Faculty of Engineering

Department of Textile Engineering

REPORT ON

"Study on Industrial Engineering in Woven Garments Production"

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A thesis submitted in partial fulfillment of the requirements for the degree of

Bachelor of Science in Textile Engineering

Advance in Apparel Manufacturing Technology

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LETTER OF APPROVAL

May 22,2021

To

The Head,

Department of Textile Engineering

Daffodil International University

Dattapara, Ashulia, Dhaka

Subject: Approval of project report of B.Sc. in TE Program

Dear Sir

I am just writing to let you know that this thesis titled as "Study on Industrial Engineering in Woven Garments Production" have been prepared by the student bearing ID 182-23-498 and 182-23-488 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 project report activities and 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

Md. Mominur Rahman

Assistant Professor and Head (In-Charge)

Department of Textile Engineering

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DECLARATION

The thesis entitled “Study on Industrial Engineering in Woven garments production” is conducted under supervision of Md. Mominur Rahman, an Assistant Professor and Head (In-Charge) of textile engineering at textile department, (DIU). we declare that the written submission report is our own original work and best of our knowledge. This report has not been currently submitted to any candidate for any other degree or diploma.

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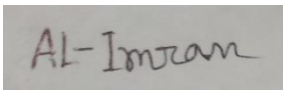
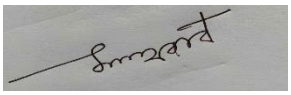
AL IMRAN	182-23-498	
Meherab Hossain Ratul	182-23-488	

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

Supervisor:

_____

Md. Mominur Rahman

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ACKNOWLEDGEMENT

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ABSTRACT

The ready-made garments (RMG) of Bangladesh has got a more preponderant facet than any other sector in terms of growth and foreign exchange earnings. This project is on "Study on Industrial Engineering in Woven garments production". This paper inaugurates the various concepts utilizing method, time, limit and production study, it is conceivable to increase productivity while diminishing wastage. Work study took a record the actual individual capacity of per worker. we have enrolled the existent cycle time to per worker for each and every worker and helper to invent the ideal number minute of worker, category of machine, particular capacity. To find out style no:1, the standard minute value (SMV)=18.91, in additional to that we have counted the target=1269 pcs, pitch time=0.44, upper control limit=0.51, lower control limit=0.37, efficiency=100%, manpower= 40, capacity= 1078 pcs, labor productivity. To find out style no:2, the standard minute value (SMV)= 17.31, furthermore, we measured the target= 1386, pitch time= 0.39, upper control limit= 0.45, lower control limit= 0.33, efficiency=100%, manpower=40, capacity= 1138 and operator productivity. This paper addressed pants dimensions' sheets for men, structure and procedure malfunction schedules, SMV estimate for each operation. Goal period calculation, command maximum, efficiency reduction, system wise capability, as we other research information methods and tools.

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CHAPTER –1: INTRODUCTION

1.1 Background of the study

Bangladesh is a developing country, now a days the industrial sector is playing a vital role in continuous developing process in this country. The textile and clothing industries are the single source of Bangladesh's rapidly developing economy. Efficiency is more essential for sales in the garments industry. There is a great need for proper machine, manpower and system consumption. Proper use of raw materials by eliminating waste can be more effective for clothing industry. Reduce lead time and wasted time. Good use of time would offer a lot of benefits to the textile industry. The team of industrial engineers will make a lot of it.

1.2 Objective of the study

The purpose of this report is specific, we are working on certain target. They are,

1. To get some answers about the correct organizational framework for quality.

2. The application of a particular response to clear or decreasing deformation.

3. The purpose behind string distortions and its fixes.

4. Designing a new quality management approach.

1.3 Importance and scope of the study

1. To know about the changed technique and performance & how the garment industry's production is working to rise.

2. Knowing about the activates of the department of industrial engineering in textile sector.

3. To understand the effect of the department of industrial engineering on development.

4. To know productivity, capacity, efficiency gained by applied method.

1.4 Limitation of the study

- Limitation of time looking for this subject.
- Limitation of primary data sources.
- Input and output problem.
- change the style and arrangement

CHAPTER-2: LITERATURE REVIEW

2.1 Industrial Engineering

The main function of this department is to re-Engineering the garment of the sampling phase so that it is a friendly production for production also contributes to increase the Productivity through the layout of the machine, the study of time and movement. In the sewn products industries, we must continually make sure we remain competitive and profitable while also seeking to improve our personal standard of living and community. Productivity improvements can be achieved.

2.2 History of industrial engineering

The history of industrial production and engineering encompasses a large period in the evolution of engineering and technology. This article presents the history of industrial production and engineering thanks to the contributions of Stalwarts. Industrial production and engineering played an important role in the society's advanced advancement and economic growth over the centuries. Although the evolution of production and industrial engineering is a slow process over the years, it has accelerated from the era of the pre-industrial revolution in England from 1730. The mechanization of production processes during the Industrial Revolution is a historic event for its growth. The formal start of industrial production and engineering can be associated with the pioneering work of F.W. Taylor. In the 20th century, the focus was on the optimization of resources. With the advent of Industry 4.0 in the 21st century, industrial engineering uses the best use of digitization and automation.

2.3 What does an industrial engineer do?

Industrial engineers generally perform the following:

- Examine production schedules, engineering specifications, process flows and other information to understand manufacturing and service methods
- Determine the manufacture of parts or products or provide services with maximum efficiency
- Develop management control systems to make financial planning and cost analysis more efficient
- Save quality control procedures to solve production issues or minimize costs
- Work with customers and management to develop design and production standards
- Design control systems to coordinate production activities and planning to ensure that products meet quality standards
- Proceed to customers of product specifications, purchasing providers, manufacturing capabilities and project status personnel

2.4 Activities of industrial engineering

The industrial engineer is involved in activities such as:

- The planning, design and implementation of process and manufacturing equipment.
- The design and management of a quality improvement and control program.
- The development and implementation of performance measurement standards.
- The planning and execution of a program to improve productivity.
- Management and control of a new technology development program.
- The design and operation of a hardware planning system.
- The development of mathematical models for system analysis.

2.5 Objectives of industrial engineering

1. Stimulate efficiency.

2. Improvement of the method by reducing movement.

3. Reduce process work (WIP) and remove the bottleneck.

4. Increase the performance of the service.

5. Offset of the man-machine report.

6. Improving price, waste and rejection processes MINIMIZE waste and defects.

7. Fill out the main performance indicator of the main objective (KPI).

8. Secure the workplace and the environment.

9. Planning and initiation of production.

2.6 Function of an industrial engineer

Industrial engineering typically many roles that help manufacturing and service operations at Increase the efficiency, safety and health of workers. Industrial engineering functions can be organized in different ways of meeting the needs of a business. The main group that includes the profile of their participation is:

1. Measure of work.

2. Preparation of installations and inventory management.

3. Regulation of statistical accuracy.

4. Planning and production management.

5. Analyze processes and simulation machine.

6. Human capital.

7. Health on work.

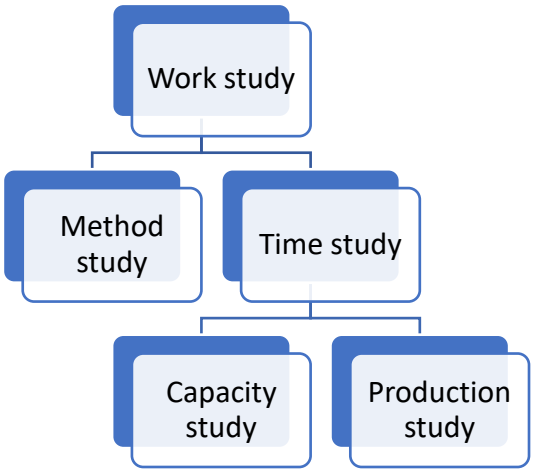
8. Engineering facilities.

2.7 Steps of Work Study:

The work study is the main part of industrial engineering. Work study divided into two parts

1. Method study

2. Time study



2.8 Calculation types of industrial engineering

The industrial engineer is the key to a manufacturing industry. They always use a certain technique to improve the organization and these techniques are as follows.

1.Time study: This is a tool used for setting up a regular time for work or operation.

2. Study of the method: after a careful examination of the work, to establish a standard of execution of a work or activity and establish the architecture of production facilities to provide a uniform Flow of material without rear tracking.

3. Movement economy: This is the approach used to optimize manual production work and Reduce the exhaustion and repetitive movements of the worker. This method is the same as the study Processes, but movements are observed in depth here.

4. Value Analysis: This is the technique in which the production process is studied and then Non-value-added duration, unimed procedures and unnecessary production costs are reduced.

5. Production, planning and control: the preparation of resources such as men, materials and the machine in development requires this technique. Appropriate planning and follow-up of manufacturing operations to achieve the quantity and quality required.

6. Work Study: Work Study Combo of time Study and Method Study.

(Work study = time study + study of the method)

7. Inventory control: this is the approach used to balance the inventory because we know that the excess inventory is waste and a company receives many benefits by managing stocks, such as improved efficiency, productivity, quality and free cash.

8. Operational Research Technique: Operational Research is the problem methodology resolution and decision making. The different techniques used for this technique are LPP, the simulation Models, network analysis.

9. Ergonomics: Human engineering is also called ergonomics. With regard to ergonomics, Any new improvement of the workstation or the office should be accomplished.

10. Employment Assessment: This is a strategy in which the good work or the right work must be attributed to the right operator according to the competence of the operator. Employment assessment helps to improve the labor productivity and increase the rate of production.

11. Material handling analysis: In order to obtain better production and efficiency, the least of the moment of material is required. The analysis of material manipulation prevents excessive movement of the Equipment.

2.9 IE Job profile

It is barely for a few years that the market for an industrial engineer had increased several times. The explanation is that an industrial engineer can do a lot to improve the efficiency of society. But the new student of the Educational Institute has obtained a minimal knowledge of an industrialist job profile of the engineer. At the factory, full work is mastered by working. There is a range of instrument and techniques used by industrial engineers to produce an effective product.

1. Awareness of several sewing production systems.

2. Knowledge of all types of sewing machines whose needs of the company need.

3. Time study (cycle time)

4. Analysis of the movements of the operation.

5. Decompose operation.

6. Preparation of the OB

7. Calculation of SAM

8. Configured line

9. Estimation of production of a line

10. Work sampling

11. Method study (sewing movements of an operation)

12. M / C layout and layout.

13. WIP control

14. Capacity study

15. Balancing the line

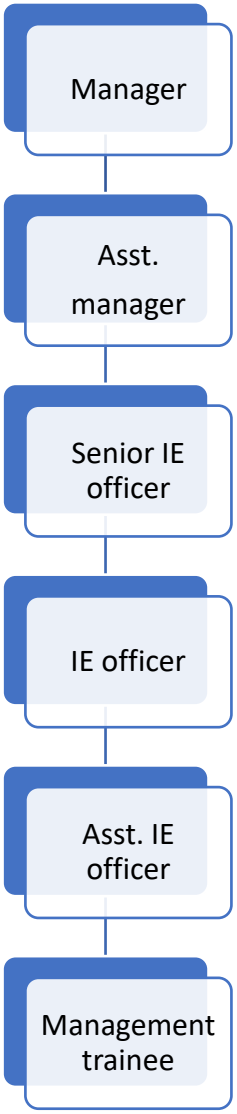
16. Performance Note

17. Cost estimate of garment

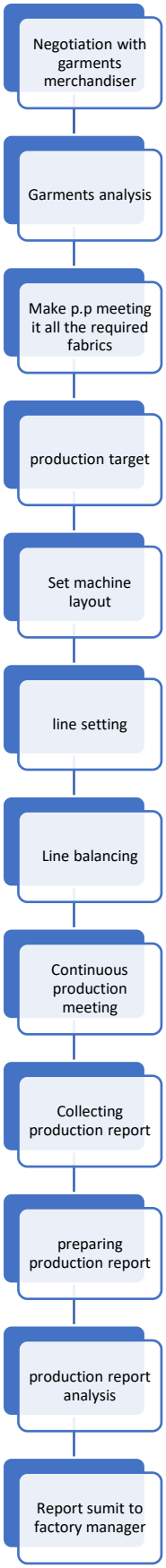
18. Calculation thread consumption

19. Incentive schemes.

2.10 Organogram of IE department



2.11 Process flow chart of Industrial Engineering



2.12 Industrial Engineering Tools

1. Lean manufacture.

2.5s.

3. JIT (just in time).

4. Kanban.

5. Kaizen.

2.12.1 Lean Manufacturing

Lean production is a systematic setting for disposal, without compromising efficiency, from waste of a production system or a flow of value. The value flow includes all sources of operation and knowledge that occurs between the producer of raw materials and the client possession. Lean making when it is well done can have a major effect on the bottom line, like toyota showed that it is "The Toyota Way" operation model of the 1930s. The lean principles aim to recognize the waste present in almost all organizations and if possible, minimize or fully eradicate. The estimated acronym shows the 8 forms of waste that should be targeted by manufacturer skinny.

1. Defects: Retravailler / Rescue and waste will contribute. It is without a doubt the most expensive of waste, especially if the consumer receives a defective product.

2. Overproduction: it produces more items than requested, possibly create an inventory lack and waste hours of work that can be used somewhere.

3. Pending: These are many forms. The most remarkable, can be a line closure when waiting for replacement of parts or equipment. Finally, when an employee has to wait for a computer to be treated before it can take the next step in the process, there is being treatment is being processed, there is a pending process that takes place.

4.Not to use peoples' talents: it is a waste of their talents and when it comes to innovation, it could return a manufacturer. This could also contribute to the loss of skilled workers who have discovered that their skills could be better used elsewhere.

5. Transport: It is carried out in the manufacturing process, from the supply chain to the distribution of goods and within the particular area of production.

6. Inventory: There are five main categories: finished products, substructures, raw parts, office supplies and repairs, maintenance and repair and service (MRO).

7. Movement: Flex, Scope, Height and Walk Included. Easy to use as tools between

The workstation will result in a lot of unnecessary movement.

8. Excess processing: occurs when times are spent on goods that do not affect the functionality of the components. For example, it is not essential and unnecessary to paint a part that is not seen if it still works properly without paint.

2.12.2 5S.

5S is a structured method for the management of the work station based on the concept of improvement. Working conditions, which leads to better goods. 5S is the most popular term, which has it evolved and developed over time, such as lean manufacturing in Japan. This method uses five prayers, each starting with an S, to find waste forms to eliminate.

The five ss are the following:

1. Sort: Remove any disaster or disorder at work by eliminating something that is not necessary for a specific job.

2. Set in order: Organize everything that is behind organizing and marking carefully. use components and equipment.

3. SHINE: Keep an environment free of dust, dirt and other problems.

4. Standardize: To ensure optimal productivity, follow uniform procedures in all shifts.

5. Hold: The processes must be placed in place to make sure that the other 4 are still pursued and it is not a one-time project.

Examples 5s

1. Sort: Fields have been sorted and redundant fields removed.

2. Define in order: On the basis of stakeholder feedback, the fields have been configured in the command.

3. Shine: The team shone in creating a Microsoft Access database to avoid duplication of

the entrees.

4. Normalize: Preserving and making it a prototype, the tablet was standardized.

5. Sustain: Microsoft Access (for Duplication Data Management and Data Format) and Microsoft Excel the models have built a freestanding frame (to control the spreadsheet size and command).

2.11.3 Jit (just in time)

Just in time is the management strategy that monitors inventory flows to and from a company, reduce inventory levels and increase the performance of the production process. The strategy is to organize. Command of raw materials so that the products are only requested for production when necessary.

Advantage of Jit.

1. Avoid excess production.
2. Reduced waiting times and traffic costs.
3. Saving resources through improved manufacturing processes.
4. Capital reductions that tied.
5. Dispense from the obligation of inventory.
6. Product defects decreased.

2.12.4 Kanban.

Kanban is a planning framework of lean production. Kanban is the term "Bill Board" means

and was invented for the first time and employed by the Industrial Engineer Taiichi Ohno to increase productivity

In Toyota.

2.12.4.1 The advantages of Kanban

1. Fleeting.
2. Improvement of performance.
3. A team with more emphasis.
4. Delete excess production.
5. Best control inventories.
6. Licer / seamless workflow.

2.12.5 Kaizen

Kaizen is a word of improvement or continuous improvement. Two Japanese terms have Described Kaizen: Kai, which means "Shift" and Z ", which means" good ". In the 1980s, Toyota launched Japanese philosophy for the first time and was embraced by thousands of companies around the world since. This minor transition promotes a culture of change that Improve quality, productivity and profitability gradually.

2.12.5.1 Benefits Kaizen

1. Objectives Dignified: Kaizen is not only useful for the organization as a means of change. This too helps workers, customers and the entire society.

2. Improved coordination: improved coordination is one of the main advantages. Kaizen is a platform led by a quality management team.

3. Kaizen develops leadership expertise: Each Kaizen team needs a team leadership. The team leader organizes and directs the execution of the Kaizen team.

4.Improvement of efficiency: Improved quality is a great advantage of Kaizen. Kaizen Improvements improve the efficiency of the service.

5. Waste Reduction: Kaizen has eliminated the waste process waste. It's another big benefit of Kaizen. The responsibility of everyone from Kaizen.

6. Better security: Improving the workplace safety is a corporate company Kaizen. When companies adopt ideas that clean and organize workspace, security is improved.

2.13 Work study

The measurement approach is a common term for the strategies used in all their contexts, in particular in the analysis of the methodology and the work calculation, which actively lead to the examination of all variables that affect the strategic and operational objectives of the circumstance being examined in order to progress.

2.13.1 Father Work Study

The founder of the work study is FW (Frédéric Winslow), a tailor named Science father of management. Does the United States need many weapons shortly during the second world war?

Mr. FW TAILOR then applied the principle of the study to produce a result in a short time and many weapons.

2.13.2 Technical of the work study

There are two work study techniques;

1. Study of the method: the technique is a methodology study that studies that systematically collects and analyzes current and potential work processes to create and apply methods are simpler and more efficient and minimize costs.

2. Work measure: The work assessment is the use of the technique designed to define the time required for a new qualified worker to complement a particular task at a given level of performance.

2.13.3 Steps involved in the work study

The work study is a systematic review of the methods of carrying out activities such as resources can be used effectively and performance standards are developed.

A complete work analysis consists of eight phases. They are,

1.Select: The duty to be investigated.

2. Register: by extracting information from the device and through constant supervision.

3. Examine: Through the question, the objective, the process and the work design.

4. Develop: Modern techniques focused on the contribution of the Parties involved.

5. Evaluate: The results of reasonable options.

6. Installation: Last approaches and preparation.

7. Maintain: Develop monitoring method.

8. Define: there are alternative ideas and results.

2.13.4 Personal qualities of the work study engineer.

A work study engineer must be honest, polite, expert, intelligent, confident, personal dignity. TO the work man of work must have the following essential qualities.

1. Sincerity and honesty: The participant of the workplace must be genuine, truthful and trust and respect for those with whom he will work.

2. Enthusiasm: He or she will only take care of the job. Accept the value of whatever he or she does to people around it.

3. Interest and sympathy with people: the individual must be able to interact with people at all levels are essential to participate in their opinions and understanding the reasons behind your behavior.

4. TACT: The reason why people face them are because they understand and do not want their feelings to be harmed by insensitive or non-deep terms, although they are rational.

5. Good appearance: This inspires confidence among those for those who work. The individual he must be safe, clean and effective.

6. Confidence in itself: It can only be done with adequate preparation and work experience. The employee must be able to face administration, bosses and union leaders.

2.13.5 Function of study engineering work.

1. Study of the method: area configuration, tools, fixing machinery, analysis of elements, productive and division of ineffective time, management and movement, contingency, improvement of work, improvement of work efficiency, better methods of work, reduction of work time and larger needles.

2. work measurement: cycle check, observed time, rating, BMV, SMV, production study, study of time, standard time setting and sampling.

3. General sewing data (GSD): process research and production within GSD time by methodology study to eliminate unimportant task.

4. Breakdown and design: breakdown of the operation, time setting, process series, tight and loose flow, design or no opportunity, selection of operatives and staff.

5. Consumption: all steps such as threads, ropes, tapestries, belts, links, thicels, Velcro, elastic, z-bands, fabric, etc.

6. Calculation: Feeding time, created time, efficiency, AQL, OQL, precision and confidence level, Cost Rupture Point, Proportion, Low Range, Time, Effective Time, BTP, HPT, LPT, BMV, SMV, speed. Time of use, customers, capacity and customer service.

2.13.6 General function

1. SMV & PRODUCTION Plan: The manufacturing plant is calculated by SMV and revised.

2. Report: SMV estimates and quality updates, production, capacity, output report, reward calculate, will benefit computing and administration important details as necessary. Compare, plant and row capabilities. Manufacture of the date plant.

3. Maintain history: normal productivity analysis data, goods, reception, effectiveness, quality, progress, objective and objective.

4. Data centralization: Command and central planning through groups of all information collection.

5. Save materials: Defense against wire abuse that can be calculated as threads.

Lock, chain and ribbon, like, button buttonhole and blocker, capture, extractor and zipper are also included in all categories.

6. Multi Experience: Simple level of acceptability and consistency, regular repairs, cutting, Specimen, markers, survey process and shipping.

7. Expert reserved: to support another as a restricted specialist, if applicable.

8. Motivation: Coaching, employment, infrastructure, optimization of life and technology.

2.13.7 Steps involved

1. Evaluate your demands, evaluate each style.

2. The Fashion Evaluation focuses on:

- Product quality of the production plant.

- Quantity of the requested workforce.

- Machinery offered.

- Density to remain manufactured.

- 'Expedited driving period.

3. Experiments and adequate inspection are used to establish depending on the sample.

4. It seems that the technicians of the clothing seem to be:

- Quantity, difficulty and series of operations.

- Machinery needed

- Indicate greater and skill

5. Breakdown on the procedure: The work is divided into operational activities for each style. The

The breakdown is a list of sequences of all assemblies of activities of a garment for each aesthetics.

6. Technical skill of clothing Each procedure to improve its effectiveness and quality or to develop

Methods to ensure the efficiency of accurate operators and reliable articles.

2.13.8 Standard time and destination configuration

Most organizations should not use conventional time systems; Your goals are based on the assumption and practice. Configure standard hours and develop adequate manufacturing processes is essential to improve efficiency. This must be understood by any organization that wants succeed in the future. That graph shows directly the advantages to plant productivity if it is normal. times and procedures have been well.

2.13.9 Method analysis

Most organizations use bad approaches, workers have the right way to do their jobs, settle in the amount of sewing, packaging and unpacking materials, mixes unnecessary and additional management. Bursts, these gestures lead to the time it is taken to deliver and can be removed. A process the analysis can be done in a market or even based on any type of production process. Suitable approaches analysis will increase efficiency at a minimum of 15%.

2.13.10 Workplace design

Administration is required to be a large number of computers that are practicable in installation, limiting the space for new strategies. There is always enough capacity between the teams. TO the successful design of the workplace eliminates excessive movements and fatigue that dramatically improved the performance of the driver. Take a look at the photo and reflect on productivity with that you can operate 8 hours per day.

2.13.11 organization segment

Many manufacturing facilities operate and without a number scheduled or specified Steps. This is a vital step in the development of textiles, and an error or negligence will result in significant losses in time, material and performance for the manufacturer later.

2.13.12 Work aids and attachment

There is an inadequate use of labor support and accessories. There are many modern and attachments and affordable directories that are constantly created, which are essential for maintain a process of performance improvement. There are many modern and affordable. Attachments and directories that are constantly created, which are essential to maintain a quality improvement program.

2.13.13 Observation of the operator

Half of the companies studied were no way to meet expectations, so they do not know where they are. Nor is there a precise calculation, but its performance is well thought out, and it is not of course, if you would be able to compete until you have better supervision and strategies for quality improvement in potential.

2.13.14 Cycle checks

Could be achieved by comparatively novice workers, a basic methodology addressed to evaluate operator's ability against real production, which is a significant aid to improve factory efficiencies. No organization conducts cycle controls. The following table shows the style contrast 1. and style 2 (without department studies in different fields of clothing production. The following figure defines the manufacturers.

2.14 Study method for clothing operation

1. Selection of work: many roles or function separated from most of the activates. First step is to choose the work that will provide you with the highest yields for the time you spend.

2. Record the facts: Before eliminating the process or technique, enough information with respect to the current system, it must be collected. This would be to make sure that the project is conserved during an impartial history.

3. Critically examine the facts: it is an essential step in the art: the details collected it is verified and by section of the task is carefully evaluated to decide whether the following sections they include:

- Deleted completely.

- Combine with some other work element.

- Linear incentive.

- Modified to minimize your work material.

4. Develop the new method: Update and create a new process, structure or protocol, the chosen solution is used. Test executions may be required to evaluate viability. It is safer if necessary to carry out those experiments in a location outside the office.

5. Install the method: the decision must be made before the installation of the new technique:

- Products are requested.

- Advance of the improvement of the manufacturing process.

- The scope of mobilization must be determined.

- Implementation of the new protocol for recording.

- Maintain current coherence and research requirements.

6. Maintenance of the method: after the implementation of a system, the transition seems to be slow down due to slight modifications of technicians or managers. For the identification of any changes, a linear programming model (work addresses document) is required.

2.15 Study of time for clothing operations

2.15.1 Definition of time study

Time work is a method of work calculation, to document the times while performing a certain task or component, also for the evaluation of the date to obtain the time required for do it at any output rate for a worker.

2.15.2 Time study techniques.

1. Evaluate the efficiency of the staff.

2. Understand the work process.

3. The worker should not be bothered by time studies.

4. If the operator is told that occasionally he could investigate.

5. Enter any description with a marker in research documents as it cannot be deleted.

Time study tools

- A stop watch.

- Time study format.

- A pen or pencil.

- Clipboard

- Eraser

- Calculation

Production target

-The estimated volume of work

- The average user.

- For full preparation. © Daffodil International University 24 | Page

- Use the best type of work.

- A regular day of the day.

A significant factor to achieve a production objective is that all will reduce the capital in compliance with your own experience. More than any operation with less capacity makes more income. An objective for production establishes critical areas for estimation. Technology is a work goal of ordinary people with peaks are doing more, while those under the medium have less.

SAM: Standard assigned minute

Also known as SMV: Standard Minute Value

Time required for an activity, fully qualified average output if a correct approach is used and the efficiency reaches an appropriate standard.

Grading the time study

The time research agent analyzes the results, since each worker is different. The actual result is linked. at a beginning of 100%. The objectives of the process of three things.

Competition: sharpness and worker synchronization.

Effort: How complicated is the worker and during the survey?

2.15.3 How to carry out the time study?

A cycle includes the processing of the material, the arrangement and the arrangement of parts, seams, clamping. ropes and building. Take the original activity in separate components based on the action pattern with periods analysis format. For example, work components can be in action 'Collar Run Stith'

- Collect the first clipping board,

- Sew the second sewing collar.

- Turn the collar to sew the third seam.

- Monitoring of employment and elimination and

- The following pending parts.

Step 1: Preparation

- Prepared with paperwork, such as work time design, automated stop watch and pencil.

- It will choose the research activity of time.

- Tell the user who needs time to execute the operation.

- Evaluate the activity closely and separate it into pieces.

Step 2: Time capture: Now register the amount required for the supplier to complete each time of the operation cycle. The tracking suit is expected to be seized. Also, by successive 5 operation cycle, get component time. When the collection data, perusived, the STOP see mostly in note and then determine the duration of the appearance.

Step 3: Calculation of Basic Time: The time required for each factor with the five cycles is set of reading (R) last deduction of literacy of simple reading. For each part, summarize the time of five cycles. Remember, no cycle would be 4 when you delete any reading. Average component times are measured. It is called simple time this average time.

Step 4: Standard time calculation:

You must divide it by an efficiency rating of the workers to translate a simple time to the standard. Here, for example, a 100 percent rating was taken. Now it has incorporated supplies of the system, exhaustion and personal situation, etc. Connect only the equipment assignment to certain items when the machine works and personal specifications and personal specifications are added to any item. We must have predetermined time in seconds for any function. Abstract all the time simple and transform the seconds in minutes. It's called SAM minutes.

2.15.4 Steps in the Time Study

1. He chose the correct work process.

2. Have a worker's best work approach.

3. The manufacturer's time for the best operating process.

4. Evaluate the potential of workers and the initiative.

5. To enable periods that the worker is not sewing the device, apply regular work

Assignments

6. Allow the expected user period foreseen 100% (estimated).

Work measurement related formula:

Standard minutes value (SMV) = Observed time*rating +15% (Allowance)

Daily Target = $\frac{Manpower*10(daily\ working\ hours)*60*Efficiency}{SMV}$

Efficiency (%) =$\frac{Output*100}{Input}$ [Output = SMV*pro. Quantity]

Individual worker target/Hour = 60 *Wanted Efficiency/ SMV

2.15.5 Design of workplace

The design involves the distribution (sequencing) for the product to the real worker of the row by taking into account the general knowledge of the worker, the total experience of the machinery and the forms of the machine. The physical structure that allows to manufacture at least the merchandise at least the unit cost in the fastest possible way is fine.

Development of processes.

Layout procedure

1st Step:

1. The person involved with the design.

2. APM

3. Chief of execution of tasks.

4. Person of work analysis.

2nd Step:

1. Choose a line.

2. To select style.

3. Confirm the entire operator.

3rd Step:

1. MAX SMV for the calculation.

2. Choose between and computer number.

3. Average approximate SMV / operator to be determined.

4. To choose the best operator according to the quality of the correct procedure.

5. Installing the machine as needed.

6. The process must be in the course of the future.

Profit of the design:

1. The distribution / work of the mechanism is very close.

2. In general, there is no unusual way of neck on the line.

3. There will be no idle worker.

4. You can reliably meet the quality level of the buyer.

5. Within so little time, you can hit the maximum lens.

2.15.6 Line balance

The line balance is described as the arrangement of systematic machinery or task assignments and sewing lines to help ensure a constant output and minimize inactive time. In the textile industry, the balance of the line is classified according to the style and design of sewing machinery. The structure of the line of the sewing machine is determined by what type of clothing do.

Importance of balancing line

1. The line balance helps capture the modern style machine.

2. It is better for each operator to delegate these activities.

3. The distribution of products in the negotiated quality for the expenses of the list is possible in the correct time.

4. The strong line balance increases the output rate.

5. The proper line balance can guarantee the benefit of the factory.

6. Eliminates failures with the final product.

7. The appropriate line balance ensured that the negotiated standard occurred optimally.

2.15.7 Capacity Study

When we do an operator capacity analysis, we calculate your efficiency if you are always in the same rate and uses the same approach as the study. At the conclusion of the study, we can suppose that perhaps the user can be a worker of 120%, or what is the degree of success the study it implies.

What else do they say for talent precisely? Well, that is equivalent to the same as the ability. This ensures that the operator can reach the efficiency of the study.

2.15.8 Breakdown of the operation

The breakdown is a collection of items for the contents of a job. Any piece and a variety of the activities are made of clothes. Breakdown means that full clothes are found behind the other in according to the system process for the entire procedure. It is important to write in addition to each method the approximate SMV and the shape of the machine.

Transaction breakdown procedure

1. The leader of a floor area, technical and research squad administrator should sit around breaking off.

2. The technician cuts the garments to bits and eliminates the items one by one.

3. The SMV of this activity is then increased by the work assessment officer and the head of the floor section.

4. Once the whole process is complete, it must recapitulate all SMV processes and the SUM is named SMV as the corresponding clothing.

Benefit of the breakdown

1. I would see all clothing activities at the same time.

2. You can predict the problems of a crucial activity.

3. You will find simple, easy and tedious things to dispose.

4. Easy to choose the correct operator.

5. You can recognize the volume styles or equipment that produce the necessary fabric.

6. It may be aware of the consistency of the buyer's standard.

2.15.9 Bottleneck

The tallest narrow section of a bottle is considered an obstacle, a neck, which corresponds to a wide part of the bottle and a narrow part of the neck. It is a figurative scenario that obstructs manufacturing. In a manufacturing market, manufacturing is interrupted by natural production. It flows, this is a drastic point. Bottleneck in a manufacturing industry means loss of output and financial losses, for example, with the slightest manufacturing capacity.

1.bottlineck before the entry online / group

1. MCD / Store Inaccessible problem.

2. The problem of source delays.

3. Inconsistency / error of the problematic series.

4. Poor production of problem.

5. Question of trends.

6. Question of content

7. Unreliable machine.

2. Online bottleneck

1. The choice of the worker is false.

2. Failure work Workflow / Work chain

3. Distribution of the non-balance factor.

4. Failure for staff.

5. Absenteeism in jobs.

6 Failures / out of control of the unit.

7. Lack of delivery.

8. Non-serial staff materials.

9. Color road.

10. The question of consistency.

11. If someone gets sick. © Daffodil International University 35 | Page

Difference of bottleneck

1. When performing the cycle verification: the measurement method is very simple and precise as well as the best technical means of location, the bottle of a diagram made of the results of the cycle inspection. The intense monitoring time position that an operator needs is the bottle point that is above HPT line even if the BPT line.

2. When verifying the counter machine: when testing the counter unit, where even the output was impoverished, it is easy to discover the boot and the stage. This method can be done per hour or within an early amount of time.

3. When observing the collection of supply: the region or position in which the distribution stack is detected is the bottle point or the area. Most workers receive a pile of food, so next to it and the opposite of the operator can rest and look like a bottleneck.

4. When observing the serial number of problems supplied: both operators generally do their work similarly to the series / number of methods of methods, and if someone or any worker considers that now the little ones the serial number of execution problems may not vary fairly from another operator, therefore, it is established bottleneck point.

Method of removal of bottlenecks

1. Timely programming of preproduction meetings.

2. Production costs.

3. Have a structure before feedback.

4. Join that schematic sheet on time for repairs.

5. Check the materials and accessories before emitting.

6. Pattern test in row before the problem.

7. Choose the appropriate operator to do the correct work.

8. Assign the assignment according to the generated standard value.

9. Try to reduce overload of the excess task of the operator / find energy.

10. Reduction of the time / task of inadequate development.

11. Establish a better system instead of bad method by reviewing the method.

12. Keep the series of jobs.

13. Maintain action over time. © Daffodil International University 36 | Page

14. Can not the goods be rejected?

15. The demand must be provided after the inspection.

16. Discrepancy should not be communicated.

17. If the quality defect material is not transmitted.

CHAPTER -3: METHODOLOGY

3.1. Data collection

We collect our experience data in a different section of a woven garment plant. Frist we collect data from the Industrial Engineering section, then we collect data from Merchandising section and sampling section. We also collect data from the line where we work our research. And we obtain information from the production manager.

3.2 Product Information

Style 1

Buyer: K.G.S

LINE: 302

STYLE: E-8127

SMV: 18.91

TGT: 105

DATE: 9-May-21

Style 2

Buyer: SYNERGY

Line: 304

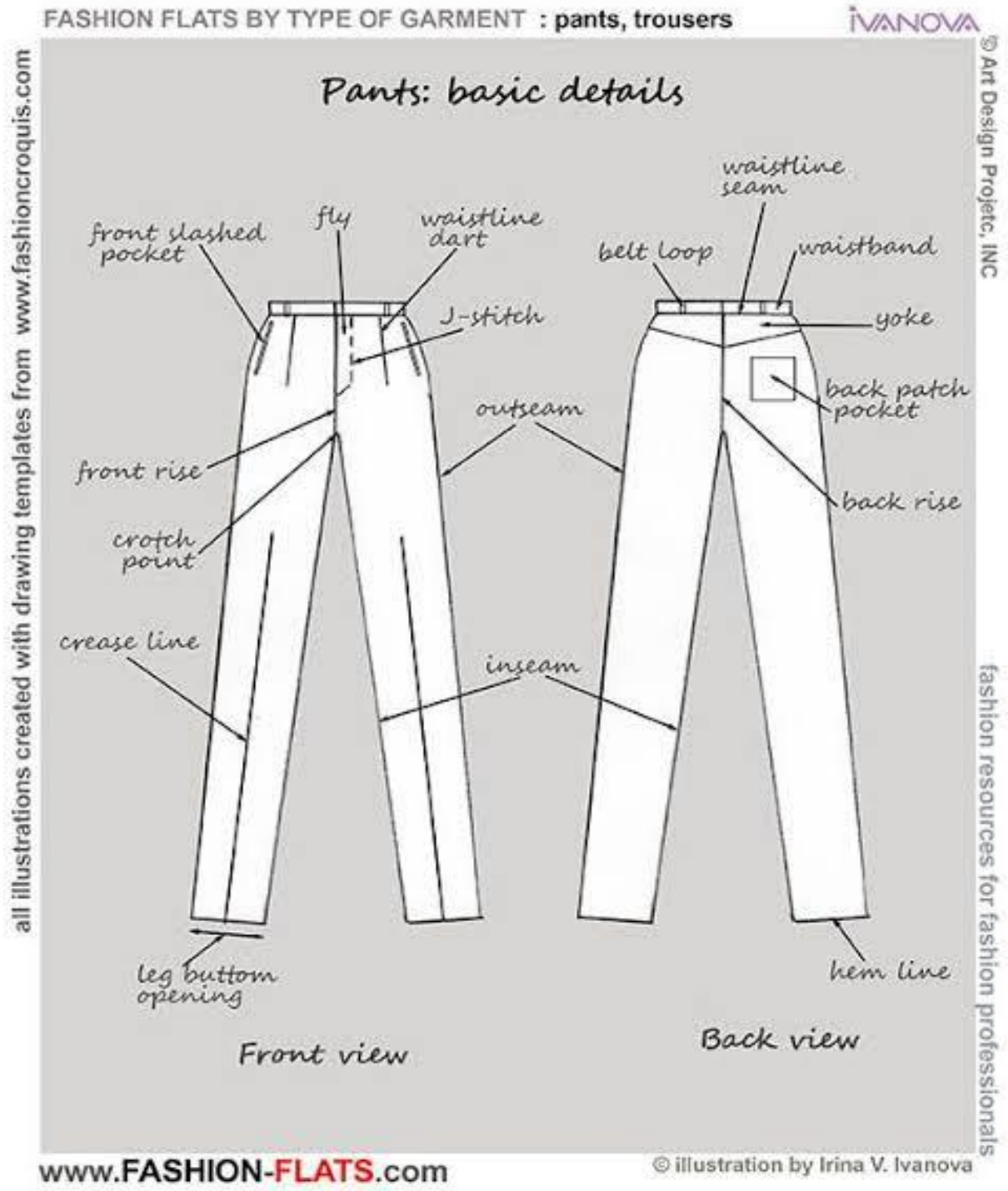
Style: JEANS-5

SMV: 17.31

TGT: 107

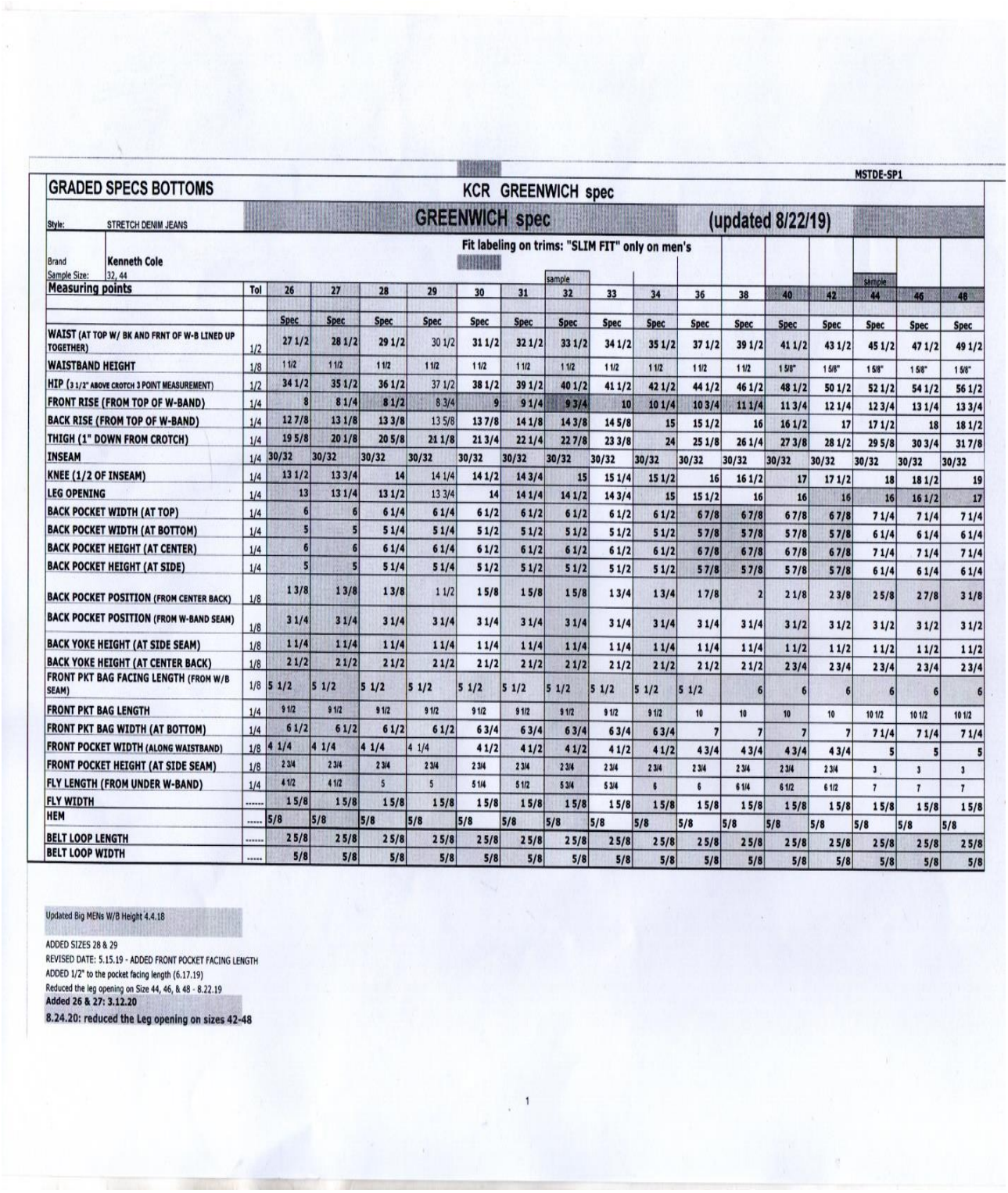
Date: 9-May-21

3.3 Product Sketch



3.4 Measurement Sheet

3.4.1 Measurement Sheet No 1



MSTDE-SP1

GRADED SPECS BOTTOMS — **KCR GREENWICH spec**

Style: STRETCH DENIM JEANS — **GREENWICH spec** — **(updated 8/22/19)**

Fit labeling on trims: "SLIM FIT" only on men's

Brand: Kenneth Cole

Sample Size: 32, 44

Measuring points	Tol	26	27	28	29	30	31	32 sample	33	34	36	38	40	42	44 sample	46	48
		Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec	Spec
WAIST (AT TOP W/ BK AND FRNT OF W-B LINED UP TOGETHER)	1/2	27 1/2	28 1/2	29 1/2	30 1/2	31 1/2	32 1/2	33 1/2	34 1/2	35 1/2	37 1/2	39 1/2	41 1/2	43 1/2	45 1/2	47 1/2	49 1/2
WAISTBAND HEIGHT	1/8	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 5/8"	1 5/8"	1 5/8"	1 5/8"	1 5/8"
HIP (3 1/2" ABOVE CROTCH 3 POINT MEASUREMENT)	1/2	34 1/2	35 1/2	36 1/2	37 1/2	38 1/2	39 1/2	40 1/2	41 1/2	42 1/2	44 1/2	46 1/2	48 1/2	50 1/2	52 1/2	54 1/2	56 1/2
FRONT RISE (FROM TOP OF W-BAND)	1/4	8	8 1/4	8 1/2	8 3/4	9	9 1/4	9 3/4	10	10 1/4	10 3/4	11 1/4	11 3/4	12 1/4	12 3/4	13 1/4	13 3/4
BACK RISE (FROM TOP OF W-BAND)	1/4	12 7/8	13 1/8	13 3/8	13 5/8	13 7/8	14 1/8	14 3/8	14 5/8	15	15 1/2	16	16 1/2	17	17 1/2	18	18 1/2
THIGH (1" DOWN FROM CROTCH)	1/4	19 5/8	20 1/8	20 5/8	21 1/8	21 3/4	22 1/4	22 7/8	23 3/8	24	25 1/8	26 1/4	27 3/8	28 1/2	29 5/8	30 3/4	31 7/8
INSEAM	1/4	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32	30/32
KNEE (1/2 OF INSEAM)	1/4	13 1/2	13 3/4	14	14 1/4	14 1/2	14 3/4	15	15 1/4	15 1/2	16	16 1/2	17	17 1/2	18	18 1/2	19
LEG OPENING	1/4	13	13 1/4	13 1/2	13 3/4	14	14 1/4	14 1/2	14 3/4	15	15 1/2	16	16	16	16	16 1/2	17
BACK POCKET WIDTH (AT TOP)	1/4	6	6	6 1/4	6 1/4	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 7/8	6 7/8	6 7/8	6 7/8	7 1/4	7 1/4	7 1/4
BACK POCKET WIDTH (AT BOTTOM)	1/4	5	5	5 1/4	5 1/4	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 7/8	5 7/8	5 7/8	5 7/8	6 1/4	6 1/4	6 1/4
BACK POCKET HEIGHT (AT CENTER)	1/4	6	6	6 1/4	6 1/4	6 1/2	6 1/2	6 1/2	6 1/2	6 1/2	6 7/8	6 7/8	6 7/8	6 7/8	7 1/4	7 1/4	7 1/4
BACK POCKET HEIGHT (AT SIDE)	1/4	5	5	5 1/4	5 1/4	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 7/8	5 7/8	5 7/8	5 7/8	6 1/4	6 1/4	6 1/4
BACK POCKET POSITION (FROM CENTER BACK)	1/8	1 3/8	1 3/8	1 3/8	1 1/2	1 5/8	1 5/8	1 5/8	1 3/4	1 3/4	1 7/8	2	2 1/8	2 3/8	2 5/8	2 7/8	3 1/8
BACK POCKET POSITION (FROM W-BAND SEAM)	1/8	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/4	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
BACK YOKE HEIGHT (AT SIDE SEAM)	1/8	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2
BACK YOKE HEIGHT (AT CENTER BACK)	1/8	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4
FRONT PKT BAG FACING LENGTH (FROM W/B SEAM)	1/8	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	6	6	6	6	6	6
FRONT PKT BAG LENGTH	1/4	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	9 1/2	10	10	10	10	10 1/2	10 1/2	10 1/2
FRONT PKT BAG WIDTH (AT BOTTOM)	1/4	6 1/2	6 1/2	6 1/2	6 1/2	6 3/4	6 3/4	6 3/4	6 3/4	6 3/4	7	7	7	7	7 1/4	7 1/4	7 1/4
FRONT POCKET WIDTH (ALONG WAISTBAND)	1/8	4 1/4	4 1/4	4 1/4	4 1/4	4 1/2	4 1/2	4 1/2	4 1/2	4 1/2	4 3/4	4 3/4	4 3/4	4 3/4	5	5	5
FRONT POCKET HEIGHT (AT SIDE SEAM)	1/8	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	2 3/4	3	3	3
FLY LENGTH (FROM UNDER W-BAND)	1/4	4 1/2	4 1/2	5	5	5 1/4	5 1/2	5 3/4	5 3/4	6	6	6 1/4	6 1/2	6 1/2	7	7	7
FLY WIDTH	.....	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8	1 5/8
HEM	.....	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8
BELT LOOP LENGTH	.....	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8	2 5/8
BELT LOOP WIDTH	.....	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8	5/8

Updated Big MENs W/B Height 4.4.18

ADDED SIZES 28 & 29

REVISED DATE: 5.15.19 - ADDED FRONT POCKET FACING LENGTH

ADDED 1/2" to the pocket facing length (6.17.19)

Reduced the leg opening on Size 44, 46, & 48 - 8.22.19

Added 26 & 27: 3.12.20

8.24.20: reduced the Leg opening on sizes 42-48

1

3.4.2 Measurement Sheet No 2

XRAY JEANS

PRODUCTION SPECS

BLOCK: CMP-99215

SKINNY

STYLE: CMP-90192

SIZE:

COLOR:

FACTORY:

SAMPLE TYPE:

DATE:

RESIZE IMAGE TO 1.35 HT

FINAL SPEC WITH POCKETS GRADING-6/4/21

MEASUREMENT POINT	Tol (+/-)	28	29	30	31	32	33	34	36	38	40	42
WAIST CIRCUMFERENCE AT WB TOP	1/2	28 1/2	29 1/2	30 1/2	31 1/2	32 1/2	33 1/2	34 1/2	36 1/2	38 1/2	40 1/2	42 1/2
WAIST CIRCUMFERENCE AT WB BOTTOM	1/2	29	30	31	32	33	34	35	37	39	41	43
LOW HIP CIRCUM 3" FROM CROTCH	1/2	36 1/2	37 1/2	38 1/2	39 1/2	40 1/2	41 1/2	42 1/2	44 1/2	46 1/2	48 1/2	50 1/2
THIGH CIRCUM 1" BELOW CROTCH	3/8	20	20 5/8	21 1/4	21 7/8	22 1/2	23 1/8	23 3/4	25	26 1/4	27 1/2	28 3/4
KNEE CIRCUM 14" BELOW CROTCH	1/4	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17
LEG OPENING CIRCUMFERENCE	1/4	11	11 1/2	12	12 1/2	13	13 1/2	14	14 1/4	14 1/2	14 3/4	15
INSEAM 32"	1/2	32	32	32	32	32	32	32	32	32	32	32
						30						
WAISTBAND HEIGHT	1/8	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
FRONT RISE FROM WB TOP	1/4	9 1/2	9 3/4	10	10 1/4	10 1/2	10 3/4	11	11 1/4	11 3/4	12 1/4	12 3/4
BACK RISE FROM WB TOP	1/4	13 3/4	14	14 1/4	14 1/2	14 3/4	15	15 1/4	15 1/2	16	16 1/2	17
FLY OPENING	1/8	4 1/4	4 1/4	4 1/2	4 1/2	4 3/4	4 3/4	4 3/4	5 1/4	5 1/4	5 3/4	5 3/4
FRONT POCKET OPENING WIDTH AT WAIST SIDE		4 1/4	4 1/4	4 1/4	4 1/2	4 1/2	4 1/2	4 7/8	4 7/8	5 1/8	5 1/8	5 1/8
FRONT POCKET OPENING LENGTH AT SIDE SEAM		2 3/4	2 3/4	2 3/4	3	3	3	3 1/4	3 1/4	3 1/2	3 1/2	3 1/2
BACK POCKET												
BACK POCKET POSITION FROM BELOW WAIST		3	3	3	3 1/4	3 1/4	3 1/4	3 1/2	3 1/2	3 3/4	3 3/4	3 3/4
BK POCKET POSITION FROM CB RISE		1 1/8	1 1/4	1 3/8	1 1/2	1 1/2	1 3/4	1 7/8	2	2 1/8	2 1/4	2 3/8
IDTH @ TOP EDGE		6	6	6 1/4	6 1/4	6 1/2	6 1/2	6 1/2	6 3/4	6 3/4	7	7
WIDTH @ BOTTOM		4 1/2	4 1/2	4 3/4	4 3/4	5	5	5	5 1/4	5 1/4	5 1/2	5 1/2
HEIGHT @ CTR		6 1/4	6 1/4	6 1/2	6 1/2	6 3/4	6 3/4	6 3/4	7	7	7 1/4	7 1/4
HEIGHT @ SIDE		5	5	5 1/4	5 1/4	5 1/2	5 1/2	5 1/2	5 3/4	5 3/4	6	6
BK YOKE HEIGHT AT CB		2	2	2	2 1/4	2 1/4	2 1/4	2 1/2	2 1/2	2 3/4	2 3/4	2 3/4
BK YOKE HEIGHT AT SIDE SEAM		1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 3/4	1 3/4	1 3/4

*MEASUREMENTS ARE SUBJECT TO CHANGE AFTER FIRST FITTING

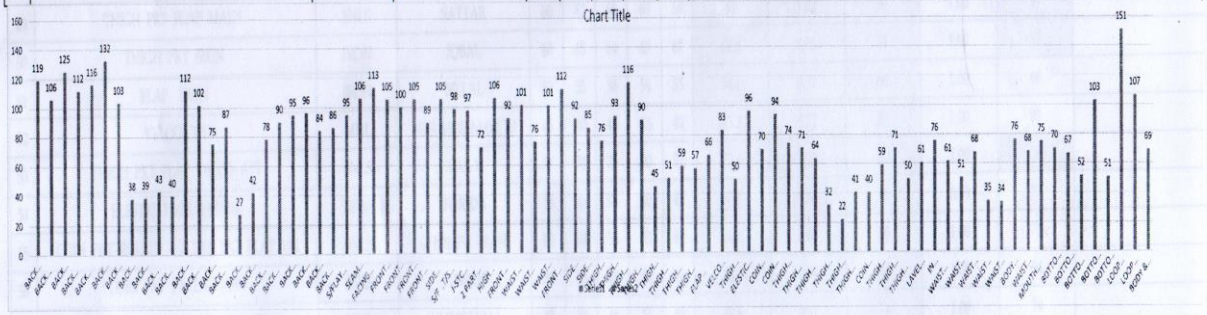
3.5 Capacity Study

CAPACITY STUDY				DG&WL		STUDIED BY:		REASON			SMV:		
BUYER:	SYNERGIES	B. CAPACITY		3rd		CHECKED BY:		RASUL			IN/DATE:	19.84	
STYLE:	E 8127	75		302		DPM/APM :		NAZRUL			UPDATE DATE:	22.04.21	

SL NO	OPERATION NAME	MC / MNL	WORKER NAME	CYCLE TIME (SEC.)					AVG. TIME (SEC)	AVG. TIME W/ALLOW. (MIN)	CAPACITY	MP	CUM. CAPACITY	REMARKS
				1	2	3	4	5						
1	WELT PKT POSITION MARK	MNL	MONI	26	27	26	25	27	26.2	0.49	123	1.00	123	
2	WELT PKT MAKE	APW	RONY	20	19	21	20	22	20.4	0.39	153	1.00	153	
3	BK RISE JOIN & T/S	5THOL & FOA	RAJON	31	30	32	32	31	31.2	0.52	115	1.00	115	
4	BK WELT PKT IRON	IRON	SAKHAWAT	20	21	22	22	23	21.6	0.36	167	1.00	167	
5	BONE T/S (IN)	SNLS	ROJINA	26	25	26	27	26	26	0.50	120	1.00	120	
6	FACING ATT WITH PKT	SNLS	PAPIA	26	25	24	25	26	25.2	0.46	130	1.00	130	
7	BK PKT BAG OL	3THOL	HALENA	30	32	29	28	30	29.8	0.55	110	1.00	110	
8	BONE T/S (TOP)	SNLS	MAHMUDA	28	29	30	28	29	28.8	0.53	114	1.00	114	
9	BK PKT BAG 1/4 T/S	SNLS	KAKOLI	30	31	33	32	32	31.6	0.58	104	1.00	104	
10	SEAM POSITION MARK	MNL	MINA	20	21	19	22	22	20.8	0.39	155	1.00	155	
11	FNT PKT TACK & BK PKT UPPER TACK	SNLS	ROJINA	30	32	30	31	30	30.6	0.56	107	1.00	107	
12	SEAM & FACING JOIN WITH PKT	SNLS	SAHIDA	80	80	82	82	84	81.6	1.50	40	1.00	105	
13	SEAM & FACING JOIN WITH PKT	SNLS	HOSNEYARA	48	50	49	47	48	48.4	0.93	65	1.00		
14	FNT PKT BAG OL	4THOL	PERVIN	29	28	30	32	30	29.8	0.57	105	1.00	105	
15	FNT PKT BAG 1/4 T/S	SNLS	FATEMA	28	26	27	27	28	27.2	0.52	115	1.00	115	
16	S/F, D/F & FNT RISE OL	4THOL	SADIQUL	32	30	29	31	30	30.4	0.58	103	1.00	103	
17	S/F T/S & ZIPPER JOIN	SNLS	KHUKUMONI	27	28	29	28	30	28.4	0.54	110	1.00	110	
18	J STAY STC WITH MARK	DNLS	IBRAHIM	27	25	26	28	30	27.2	0.52	115	1.00	115	
19	2 PART JOIN	SNLS	JORINA	28	29	30	30	30	29.4	0.56	106	1.00	106	
20	HIGH CLOSE		RAHIMA	22	24	22	26	23	23.4	0.44	137	1.00	137	
21	FNT PKT JOIN	SNLS	TASLIMA	32	30	28	29	30	29.8	0.50	121	1.00	121	
22	FNT PKT MOUTH ROLLING	DNLS	LIMA	27	26	24	27	28	26.4	0.44	136	1.00	136	
23	SIDE & WAIST TACK	SNLS	TOGOTI	28	30	32	30	30	30	0.58	104	1.00	104	

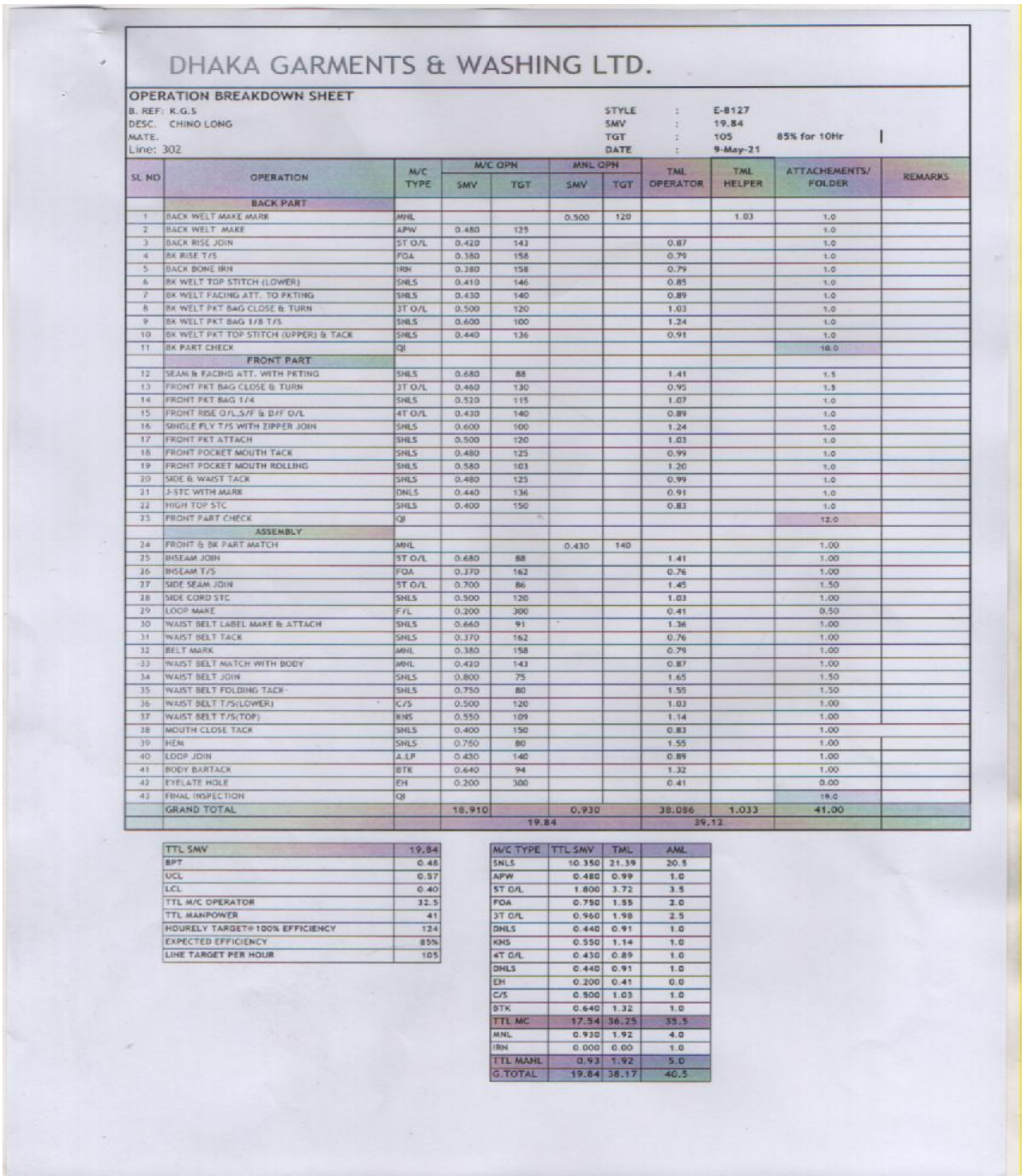
SL NO	OPERATION NAME	MC/ MNL	WORKER NAME	CYCLE TIME (SEC.)					AVG. TIME (SEC)	AVG. TIME W/ALLOW. (MIN)	CAPACITY	MP	CUM. CAPACITY	REMARKS
				1	2	3	4	5						
30	FRONT PKT MOUTH ROLLING	DNLS	SUMA	40	42	39	41	40	40.4	0.67	89	1.00	89	
31	SIDE WIST TACK	SNLS	NILA	33	35	37	32	34	34.2	0.57	105	1.00	105	
32	S/F ,T/S WITH ZIPPER JOIN	SNLS	RANI	34	36	34	39	40	36.6	0.61	98	1.00	98	
33	J-STC WITH MARK	SNLS	MASUMA	36	38	35	37	39	37	0.62	97	1.00	97	
34	2 PART JOIN	SNLS	NASIMA	50	52	49	50	48	49.8	0.83	72	1.00	72	
35	HIGH CLOSE	SNLS	ROTNA	32	35	36	34	33	34	0.57	106	1.00	106	
36	FRONT PKT FLASE TACK	SNLS	SHAHINA	40	38	41	39	37	39	0.65	92	1.00	92	
37	WAIST BELT MATCH	MNL	KOBIR	40	38	32	34	34	35.6	0.59	101	1.00	101	
38	WAIST BELT JOIN	SNLS	NARGIS	45	47	49	46	50	47.4	0.79	76	1.00	76	
39	WAIST BELT MARK & LAVEL JOIN	SNLS	MURSEDA	40	36	32	34	37	35.8	0.60	101	1.00	101	
40	FRONT & BACK PART MATCH	MNL	BEAUTY	32	30	28	37	34	32.2	0.54	112	1.00	112	
41	SIDE SEAM O/L	5TH O/L	RAKIB	38	40	39	41	38	39.2	0.65	92	1.00	92	
42	SIDE SEAM T/S	FOA	ALI	42	41	44	40	44	42.2	0.70	85	1.00	85	
43	THIGH PKT POSITION MARK	MNL	HAFIZA+NURUN NAHAR	45	48	46	47	50	47.2	0.79	76	1.00	76	
44	THIGH & COIN PKT FACING O/L	4TH O/L	TAHAMINA	40	36	37	42	38	38.6	0.64	93	1.00	93	
45	THIGH PKT O/L	4TH O/L	ALAMIN	30	28	32	31	34	31	0.52	116	1.00	116	
46	THIGH PKT ROLLING	SNLS	HALIMA	40	42	38	39	40	39.8	0.66	90	1.00	90	
47	THIGH PKT FACING JOIN	SNLS	TASMIMA	80	78	81	79	82	80	1.33	45	1.00	45	
48	THIGH PKT VELCO JOIN	SNLS	SUMI	73	70	68	71	72	70.8	1.18	51	1.00	51	
49	THIGH PKT FLAP MAKE	SNLS	SATTAR	60	62	65	60	58	61	1.02	59	1.00	59	
50	THIGH PKT IRON	IRON	IQBAL	60	65	64	63	62	62.8	1.05	57	1.00	57	
51	FLAP IRON	IRON	BILLAL	52	55	58	54	53	54.4	0.91	66	1.00	66	
52	VELCO CUT	MNL	NUR MOHAMMOD	45	40	48	43	40	43.2	0.72	83	1.00	83	
53	THIGH PKT FLAP VELCO ATT	SNLS	LAILY	75	74	71	70	72	72.4	1.21	50	1.00	50	
54	ELESTIC TACK & MARK	DNLS	FORIDA	35	36	34	40	42	37.4	0.62	96	0.80	77	
55	COIN PKT ROLLING & COIN PKT FLAP 1/4	SNLS	CHOMPA - RANI	50	48	55	53	51	51.4	0.86	70	1.00	70	
56	COIN PKT FACING JOIN	SNLS	TOWKIR	38	36	40	37	41	38.4	0.64	94	1.00	94	
57	THIGH & COIN PKT FLAP MARK	MNL	UMME HIMA	45	50	48	51	49	48.6	0.81	74	1.00	74	
58	THIGH & COIN PKT WITH FLAP MATCH	MNL	ROKIYA	52	50	48	51	53	50.8	0.85	71	1.00	71	
59	THIGH & COIN PKT MARK	MNL	MAHAMUDA	58	56	60	57	52	56.6	0.94	64	1.00	64	
60	THIGH PKT JOIN	SNLS	ANGINA	110	114	112	116	109	112.2	1.87	32	1.00	32	54
61	THIGH PKT JOIN	SNLS	AMENA	160	163	160	162	164	161.8	2.70	22	1.00	22	
62	THIGH PKT TACK	SNLS	JESMIN	92	88	86	90	86	88.4	1.47	41	1.30	53	
63	COIN PKT JOIN & TACK	SNLS	SOMOLA	90	88	92	86	90	89.2	1.49	40	1.30	52	
64	THIGH & COIN PKT FLAP JOIN	SNLS	AYSHA	58	60	62	61	63	60.8	1.01	59	1.00	59	

SL NO	OPERATION NAME	MC/ MNL	WORKER NAME	CYCLE TIME (SEC.)					AVG. TIME (SEC)	AVG. TIME W/ALLOW. (MIN)	CAPACITY	MP	CUM. CAPACITY	REMARKS
				1	2	3	4	5						
65	THIGH & COIN PKT FLAP T/S	SNLS	SHEULY	48	50	52	54	51	51	0.85	71	1.00	71	
66	THIGH PKT BTK	BTK	SONIYA	72	74	71	75	70	72.4	1.21	50	1.00	50	
67	LAVEL JOIN	SNLS	TANIYA	60	58	62	60	57	59.4	0.99	61	1.00	61	
68	IN SEAM JOIN & CORNER CUT	FOA	RONI	48	50	47	45	48	47.6	0.79	76	1.00	76	
69	WAIST BELT CUT & TACK	SNLS	SALMA	58	60	55	61	59	58.6	0.98	61	1.00	61	
70	WAIST BELT FOLDING TACK	SNLS	PARVIN	70	68	73	71	74	71.2	1.19	51	1.00	51	
71	WAIST BELT FOLDING MOUTH TACK	SNLS	NASIMA	50	55	54	52	55	53.2	0.89	68	1.00	68	
72	WAIST BELT T/S	KANSAI	SHOHAG	105	108	100	104	102	103.8	1.73	35	1.00	35	68
73	WAIST BELT T/S	KANSAI	KOBIR	103	108	100	110	112	106.6	1.78	34	1.00	34	
74	BODY TRUN OVER & MOUTH MARK	MNL	USUF	48	50	43	46	49	47.2	0.79	76	1.00	76	
75	WAIST BELT T/S (TOP SIDE)	Chain Stc	JAHAGGIR	55	52	50	56	51	52.8	0.88	68	1.00	68	
76	MOUTH CLOSE	SNLS	NASIMA	50	48	47	46	49	48	0.80	75	1.00	75	
77	BOTTOM CUFF TACK & MARK	SNLS	MUKTA	51	49	52	54	50	51.2	0.85	70	1.00	70	
78	BOTTOM CUFF FOLDING TACK	SNLS	KHADIZA	52	54	56	53	55	54	0.90	67	1.00	67	
79	BOTTOM CUFF T/S	SNLS	RUMA	72	70	68	71	68	69.8	1.16	52	1.00	52	
80	BOTTOM CUFF MATCH	MNL	SHORIF	35	36	34	32	38	35	0.58	103	1.00	103	
81	BOTTOM CUFF JOIN	5TH O/L	SUMON	75	70	72	68	70	71	1.18	51	1.00	51	
82	LOOP MAKE	F/L	JAHABUL	25	28	20	22	24	23.8	0.40	151	0.80	121	
83	LOOP ATT	LOOP ATT	SHITA-RANI	30	34	38	36	31	33.8	0.56	107	1.00	107	
84	BODY & LOOP BTK (8)	BTK	MUNNI	50	53	51	52	54	52	0.87	69	1.00	69	



3.6 Operation Breakdown procedure:

3.6.1 Operation breakdown sheet Style on



DHAKA GARMENTS & WASHING LTD.

OPERATION BREAKDOWN SHEET

B. REF: K.G.S
DESC. CHINO LONG
MATE.
Line: 302

STYLE : E-8127
SMV : 19.84
TGT : 105 85% for 10Hr
DATE : 9-May-21

SL NO	OPERATION	M/C TYPE	M/C OPN		MNL OPN		TML OPERATOR	TML HELPER	ATTACHEMENTS/ FOLDER	REMARKS
			SMV	TGT	SMV	TGT				
	BACK PART									
1	BACK WELT MAKE MARK	MNL			0.500	120		1.03	1.0	
2	BACK WELT MAKE	APW	0.480	125					1.0	
3	BACK RISE JOIN	5T O/L	0.420	143			0.87		1.0	
4	BK RISE T/S	FOA	0.380	158			0.79		1.0	
5	BACK BONE IRN	IRN	0.380	158			0.79		1.0	
6	BK WELT TOP STITCH (LOWER)	SNLS	0.410	146			0.85		1.0	
7	BK WELT FACING ATT. TO PKTING	SNLS	0.430	140			0.89		1.0	
8	BK WELT PKT BAG CLOSE & TURN	3T O/L	0.500	120			1.03		1.0	
9	BK WELT PKT BAG 1/8 T/S	SNLS	0.600	100			1.24		1.0	
10	BK WELT PKT TOP STITCH (UPPER) & TACK	SNLS	0.440	136			0.91		1.0	
11	BK PART CHECK	QI							10.0	
	FRONT PART									
12	SEAM & FACING ATT. WITH PKTING	SNLS	0.680	88			1.41		1.5	
13	FRONT PKT BAG CLOSE & TURN	3T O/L	0.460	130			0.95		1.5	
14	FRONT PKT BAG 1/4	SNLS	0.520	115			1.07		1.0	
15	FRONT RISE O/L,S/F & D/F O/L	4T O/L	0.430	140			0.89		1.0	
16	SINGLE FLY T/S WITH ZIPPER JOIN	SNLS	0.600	100			1.24		1.0	
17	FRONT PKT ATTACH	SNLS	0.500	120			1.03		1.0	
18	FRONT POCKET MOUTH TACK	SNLS	0.480	125			0.99		1.0	
19	FRONT POCKET MOUTH ROLLING	SNLS	0.580	103			1.20		1.0	
20	SIDE & WAIST TACK	SNLS	0.480	125			0.99		1.0	
21	J-STC WITH MARK	DNLS	0.440	136			0.91		1.0	
22	HIGH TOP STC	SNLS	0.400	150			0.83		1.0	
23	FRONT PART CHECK	QI							12.0	
	ASSEMBLY									
24	FRONT & BK PART MATCH	MNL			0.430	140			1.00	
25	INSEAM JOIN	5T O/L	0.680	88			1.41		1.00	
26	INSEAM T/S	FOA	0.370	162			0.76		1.00	
27	SIDE SEAM JOIN	5T O/L	0.700	86			1.45		1.50	
28	SIDE CORD STC	SNLS	0.500	120			1.03		1.00	
29	LOOP MAKE	F/L	0.200	300			0.41		0.50	
30	WAIST BELT LABEL MAKE & ATTACH	SNLS	0.660	91			1.36		1.00	
31	WAIST BELT TACK	SNLS	0.370	162			0.76		1.00	
32	BELT MARK	MNL	0.380	158			0.79		1.00	
33	WAIST BELT MATCH WITH BODY	MNL	0.420	143			0.87		1.00	
34	WAIST BELT JOIN	SNLS	0.800	75			1.65		1.50	
35	WAIST BELT FOLDING TACK	SNLS	0.750	80			1.55		1.50	
36	WAIST BELT T/S(LOWER)	C/S	0.500	120			1.03		1.00	
37	WAIST BELT T/S(TOP)	KNS	0.550	109			1.14		1.00	
38	MOUTH CLOSE TACK	SNLS	0.400	150			0.83		1.00	
39	HEM	SNLS	0.750	80			1.55		1.00	
40	LOOP JOIN	A.LP	0.430	140			0.89		1.00	
41	BODY BARTACK	BTK	0.640	94			1.32		1.00	
42	EYELATE HOLE	EH	0.200	300			0.41		0.00	
43	FINAL INSPECTION	QI							19.0	
	GRAND TOTAL		18.910		0.930		38.086	1.033	41.00	
			19.84				39.12			

TTL SMV	19.84
BPT	0.48
UCL	0.57
LCL	0.40
TTL M/C OPERATOR	32.5
TTL MANPOWER	41
HOURELY TARGET@100% EFFICIENCY	124
EXPECTED EFFICIENCY	85%
LINE TARGET PER HOUR	105

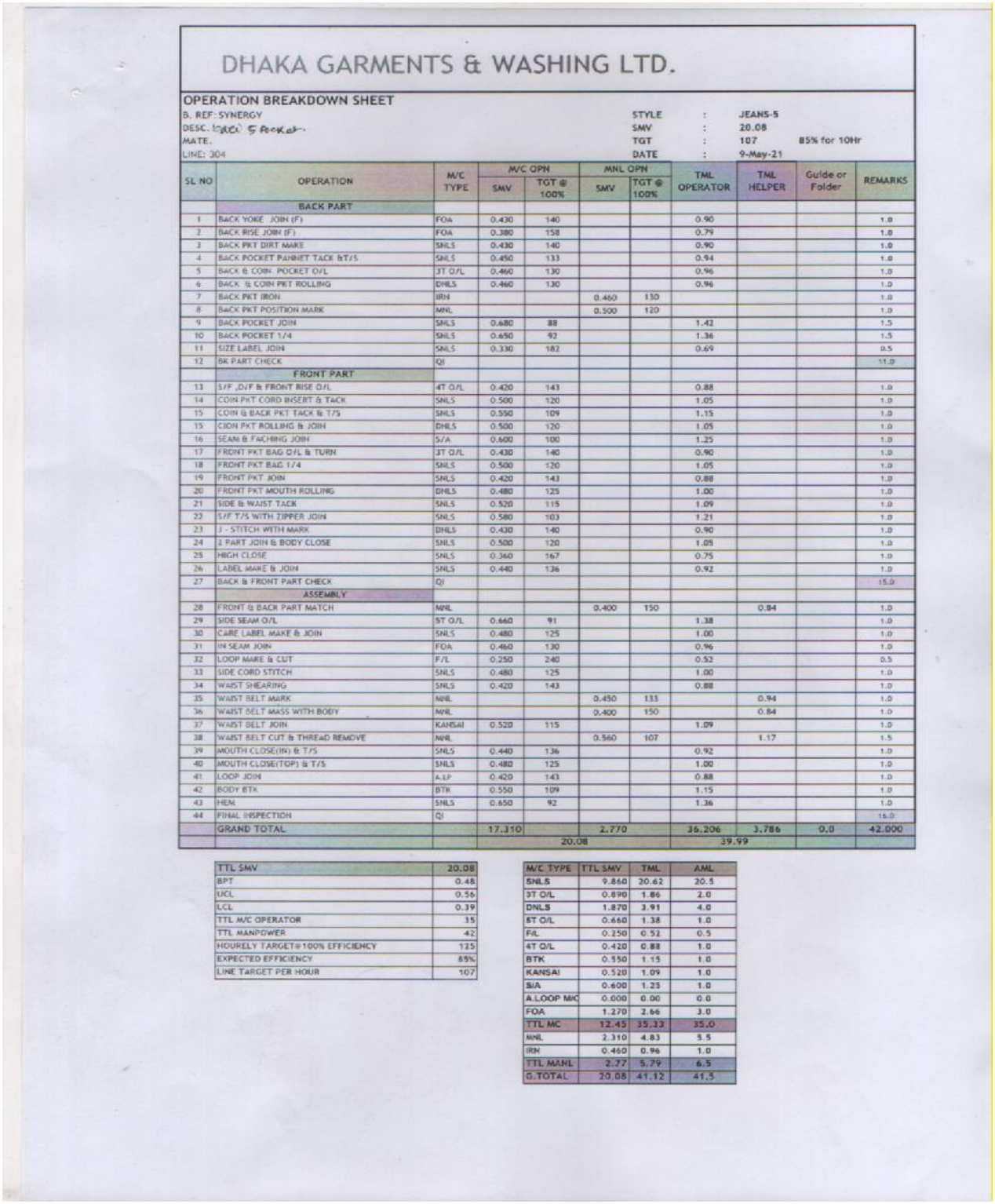
M/C TYPE	TTL SMV	TML	AML
SNLS	10.350	21.39	20.5
APW	0.480	0.99	1.0
5T O/L	1.800	3.72	3.5
FOA	0.750	1.55	2.0
3T O/L	0.960	1.98	2.5
DNLS	0.440	0.91	1.0
KNS	0.550	1.14	1.0
4T O/L	0.430	0.89	1.0
DNLS	0.440	0.91	1.0
EH	0.200	0.41	0.0
C/S	0.500	1.03	1.0
BTK	0.640	1.32	1.0
TTL MC	17.54	36.25	35.5
MNL	0.930	1.92	4.0
IRN	0.000	0.00	1.0
TTL MANL	0.93	1.92	5.0
G.TOTAL	19.84	38.17	40.5

3.6.2. Operation Breakdown Chart:

SL NO	OPERATION	M/C Type	SMV
1	BACK WELT MAKE MARK	MNL	0.480
2	BACK WELK MAKE	APW	0.420
3	BACK RISE JOIN	5/T O/L	0.380
4	BK RISE T/S	FOA	0.380
5	BACK BONE IRN	IRN	0.410
6	BK WELT TOP STITCH (LOWER)	SNLS	0.430
7	BK WELT FACING ATT. TO PKTING	SNLS	0.500
8	BK WELT PKT BAG CLOSE & TURN	3T O/L	0.600
9	BK WELT PKT BAG 1/B T/S	SNLS	0.440
10	BK WELT PAK TOP STITCH (UPPER) & TACK	SNLS	
11	BK PARK CHECK	Qt	
12	SEAM & FACING ATT. WITH PKTING	SNLS	0,680
13	FRONT PKT BAG CLOSE & TURN	3/T O/L	0.460
14	FRONT PKT BAG ¼	SNLS	0.520
15	FRONT RISE O/L, S/F, & D/F, O/L	4/T O/L	0.430
16	SINGLE FLY T/S WITH ZIPPER JOIN	SNLS	0.600
17	FRONT PKT ATTACH	SNLS	0.500
18	FRONT POCKET MOUTH TACK	SNLS	0.480
19	FRONT POCKET MOUTH ROLLING	SNLS	0.580
20	SIDE & WAIST TACK	SNLS	0.480
21	J-STC WITH MARK	DNLS	0.440
22	HIGH TOP STC	SNLS	0.400
23	FRONT PART CHECK	Ql	
24	FRONT & BK PART MATCH	MNL	
25	INSEAM JOIN	5/T O/L	0.680
26	INSEAM T/S	FOA	0.370
27	SIDE SEAM JOIN	S/T O/L	0.700
28	SIDE CORD STC	SNLS	0.500
29	LOOP MAKE	F/L	0.200
30	WAIST BELT LABEL MAKE & ATTACH	SNLS	0.660
31	WAIST BELT TACK	SNLS	0.370
32	BELT MAKE	MNL	0.380
33	WAIST BELT MATCH WITH BODY	MNL	0.420
34	WAIST BELT JOIN	SNLS	0.800
35	WAIST BELT FOLDING TACK	SNLS	0.750
36	WAIST BELT T/S (LOWER)	C/S	0.500
37	WAIST BELT T/S (TOP)	KNS	0.550
38	MOUTH CLOSE TACK	SNLS	0.400
39	HEM	SNLS	0.750

40	LOOP JOIN	A. LP	0.430
41	BODY BARTACK	BTK	0.640
42	EYELATE HOLE	EH	0.200
43	FINAL INSPECTION	Ql	
	GRAND TOTAL		18.91

3.6.3 Operation breakdown sheet Style Two



DHAKA GARMENTS & WASHING LTD.

OPERATION BREAKDOWN SHEET

B. REF: SYNERGY
DESC. 10XC 5 Pocket
MATE.
LINE: 304

STYLE : JEANS-5
SMV : 20.08
TGT : 107 85% for 10Hr
DATE : 9-May-21

SL NO	OPERATION	M/C TYPE	M/C OPN		MNL OPN		TML OPERATOR	TML HELPER	Guide or Folder	REMARKS
			SMV	TGT @ 100%	SMV	TGT @ 100%				
	BACK PART									
1	BACK YOKE JOIN (F)	FOA	0.430	140			0.90			1.0
2	BACK RISE JOIN (F)	FOA	0.380	158			0.79			1.0
3	BACK PKT DIRT MARK	SNLS	0.430	140			0.90			1.0
4	BACK POCKET PANNET TACK &T/S	SNLS	0.450	133			0.94			1.0
5	BACK & COIN POCKET O/L	3T O/L	0.460	130			0.96			1.0
6	BACK & COIN PKT ROLLING	DNLS	0.460	130			0.96			1.0
7	BACK PKT IRON	IRN			0.460	130				1.0
8	BACK PKT POSITION MARK	MNL			0.500	120				1.0
9	BACK POCKET JOIN	SNLS	0.680	88			1.42			1.5
10	BACK POCKET 1/4	SNLS	0.650	92			1.36			1.5
11	SIZE LABEL JOIN	SNLS	0.330	182			0.69			0.5
12	BK PART CHECK	QI								11.0
	FRONT PART									
13	S/F ,D/F & FRONT RISE O/L	4T O/L	0.420	143			0.88			1.0
14	COIN PKT CORD INSERT & TACK	SNLS	0.500	120			1.05			1.0
15	COIN & BACK PKT TACK & T/S	SNLS	0.550	109			1.15			1.0
15	CION PKT ROLLING & JOIN	DNLS	0.500	120			1.05			1.0
16	SEAM & FACHING JOIN	S/A	0.600	100			1.25			1.0
17	FRONT PKT BAG O/L & TURN	3T O/L	0.430	140			0.90			1.0
18	FRONT PKT BAG 1/4	SNLS	0.500	120			1.05			1.0
19	FRONT PKT JOIN	SNLS	0.420	143			0.88			1.0
20	FRONT PKT MOUTH ROLLING	DNLS	0.480	125			1.00			1.0
21	SIDE & WAIST TACK	SNLS	0.520	115			1.09			1.0
22	S/F T/S WITH ZIPPER JOIN	SNLS	0.580	103			1.21			1.0
23	J - STITCH WITH MARK	DNLS	0.430	140			0.90			1.0
24	2 PART JOIN & BODY CLOSE	SNLS	0.500	120			1.05			1.0
25	HIGH CLOSE	SNLS	0.360	167			0.75			1.0
26	LABEL MAKE & JOIN	SNLS	0.440	136			0.92			1.0
27	BACK & FRONT PART CHECK	QI								15.0
	ASSEMBLY									
28	FRONT & BACK PART MATCH	MNL			0.400	150		0.84		1.0
29	SIDE SEAM O/L	5T O/L	0.660	91			1.38			1.0
30	CARE LABEL MAKE & JOIN	SNLS	0.480	125			1.00			1.0
31	IN SEAM JOIN	FOA	0.460	130			0.96			1.0
32	LOOP MAKE & CUT	F/L	0.250	240			0.52			0.5
33	SIDE CORD STITCH	SNLS	0.480	125			1.00			1.0
34	WAIST SHEARING	SNLS	0.420	143			0.88			1.0
35	WAIST BELT MARK	MNL			0.450	133		0.94		1.0
36	WAIST BELT MASS WITH BODY	MNL			0.400	150		0.84		1.0
37	WAIST BELT JOIN	KANSAI	0.520	115			1.09			1.0
38	WAIST BELT CUT & THREAD REMOVE	MNL			0.560	107		1.17		1.5
39	MOUTH CLOSE(IN) & T/S	SNLS	0.440	136			0.92			1.0
40	MOUTH CLOSE(TOP) & T/S	SNLS	0.480	125			1.00			1.0
41	LOOP JOIN	A.LP	0.420	143			0.88			1.0
42	BODY BTK	BTK	0.550	109			1.15			1.0
43	HEM	SNLS	0.650	92			1.36			1.0
44	FINAL INSPECTION	QI								16.0
	GRAND TOTAL		17.310		2.770		36.206	3.786	0.0	42.000
			20.08				39.99			

TTL SMV	20.08
BPT	0.48
UCL	0.56
LCL	0.39
TTL M/C OPERATOR	35
TTL MANPOWER	42
HOURELY TARGET@100% EFFICIENCY	125
EXPECTED EFFICIENCY	85%
LINE TARGET PER HOUR	107

M/C TYPE	TTL SMV	TML	AML
SNLS	9.860	20.62	20.5
3T O/L	0.890	1.86	2.0
DNLS	1.870	3.91	4.0
5T O/L	0.660	1.38	1.0
F/L	0.250	0.52	0.5
4T O/L	0.420	0.88	1.0
BTK	0.550	1.15	1.0
KANSAI	0.520	1.09	1.0
S/A	0.600	1.25	1.0
A.LOOP M/C	0.000	0.00	0.0
FOA	1.270	2.66	3.0
TTL MC	12.45	35.33	35.0
MNL	2.310	4.83	5.5
IRN	0.460	0.96	1.0
TTL MANL	2.77	5.79	6.5
G.TOTAL	20.08	41.12	41.5

3.7 Calculation:

Target Hourly = $\frac{60}{SMV}$

Hourly Line Target = $\frac{60*No\ of\ worker}{Total\ GMT\ SMV}$

Line Daily Target = $\frac{60*No\ of\ worker*W/H}{Total\ GMT\ SMV}$

3.7.1 Bellow analysis is subjected to following supposition for style one:

1	No. of worker (operator and Helper)	40
2	Factory Efficiency	100%
3	No of working Hours	10
4	Total GMT SMV	18.91

Day Line Target = $\frac{60*No.of\ worker*W/H}{Total\ GMT\ SMV}$

= $\frac{60*40*10}{18.91}$ * 100%

Pcs day Target = 1269 Pcs

Target per Hour= 127 Pcs

3.7.2 Bellow analysis is subjected to following supposition for style two:

No. of worker (operator and Helper)	40
Factory Efficiency	100%
No of working Hours	10
Total GMT SMV	17.310

Day Line Target= $\frac{60*40*10}{17.310}$*100%

Pcs day Target= 1386 pcs

Target per Hour= 138 pcs

3.8 Basic Pitch Time Calculation

3.8.1 Basic Pitch Time Calculation For style one

Here,

No of operation= 43

Total SMV= 18.91

So,

Pitch Time= $\frac{Total\ GMT\ SMV}{No.of\ operation}$

$= \frac{18.91}{43}$

= 0.44

Upper Control Limit= $\frac{Pitch\ Time}{Expected\ Efficiency}$

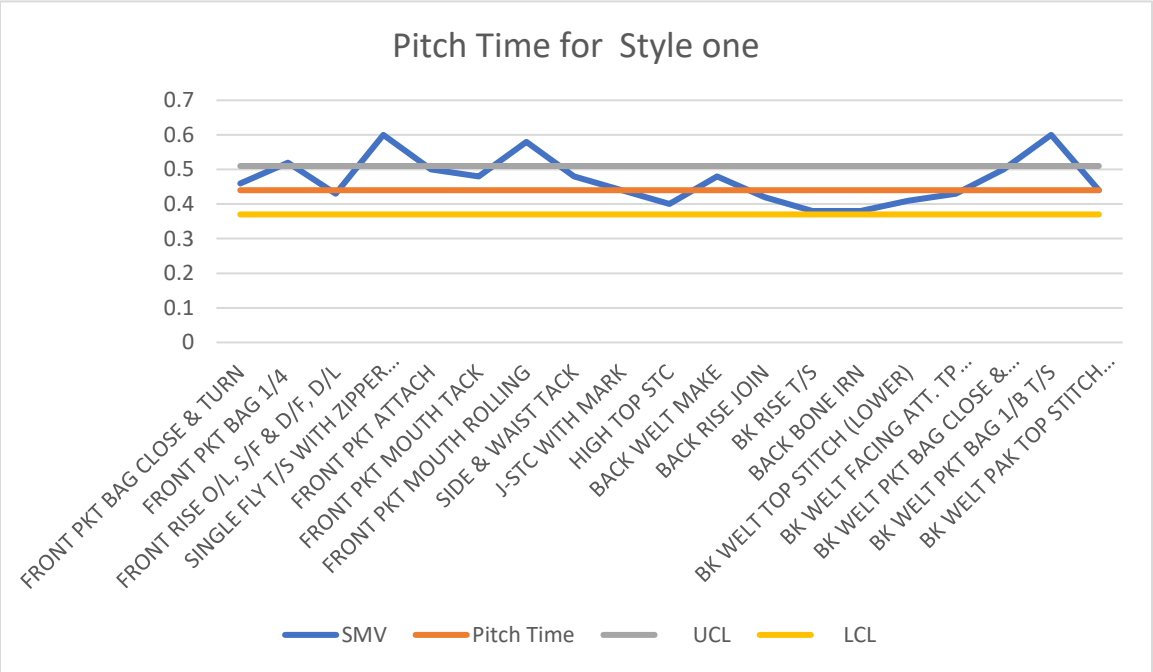
$= \frac{0.44}{85\%}$

= 0.51

Lower Control Limit = (2*Pitch Time)-UCL

= (2*0.44)-0.51

= 0.37



Graph Figure 3.8.1: Pitch time result

3.8.2 Basic Pitch Time Calculation For style two

Here,

No of operation= 44

Total SMV= 17.310

So,

Pitch Time=$\frac{17.310}{44}$

= 0.39

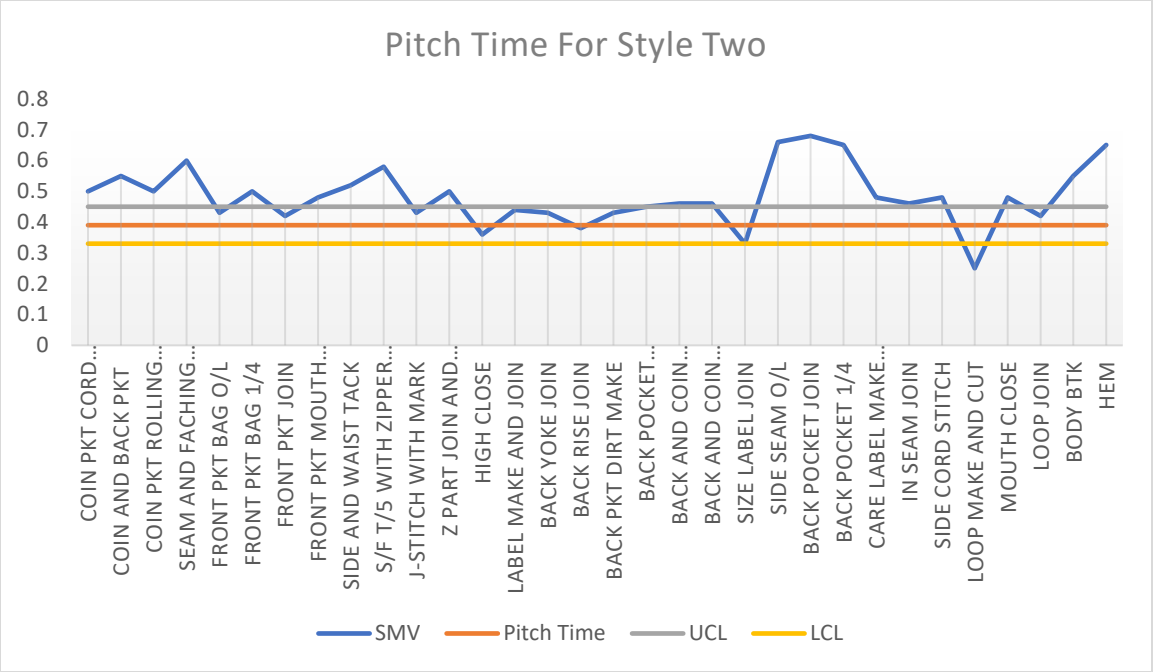
Upper Control Limit = $\frac{0.39}{85\%}$

= 0.45

Lower Control Limit = (2*Pitch Time)-UCL

= (2*0.39)-0.45

= 0.33



Graph figure: 3.8.2: Pitch Time Result

3.9 Bellow analysis is subjected to following assumption:

3.9.1 Bellow analysis is subjected to following assumption for style 1

1	No. of worker (operator and Helper)	40
2	Factory Efficiency	85%
3	No of working Hours	10
4	Total GMT SMV	18.91

Day Line Capacity= $\frac{60*No\ of\ Worker*W/H}{TOTAL\ GMT}$*****Efficiency

$=\frac{60*40*10}{19.84}$*85%

= 1078 pcs

=108 pcs

Line labor productivity = Total number of output per day per line / Number of worker worked

= 1078/43

=25

Factory capacity = {(work hour× total workers × working day ×60)/ SMV}×Efficiency

= {(10×1200×26×60)/18.91}×85%

= 841460 pcs

3.9.2 Bellow analysis is subjected to following assumption for style 2

No. of worker (operator and Helper)	40
Factory Efficiency	85%
No of working Hours	10
Total GMT SMV	17.31

Day Line Capacity= $\frac{60*40*10}{17.31}$***85%**

= 1138 pcs

= 114 pcs

Line labor productivity = Total number of output per day per line / Number of worker worked

=1138/44

=27

Factory capacity = {(work hour× total workers × working day ×60)/ SMV}×Efficiency

= {(10×1200×26×60)/17.31}×85%

= 919237 pcs

3.10 Line Balancing:

Line balance means the better parceling of the necessary tasks between the workers, which reduces waiting time.

For line balance we have to focus some data & information those are follows:

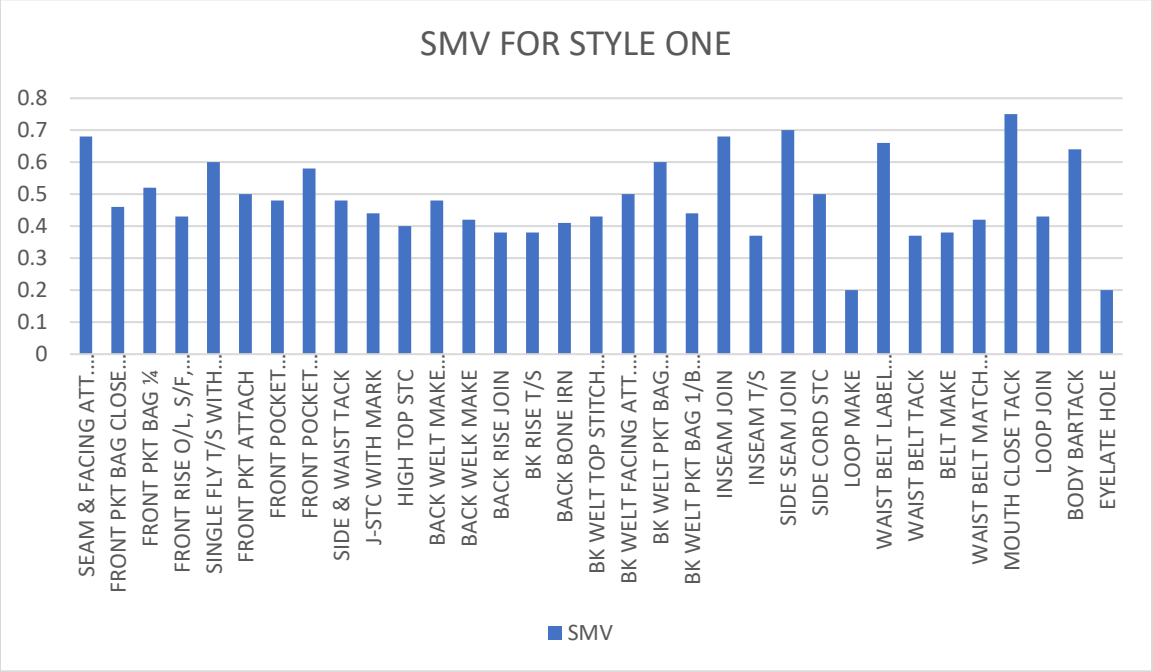
1) Number of operators.

2) Operation name.

3) Operation SMV.

By bellow graph we can easily see where we should have to balance in this line.

3.10.1 Line Balancing for style 1



Efficiency Calculation:

Here,

W/H=10

SMV=19.84

Manpower=40

Output=1036

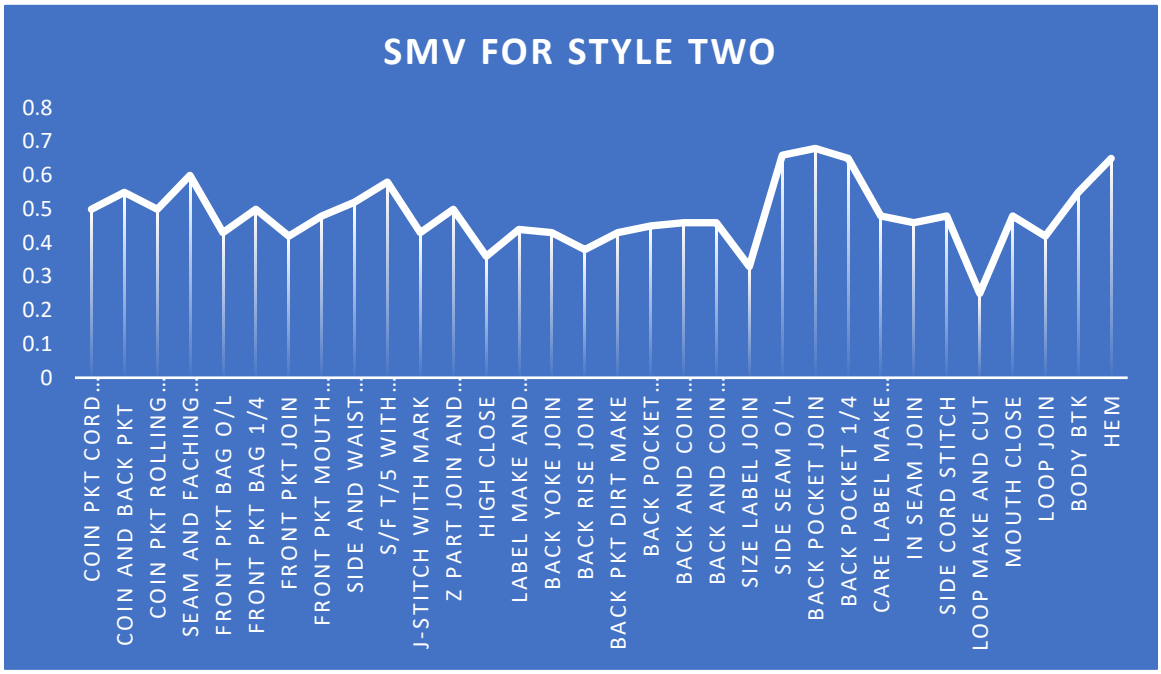
So,

Line Efficiency(%)=$\frac{production/day*SMV}{Total\ man\ power*W/H*60}$*85

$= \frac{1078*18.91}{40*10*60} *85$

=72%

3.10.2 Line Balancing for style two



Efficiency Calculation:

Here,

W/H=10

SMV= 19.31

Manpower=40

Output=1

Line efficiency= $\frac{1128*17.31}{60*40*10}$*85

= 0.69%

CHAPTER 4: RESULT & DISCUSSION

Comparison between two different styles in an order (Basic pant):

4.1.SMV

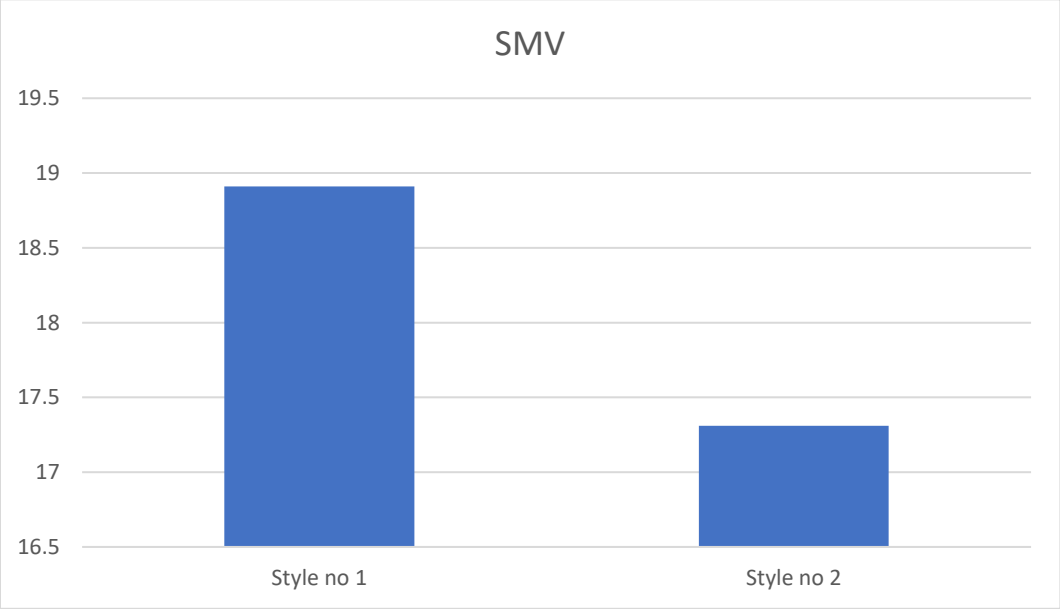
Shows the SMV comparison of two style

SMV of style no-1 is 18.91

SMV of style no-2 is 17.310

1. Graph shows that style no-2 operators are skilled but less competence worker is on style no- 1.

2. Graph shows that style no-2 has fewer issues with consistency but more in style no-1.



Graph Fig 4.1: SMV

4.2. Line Efficiency

Graph shows that line efficiency of style no-1 is 72%

Graph shows that line efficiency of style no-2 is 69%

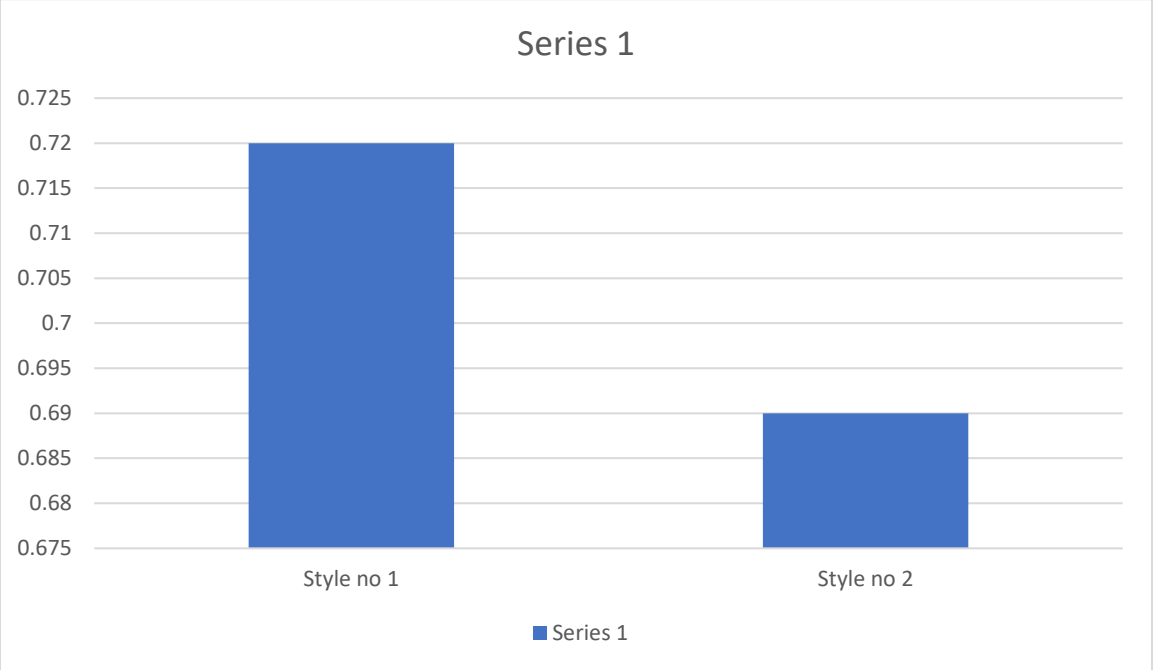
1. Less machine breakdown at style no-1 but more machine breakdown of style no -2

2. Style no-1 well balanced, although in others it is not so healthy.

3. Strong manufacturing quality style no-1, and in the following style no-2 fewer performance.

4. Style no-1 seems to have more expertise but fewer skills in style no-2 operators.

5. The plant is fine style no-1, but style no-2 plants aren't as well.



Graph Fig 4.2: Line efficiency

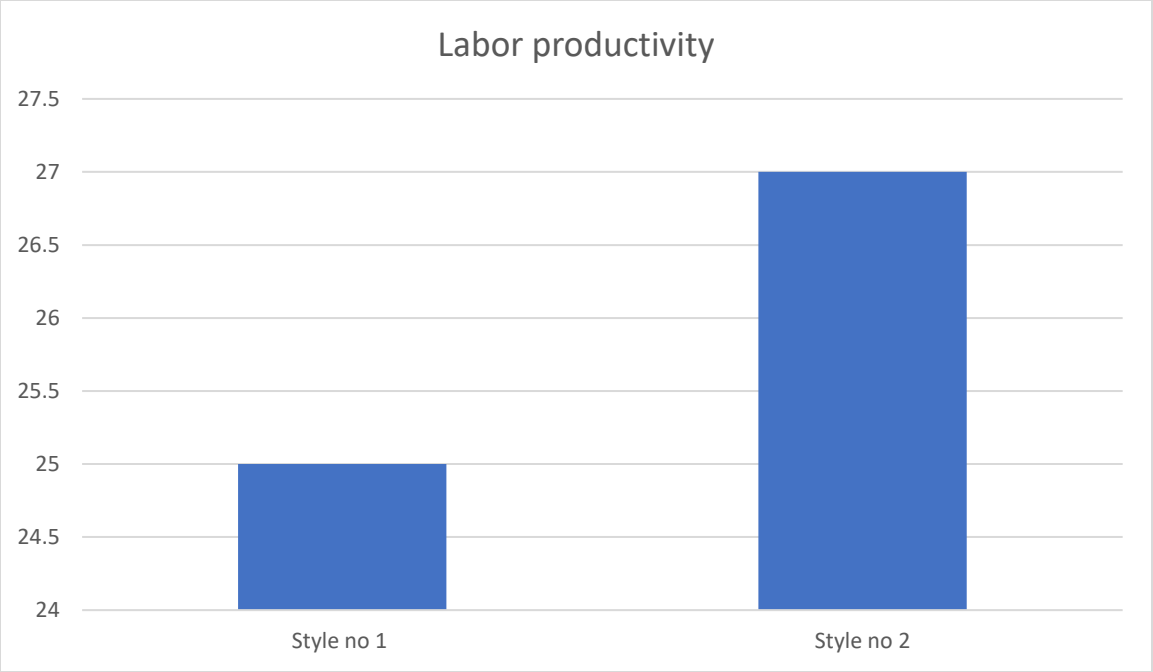
4.3. Labor productivity

Graph shows that labor productivity of style no-1 is 20 pcs

Graph shows that labor productivity of style no-2 is 24 pcs

1. Style no-1 workers are much more careful of the mission but also less careful of style no-2.

2. Lower machine breakdown at style no-1 but much machine breakdown at style no-2.



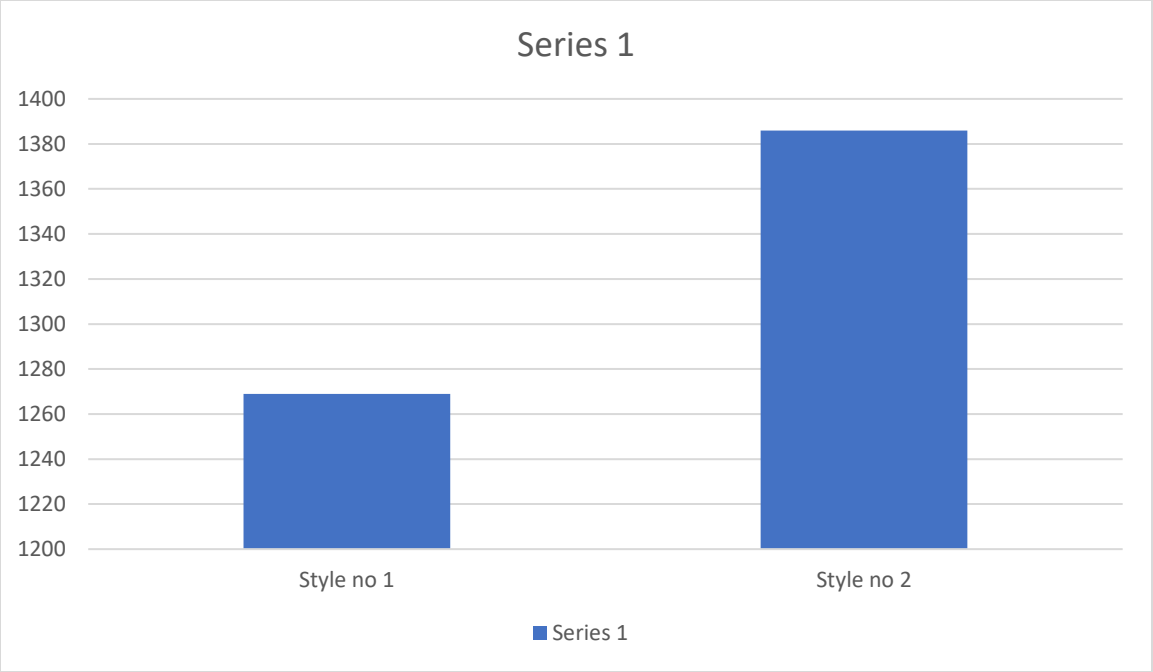
Graph Figure 4.3: Labor productivity

4.4. Line target

Graph shows that line target of style no -1 is 1269 pieces.

Graph shows that line target of style no-2 is 1386 pieces.

1. Style no-2 has well plant layout than style no-1.
2. Style no-2 capabilities worker is another main factor.
3. Enough input for style no-1 but not enough for other one.



Graph Fig 4.4: Line target

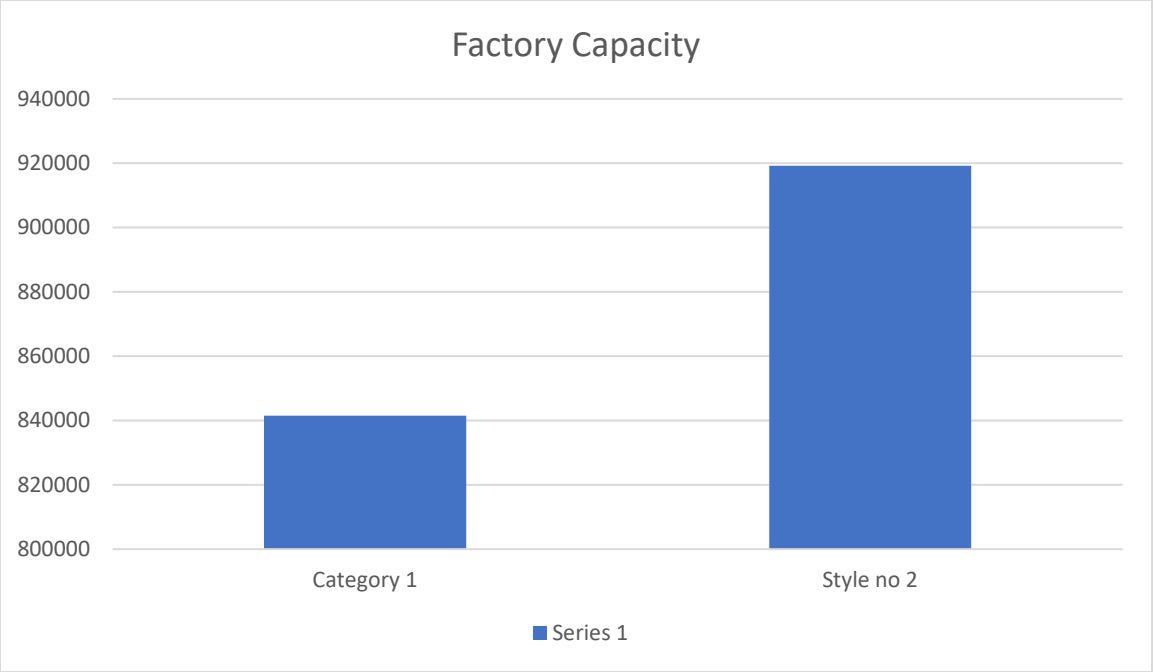
4.5. Factory capacity

Graph shows that for Style no-1 factory capacity is 841460 pieces.

Graph shows that for style no-2 factory capacity is 9192337 pieces.

1. Style no-2 space is much more overall than other.

2. More machinery used at style no-2 than style no-1.



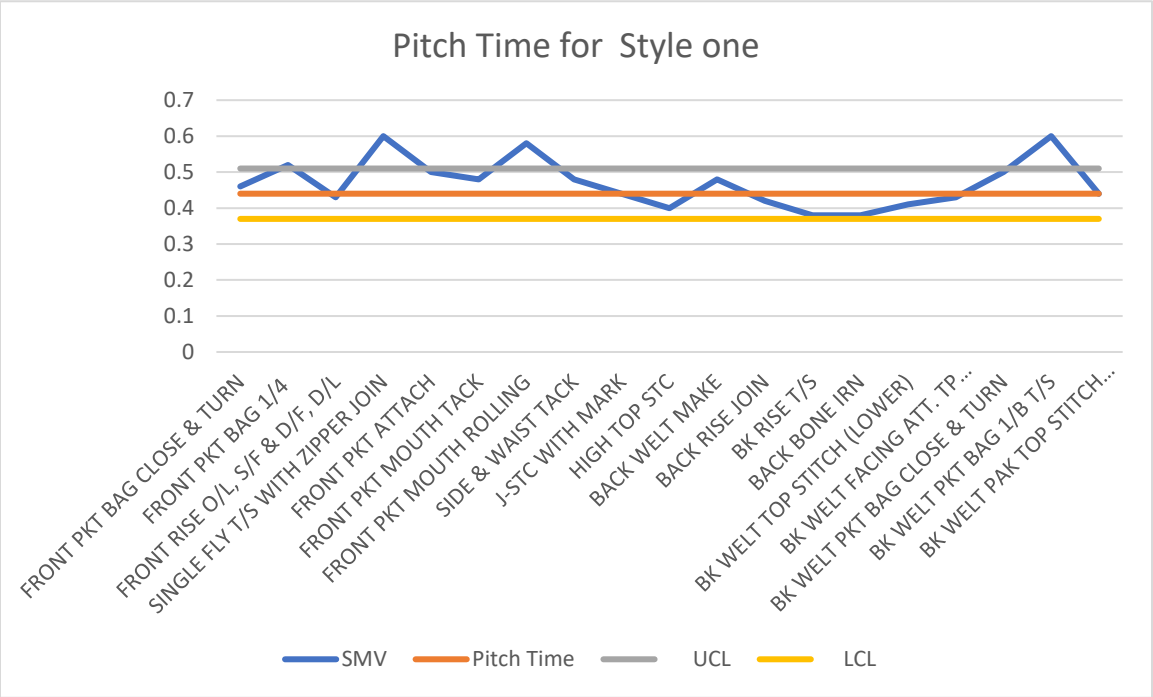
Graph Figure 4.5: Factory Capacity

4.6 Time study

4.6.1 Result style no-1

While using stopwatch we take processing time instead estimated the mean. we received simple time since attaching ranking. we added an allowance of basic (10 percent), then earned style no-1 SMV is 18.91 & style no-2 SMV is 17.31.

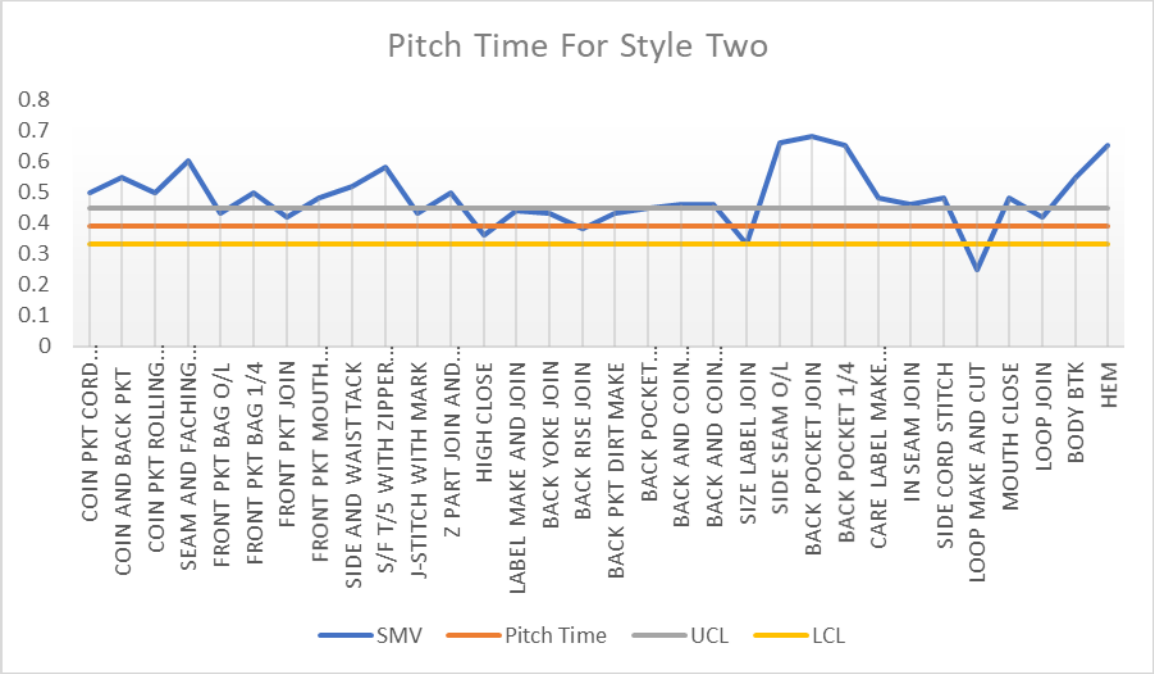
Then we measured for style no-1, pitch time= 0.44, upper control limit=0.51, lower control limit=0.37



Graph Fig 4.6.1: Pitch time result

4.6.2 Result style no-2

Then we measured for style no-2, pitch time= 0.38, upper control limit=0.50, lower control limit=0.26



Graph Fig 4.6.2: Pitch time result

Discussion

If we are to raise higher output like style no-2 in style no-1, it must first build a certain process including style no-2, for example

1. Time, cost and consistency criteria creation.
2. Income companion systems have mounted.
3. Quality technical and theoretical device architecture and implementation.
4. Numerical and mathematical analysis, like organizational studies.
5. Choice & appraisal of vendors.
6. Creation of installations like plant site, construction structure, machinery.
7. Development scheduling and management system configuration and enhancement, stock.

CHAPTER 5: CONCLUSION

Conclusion

Industrial engineering is now an unabated and most relevant part of every apparel industry. We have learnt many procedures and interesting things about industrial engineering by doing this experiment. We find out several problems in Industrial Engineering, we also know how to solve problems by doing this experiment, and how to organize all; Industrial Engineering work. Before IE there were many problems in the apparel industry such as manufacturing ability, daily target ability, layout, distribution problems. After this experiment we find out this calculation,

- In style no:1, the standard minute value (SMV)=18.91 and the standard minute value (SMV)= 17.31 for style two.
- In style no 1 we have counted the target=1269 pcs and production capacity = 1078 on the other hand the target= 1386 pcs and production capacity= 1138 in style no 2
- With style no one the pitch time=0.44, upper control limit=0.51, lower control limit=0.37 and pitch time= 0.39, upper control limit= 0.45, lower control limit= 0.33 with style no two.
- That for Style no-1 factory capacity is 6328113 pieces and for style no-2 factory capacity is 7444327 pieces.
- Style no 2 shows that the line efficiency is 72% and that the line efficiency of style no-2 is 69%

After IE and Planning there is implementation in line balancing, daily line target, production capacity increase. In addition, it gives us the opportunity to expand our knowledge into material organization, generation structure, acquisition system, method of development, and apparatuses and allow us to change with present life.

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