	1	1	FOLDER USE				
16	✓ BOX & BUTTON PLACKET THREAD CUT	HEL	0.27	222	1						
17	✓ FRONT PART PAIR TACK FGR HIGH-LOW	SNL	0.24	250	1	1					
18	✓ FRONT PKT AROUND OL 1X2	3DL	0.34	176	1	1					
19	✓ FRONT PKT BUTTON HOLE(1X2)	BHL	0.28	214	1	1					
20	✓ FRONT PKT MOUTH ROLLING 1X2	SNL	0.34	176	1	1					
21	✓ FRONT PKT MOUTH CLOSE TOP STC 1X2	SNL	0.36	167	1	1					
22	✓ FRONT PKT ATC POSITION MARK 1X2	HEL	0.35	171	1						
23	✓ FRONT PKT ATC 1X2 WITH INSIDE FELT	SNL	0.90	67	3	3					
24	✓ FRONT PKT 1/4 TOP STC	SNL	0.60	100	2	2					
25	✓ FRONT PART BOTTOM HEM ROLLING	SNL	0.60	100	2	2	FOLDER USE				
BK PART											
26	✓ BK YOKE ATC	FOA	0.35	171	1	1	FOLDER USE				
27	✓ BK PART BOTTOM HEM ROLLING	SNL	0.60	100	2	2	FOLDER USE				
ASSEMBLE											
28	✓ FRONT & BK PART FITTING(SCISSORING)	HEL	0.34	176	1						
29	✓ FRONT & BK PART MATCHING	HEL	0.30	200	1						
30	✓ SHOULDER CLOSE & ARM HOLE DROP MARK	GST	0.48	125	2	2	FOLDER USE				
31	✓ BODY NECK+COLLAR MARK & MATCHING FOR ATC	HEL	0.40	150	1						
32	✓ COLLAR ATC WITH BODY	SNL	0.50	120	2	2					

3.6.2 Calculation for Short Sleeve Shirt:

Here,

Allowance=15%

Total Manpower =70

Rating=80%

34	COLLAR NECK 1/16 TOP STC	SNL	0.56	103	2	2	
35	SLEEVE MARK & MATCHING FOR JOIN	HEL	0.40	150	1		
36	SLEEVE ATC	SNL	0.92	65	3	3	
37	ARM HOLE TOP STC	CST	0.60	100	2	2	FOLDER USE 3 NIDDLE
38	PLAS TIC BUTTON ATC ON LABEL	BTS	0.20	300	1	1	
39	CARE LABEL MAKE & INSERT POLY-ATC WITH SIDE SEAM (1X3)	SNL	0.34	176	2	2	
40	SIZE LABEL ATC WITH SIDE SEAM		0.26	231			
41	SIDE SEAM SCISSORING	HEL	0.34	176	1		
42	FRONT & BK PART BOTTOM FITTING FOR HEM ROLLING	VERTICAL	0.30	200	1	1	
43	SIDE SEAM CLOSE WITH THREAD CUT	FOA	0.79	76	3	3	FOLDER USE 3 NIDDLE
44	SIDE SEAM SLIT P5N EXTRA STITCH REMOVE	HEL	0.32	188	1		
45	SLEEVE CUFF ROLLING	SNL	0.60	100	2	2	
46	BODY TURN & FINALY THREAD CUT	HEL	0.50	120	2		
47	ALL NUMBER SCISSORING	HEL	0.40	150			
48	FALSE ATC WITH FRONT PLACKET FOR WASH SAFETY	SNL	0.83	72	3	3	
	TOTAL SMV		21.57		70	52	
	AFTER WASH SEWING						
	TOTAL		21.57				

SUMMERY				
		SMV	ALL	TOTAL
TOTAL HEL SMV - SEWING	HEL	4.53	0	4.53
TOTAL MC SMV - SEWING		17.04		17.04
TOTAL HEL SMV - AFTER WASH	HEL	0.00		0.00
TOTAL MC SMV - AFTER WASH		0.00		0.00
TOTAL SMV		21.57		21.57

NB: HELPER SUPPORT FROM LINE OPERATOR.

M/C DETAILS	MANNING	M/C
SNL	38	38
DNL	0	0
3OL	1	1
5OL	0	0
KSP	2	2
FOA	4	4
CST	4	4
BTN	0	0
IRN	4	0
BHL	1	1
BTS	1	1
VERTICAL	1	1
HEL	14	0
TOTAL OPERATOR		49
TOTAL MANPOWER	70	

BARTACK					
SL NO	PROCESS NAME	BTK LENG	BTK QTY	UNIT SMV	PROCES S SMV
1	BODY CARRING		1	0.1	0.1
2	FRONT PKT	1/4	4	0.06	0.24
3	FRONT FLAP	1/4		0.06	0
4	BODY CARRING		1	0.1	0.1
5					0
6					0
7					0
8					
9					
10					
11					0
TOTAL =			4		0.44

PRE BY IE DEPARTMENT

$$\frac{170}{50} = 7:5$$

MMA = $\frac{70}{40} = 1:40$
~~70:40~~
 1:40 PM

SMV calculation:

SMV=Basic time + Allowance of basic time

Basic Time= (Observe time × Rating %) / 60

Observe Time= Total Cycle Time / Total Number of Cycle

SMV calculation for Side Seam Close with thread cut of short sleeve Shirt

Observe time= Total Cycle Time / Total Number of Cycle

$$= (52+52+53+52+54) / 5$$

$$= 263 / 5$$

$$=52.6$$

Basic Time = (Observe time × Rating %) / 60

$$= (52.6 \times 80 \%) / 60$$

$$=0.701$$

Now for SMV = Basic time + Allowance of basic time

$$= 0.701 + (0.701 \times 15\%)$$

$$= 0.8$$

The help of same method can calculate other operation SMV

Here,

Total garments SMV =21.57

Total Manpower = 70

Basic Pitch time Calculation= (Total Garments SMV / Total Manpower)

$$= (21.57 / 70)$$

$$=0.31 \text{ minute}$$

Capacity Calculation:

Capacity= 3600 / operation time (Observe Time or average cycle time)

$$= (3600 / 52.6)$$

$$= \mathbf{68.44}$$

Efficiency Calculation:

$$\begin{aligned}\text{Efficiency} &= \frac{(\text{Production per hour} \times \text{SMV})}{(60 \times \text{Manpower} \times \text{Working hour})} \times 100 \\ &= \frac{(155 \times 21.57)}{(60 \times 70 \times 1)} \times 100 \\ &= 79.6\%\end{aligned}$$

Working Hour =10 (per 1 hour production & working hour are used to calculate efficiency)

Total SMV = 21.57

Find Efficiency= 79.6 %

3.6.3 Operation Breakdown of 5Pocket Long Pant Solid:

Buyer: GU. COM. LTD

Fabric: TWILL

Item: 5Pocket Long Pant Solid

Order Quantity: 30000 Pcs

Line: 09

Pitch Time: 0.25

MAXCOM INTERNATIONAL (BD) LTD.

OPERATION ANALYSIS REPORT	
STYLE NO	: 323H060A
FABRIC	: TWILL
GMT TYPE	: 5 PKT SHEF LONG PANT SOLID
BUYER	: GU. COM. LTD
ORDER QTY	: 30000 PCS
LINE	: 09
DATE	: 17.04.2022
PITCH TIME	: 0.25

OPERATION BULLETIN

TARGET/HOURS	TARGET/10 HOURS
100%	245
90%	221
85%	209
80%	196

INPUT DATE: 09.02.2023

OUTPUT DATE: 11.02.2023

OP. NO.	OPERATION	MC TYPE	SMV	TGT/HR	MANING	M/C	BALANCING	DAY	TGT EFF%	TGT/HR	TGT/10 HRS
FRONT PART											
1	BK PKT ATC PSN MARK	HEL	0.34	176	2			1st	80	147	1473
2	ELASTIC MEASUREMENT+MARK & CUT	HEL	0.24	250	1			2nd	80	196	1963
3	LOOP MAKE	FLT	0.15	400	1	1	FOLDER USE				
4	COIN PKT MOUTH ROLLING	SNL	0.15	400	1	1					
5	COIN PKT ATC ON LOWER PKTING	SNL	0.30	200	1	1	LASER USE.				
6	LOWER FACING ATC ON PKTING	SNL	0.34	176	2	2					
7	FRONT RISE CLOSE	5OL	0.30	200	1.5	1					
8	BK RISE CLOSE	5OL	0.34	176	1.5	2	COMBIND				
9	BK RISE SAFETY STC	CST	0.18	333	1	1					
10	LOOP TAG ATC WITH FRONT PKT BAG PSN	SNL		#DIV/0!			AS PER SAMPLE				
11	OPENING MARK FOR PKTING ATC	HEL	0.29	207	1						
12	PKTING ATC WITH FRONT PKT MOUTH	SNL	0.80	75	3	3					
13	FRONT PKT MOUTH OPENING CUT & TURN	HEL	0.25	240	1	1					
14	FRONT PKT MOUTH SEFTY STC	SNL	0.33	182	1	1					
15	FRONT PKT MOUTH ROLLING	SNL	0.78	77	3	3					
16	FACING NUMBER MATCHING & OPENING TACK	SNL	0.64	94	2	2	COMBIND				
17	FRONT PKT BAG CLOSE	5OL	0.36	167	2	2					
18	FRONT PKT BAG INNER SIDE OL	3OL	0.30	200	1	1	ADD PROCESS				
19	FRONT PKT BAG TACK TO BODY WAIST	SNL	0.22	273	1	1	MAGIC THREAD USE				
BACK PART											
20	BK PKT MOUTH ROLLING	SNL	0.34	176	1.5	1					
21	BK PKT OL	3OL	0.29	207	1.0	1	ADD PROCESS				
22	BK PKT ATC	SNL	0.75	80	2.5	3					
23	BK PKT 1/4 TOP STC	SNL	0.75	80	3	3					
IRON SECTION											
24	ELASTIC PRESS (STEAM)	IRN	0.22	273	1						
25	FUSING PRESS ON FRONT PKT MOUTH	IRN	0.32	188	1		COMBIND				
26	W/B HOLE PSN FUSING PRESS	IRN	0.22	273	1						
27	BK PKT IRON FOR ATC	IRN	0.36	167	2						
ASSEMBLE											
28	FRONT & BK PART MATCHING	HEL	0.26	231	1						
29	SIDE SEAM CLOSE	5OL	0.70	86	3	3					
30	W/B MOUTH AROUND OL	3OL	0.40	150	2	2					
31	FRONT W/B INNER BTN HOLE (1X2)	BHL	0.30	200	1	1					
32	ELASTIC MARK (4 POINT MARK)	SNL	0.40	150	2	2					

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29	SIDE SEAM CLOSE	SOL	0.70	86	3	3	
30	W/B MOUTH AROUND OL	3OL	0.40	150	2	2	
31	FRONT W/B INNER BTN HOLE (1X2)	BHL	0.30	200	1	1	
32	ELASTIC MARK (4 POINT MARK)	SNL	0.40	150	2	2	
33	ELASTIC RING TACK						
34	SIZE LABEL ATC	SNL	0.26	231	1	1	
35	W/B MARK FOR ELASTIC ATC	HEL	0.45	133	2		
36	ELASTIC INSERT TO W/B	SNL	0.65	92	3	3	MAGIC THREAD USE
37	BODY ALINE FOR W/B ATC	HEL	0.76	375	1		
38	W/B CLOSE TOP STC	KSP	0.50	120	2	2	
39	W/B TACK FOR SAFETY	SNL	0.27	222	1	1	
40	W/B THREAD CUT & BODY ALINE	HEL	0.30	200	2		COMBIND
41	BODY TURN & STIKER REMOVE	HEL	0.30	200	1		
42	INSEAM CLOSE	SOL	0.56	107	2	2	NEED HELP SIDE SEAM CLOSE
43	CARE LABEL ATC	SNL	0.30	200	1	1	
44	BODY TURN FOR BARTACK	HEL	0.18	333	1		
45	BARTACK (9 POINTS)	BTK		#DIV/0!			BARTACK OPERATOR
46	LOOP MARK & CUT WITH MATCH	HEL	0.45	133	2		
47	LOOP TACK 1X10	SNL	0.70	86	2	2	
48	BOTTOM HEM ROLLING	SNL	0.50	120	2	2	
49	W/B FALSE TACK REMOVE	HEL	0.70	86	2		COMBIND
50	FAINALY THREAD CUT & TURN	HEL	0.52	115	2		
51	BODY TURN FOR Q.C TABEL CHECK	HEL	0.16	375	1		
TOTAL SMV			18.58		76	53	
AFTER WASH SEWING							
TOTAL			18.58				

SUMMERY		SMV	ALL	TOTAL
TOTAL HEL SMV - SEWING	HEL	4.60		4.60
TOTAL MC SMV - SEWING		13.98		13.98
TOTAL HEL SMV - AFTER WASH	HEL	0.00		0.00
TOTAL MC SMV - AFTER WASH		0.00		0.00
TOTAL SMV		18.58		18.58

NB: HELPER SUPPORT FROM LINE OP.

M/C DETAILS	MANNING	M/C
SNL	33	33
3OL	4	4
SOL	10	10
KSP	2	2
CST	1	1
BTK	0	0
BHL	1	1
IRN	5	0
HEL	19	1
TOTAL OPERATOR		52
TOTAL MANPOWER	75	

BARTACK					
SL NO:	PROCESS NAME	BTK LENG	BTK QTY	UNIT SMV	PROCESS SMV
1	BODY CARRING		1	0.10	0.10
2	FRONT PKT & RISE	1/4	5	0.06	0.30
3	BK PKT	1/4	4	0.08	0.32
4	BODY CARRING		1	0.10	0.10
5					
6					
7					
TOTAL =			9		0.82

PREPARED BY IE DEPARTMENT

LC

PM

IE

3.6.4 Calculation for 5Pocket Long Pant Solid:

Here,

Allowance= 15%

Total Manpower= 75

Rating = 80%

SMV calculation:

SMV=Basic time + Allowance of basic time

Basic Time= (Observe time × Rating %) / 60

Observe Time= Total Cycle Time / Total Number of Cycle

SMV Calculation for Back Rise

$$\begin{aligned}\text{Observe Time} &= \text{Total Cycle Time} / \text{Total Number of Cycle} \\ &= (16+16+14+14+15) / 5 \\ &= 75/5 \\ &= 15\end{aligned}$$

$$\begin{aligned}\text{Basic Time} &= (\text{Observe time} \times \text{Rating \%}) / 60 \\ &= (15 \times 80\%) / 60 \\ &= 0.2\end{aligned}$$

$$\begin{aligned}\text{Now for SMV} &= \text{Basic time} + \text{Allowance of basic time} \\ &= 0.2 + (0.2 \times 15\%) \\ &= 0.26\end{aligned}$$

The help of same method can calculate other operation SMV

Here,

Total garments SMV = 18.58

Total Manpower = 75

Basic Pitch time Calculation= (Total Garments SMV / Total Manpower)

$$= (18.58 / 75)$$

$$= 0.25 \text{ minute}$$

Capacity Calculation:

$$\begin{aligned}\text{Capacity} &= 3600 / \text{operation time (Observe Time or average cycle time)} \\ &= (3600 / 15) \\ &= \mathbf{240}\end{aligned}$$

Efficiency Calculation:

$$\begin{aligned}\text{Efficiency} &= [(\text{Production per hour} \times \text{SMV}) / (60 \times \text{Manpower} \times \text{Working hour})] \times 100 \\ &= [(196 \times 18.58) / (60 \times 75 \times 1)] \times 100 \\ &= \mathbf{81 \%}\end{aligned}$$

Working Hour =10 (per 1 hour production & working hour are used to calculate efficiency)

Total SMV = 18.58

Find Efficiency= 81 %

3.7.0 IE in Finishing Section:

In a piece of clothing industry, completing division includes with piece of clothing washing, checking. Last assessment, Squeezing, pressing and so forth. Appropriate completing interaction can be worked on nature of articles of clothing and make on time request shipment.

3.7.1 Machine & Equipment used in Finishing:

- ❖ Thread sucker machine
- ❖ Thread cutter
- ❖ Hang tag gun
- ❖ Lifter
- ❖ Iron
- ❖ Metal detector
- ❖ Textile cleaning gun

3.7.2 Finishing Techniques:

- ❖ Temporary finished
- ❖ Semi-Durable finished
- ❖ Permanent finished

3.7.3 Common defect of finishing section:

- ❖ Dust & Dirt
- ❖ Solvent popping
- ❖ Edge mapping
- ❖ Adhesion problems

3.7.4 Thread Sucker machine time & action Calculation for 1 hour:

Inside cleaning time = 10 second

Outside cleaning time = 10 second

Total garments cleaning time = 20 second

20second doing clean = 1 pcs garments

1 second doing clean = $1/20$ pcs garment

60 second or 1 minute doing clean = $(1/20) \times 60$ pcs garments

= 3 pcs garments

Now 1 minute doing clean = 3 pcs garments

60 minute or 1 hour doing clean = (3×60) pcs garments

= 180 pcs garments

3.7.5 Activities of Metal detector machine:

It is doing by the buyer requirement. Metal detector machine is a machine, which is used to check the presence of metal in the whole garments.

It is doing by 1.0, 0.1, and 1.2 measurement and fully depend on buyer.

3.7.6 Application of Industrial Engineer in finishing section: Most of IE standards are utilized exclusively on the sewing floor in the article of clothing area. Comparative devices can be utilized in the cutting and completing segments as well as the completing area. In this article, I've referenced a couple of things that should be possible in the completing division without the requirement for extra exertion, thinking or expertise improvement.

Set Up Psyche of Individuals

Make an inspirational preparation or Meeting to generate new ideas assembling all representatives of the completing segment. Share the advantages of efficient and standard work.

Setting SAM For Following through with Responsibilities

Gauge SAM for completing works similarly of sewing tasks. While deciding the SAM of an errand, the Time Study technique or manufactured information (PMTS) can be utilized. Anybody can do design precisely to complete pieces of clothing and gauge completing expenses and work necessities by laying out a SAM for completing exercises.

Supplant Existing Format with another One

Inspect the ongoing completing room workstations format and track down any current defects, then, at that point, right them and make a more proficient design.

Carry out a Superior Material Dealing with Technique

Commonly the majority of the completing segment has unfortunate material dealing with methodology. There can be applied streetcar, conveyor like this gadget in completing segment.

Execute a Superior Working Technique

To begin with, See all completing jobs. Look at movements of every sort. Decrease/eliminate every single pointless movement and set a norm. Train the specialists to observe the guideline and keep up with it.

Keep up with Sensible In the middle of Between Two Workstations

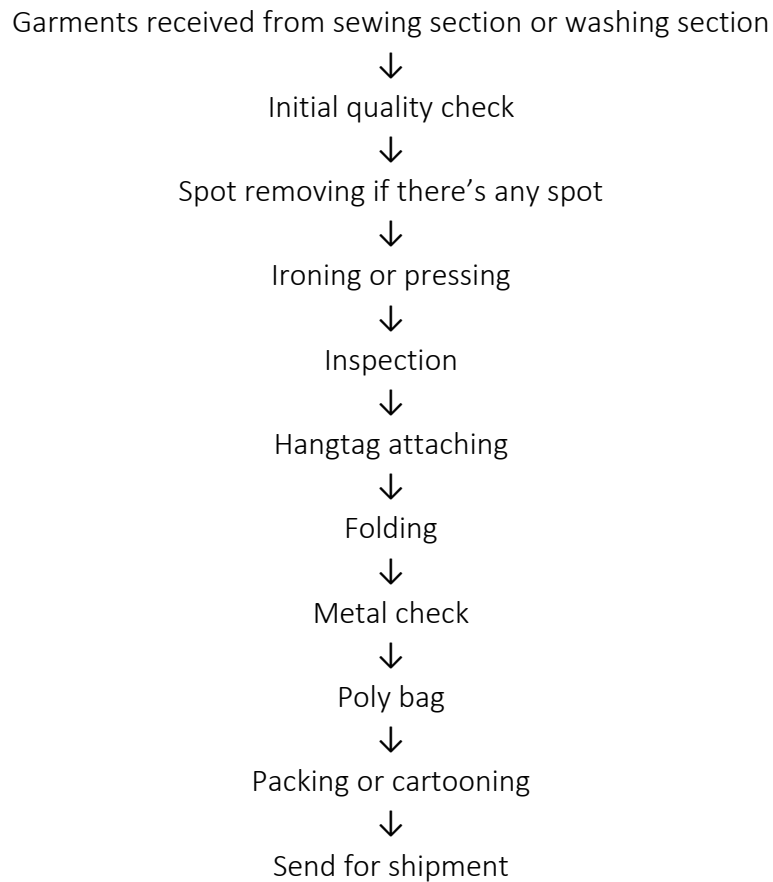
Catch completing creation information and work out WIP, set a standard WIP and keep up with it. You can deal with evening out of responsibility in each cycle.

Train the Completing Specialists

Laborers' capacities can be improved by furnishing them with task-explicit preparation.

Begin Responsibility A few configurations can be begun to record and examine information. The objective of various tasks can be set and asked the connected laborers/boss with respect to the accomplishment of the objective. Start with a solitary movement in the completing segment. Subsequent to becoming associated with the completing region, you will find a lot of thoughts for expanding completing room efficiency through the use of modern designing standards and practices

3.7.7 Process flowchart of Garments Finishing section:



3.7.8 Packing Procedure: According to buyer requirement doing packing garments. In a cartoon are staying different size of garments.

Garments size:

XS= 2 pcs

S = 3pcs

M = 2pcs

L = 2 pcs

XL =1 pcs

XXL =1 pcs

XXXL= 1 pcs

Total = 12 pcs in a one cartoon

3.7.9 Operation Breakdown of finishing section:

Total SMV= 5.80

Total Manpower= 35

Pitch time= 0.15

Bulletin No.	Style		Description		Total		Description		Total manpower	
	Style	26353D1/D2	Description	Total	100% TGT	3621	Ironer	5		
	Fabric	100% Cotton	SAM (QI)	1.76	Planned TGT	3078	Helper	26		
	Buyer	ELCORTE	SAM (IR & HP)	4.63	Planned Eff:	85%	Q.C	10		
	Style Description	Solid Fabric, Long Sleeve Shirt, wash, Standup Pack.	SAM/OP)	0.30	Working Minutes	600	OP	2		
			QI	10.00	Pcs/Manpower	88	Total	43		
			OP	2.00						
			Helper	25.5						
			Iron man	5.00	Date	19-May				
			TTL Manpower	35.0			Plan W/S	46		
			Work Station	46.0	Total SMV	5.80				

OP Seq	S/L	Section	Operation Description	Mq/ Hlp	Machine Code	S.A.M	TGT /Hrs	Man Req	Allocated MP	Plan W/S
	1	Button	Mark For Down Button Attach	H	Plain table	0.24	250	1.3	2.0	2
	2	Button	Down Button Attach	OP	1N2TIS-BA	0.30	200	1.6	2.0	2
						0.54			4.0	
	3	Thread Cut	Inside Thread Cut	H	Plain table	0.60	100	3.1	3.0	3
	4	Check	Body Inside Check	QI	Quality Table	0.60	100	3.1	3.0	3
	5	Sucking	Thread Sucking (Long SLV)	H	Sucking m/c	0.08	750	0.4	0.5	1
	6	Bundle	Body slv turn & bundling for iron	H	Plain table	0.13	462	0.7	1.0	1
	7	Iron	Body Iron	I	Iron Table	0.92	65	4.8	5.0	5
	8	Hanger	Hanger insert & button close	H	Plain table	0.46	130	2.4	2.5	3
	9	Check	Top side Qc check	QI	Quality Table	0.86	70	4.5	5.0	5
	10	Transportation	Body Carrying & Accessories Supply	H		0.12	500	0.6	0.5	1
	11	Measurement	Body Measurement check	QI	Quality Table	0.30	200	1.6	2.0	2
	12	Hang Tag	Hang Tag Make	H	Hanger Stand	0.15	400	0.8	1.0	1
	13	Hang Tag	Hang tag attach	H	Plain table	0.17	353	0.9	1.5	2
	14	Buterfly	Buterfly Attach	H	Plain table	0.15	400	0.8	1.5	2
	15	Collar Stand	Collar Stand Attach	H	Plain table	0.17	353	0.9	1.5	2
	16	Folding	Body folding (Stand-up)	H	Plain table	0.92	65	4.8	6.0	6
	17	Poly	Body poly insert & Colse	H	Plain table	0.17	353	0.9	1.0	1
						5.80			35.0	
	18	Packing	Metal Detector	H	PlainTable	0.04	1500	0.2	0.5	0.5
	19	Packing	Sizing	H	PlainTable	0.05	1200	0.3	0.5	0.5
	20	Packing	Ratiowise Check	H	PlainTable	0.04	1500	0.2	0.5	1.0
	21	Packing	Cartoon make & Numbering	H	PlainTable	0.12	500	0.6	1.0	1
	22	Packing	Body insert into cartoon & carton close	H	PlainTable	0.10	600	0.5	1.0	1
						0.35			3.5	
						6.69		35.0	38.5	46.0

Manager (IE)

Sr. GM (Operation)

CHAPTER -4: RESULT & DISCUSSION

4.1 Analysis of Absolute SMV of various item from Information 3.6.1 & 3.6.2

ITEM	TOTAL SMV
Short sleeve shirt	21.57
5 Pocket Long Pant	15.58

Description: On this pie outline, we affirmed the just of kind contraptions of common SMV which we determined monetary - 03. Here we assessment Casual Shirt, 5 Pocket long Pant. This pie outline recognize the generally speaking SMV. The generally speaking SMV of Casual Shirt 21.57 & 5 Pocket Long Pant 15.5

ITEM	TOTAL EFFIENCY%
Short Sleeve Shirt	69.6%
5 Pocket Long Pant	81%

Description: On this pie diagram, we affirmed the top notch of-a-sort object normal generally efficiency% which we determined. Here we ascertain Casual Shirt, 5 Pocket Long Pant. This pie outline shows the effectiveness %. In general efficiency% of the Casual Shirt 69.6%, 5 Pocket Long pant 81%.

CHAPTER -5: CONCLUSION

5.1 Conclusion:

With the help of gathering SMV guide and administration notice, we have finished up our task with its connected Maxcom International (BD) Ltd. way reports. This challenge makes it conceivable to be aware of result, SMV time checks out at the relating parts and their amended cycle furthermore. We calculated SMV of short sleeve shirt and 5 pocket long pant are 21.57 & 18.58. We also calculated efficiency% of short sleeve shirt and 5 pocket long pant are 69.6% & 81%.

Reference:

- (1) [https://onlinegarmentsacademy.blogspot.com/2020/07/cutting-IE.html#:~:text=An%20Industrial%20engineering%20\(IE\)%20section,of%20fabrics%20and%20fabric%20utilization](https://onlinegarmentsacademy.blogspot.com/2020/07/cutting-IE.html#:~:text=An%20Industrial%20engineering%20(IE)%20section,of%20fabrics%20and%20fabric%20utilization)
- (2) <https://www.onlineclothingstudy.com/2014/10/involvement-of-industrial-engineers-in.html>
- (3) <https://cosmatechnology.com/news/what-are-the-objectives-and-method-of-cutting-room-65>
- (4) <https://garmentsmerchandising.com/flow-chart-of-garments-cutting-section/>
- (5) <https://www.onlineapparelstudy.com/2022/02/Application-of-IE-Concepts-in-Garment-Finishing-Sections.html>

Plagiarism = 24 %