

Improving Productivity of Garment Industry with Time Study

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Abstract

The garment industries are always trying to improve production and the quality of the garments to sustain in the enormous competitive market. The sustainability and profitability of garment industry is governed by the productivity of that industry. Garment manufacturing involves number of operations carried out at different spots by the operators. All these activity need to be performed in synchronized, planned and timely to achieve desired productivity. There are various practices and methods applied in industries to improve productivity of the industries, time study is one of the effective tool used by almost all garment industry for improving production rate. This paper deals with time study of manufacturing process of Shirts and Leggings. In which we have studied the time taken in each steps of garment manufacturing. The observations of the time study elaborate on the scope for reduction the time taken and improvement in the production of the garment industry. One of the important finding from this study is that the timely supply of pieces and order sheets plays vital role in improving productivity of the industry.

Keywords: -Breakdown, Machine Maintenance, Buffer, workflow.

I. Introduction

This is a study conducted at garment house “A” where we have come out with the solution towards the problem faced by many industries, if a necessary and proper action is taken against this particular point we can definitely improve the quality and production of any garment house with time saving. By using method related to time saving, its capacity and production study, it is possible to improve productivity while reducing wastage. Two important attributes have been considered, one is possible standard method for each process and another is considerable time is consumed. Time study took to record the actual individual capacity of each worker and process line. The work measurement techniques were applied for recording the times and rates of working in the elements within specific conditions. The results of work measurement for analyzing the data so as to determine the time necessary for carrying out a job at a defined level of performance. Time study evolved from the work of Taylor and was the original work measurement technique. The objectives of this project are to find out average time taken to complete each process of garment manufacturing, to analyze the difference between and actual time taken and basic time of each process of garment manufacturing and to recommendations for improving production rate based on analysis. Time study is the field of engineering in which productivity of the manufacturing process is measured to find out the scope for improvement. Time study elaborates on manufacturing process about the best way to do something, the time required to complete task, and the way to measure production rates [1]. Today's customers around the globe demand product at the best possible price. In today's highly competitive global marketplace they are placing greater value on quality and delivery time [2]. According to ANSI (American National Standard Institute) it is stated that time study is a work measurement technique consisting of careful time measurement of the task with a time measuring instrument, adjusted for any observed variance from normal effort or pace and to allow adequate time for such items as foreign elements, unavoidable or machine delays, rest to overcome fatigue, and personal needs.” The author in this paper have specified various ways to stand in this competitive business environment by efficiently managing the lead time required for the manufacturing of the entire product. He has thrown light on the business process of garment sector about the importance of lead time in minimization of the garment making process [3]. The amount of time required to complete a specific job or operation under existing conditions, using the specified & standard method at a standard space when there is plenty of repetitive work. Different type of allowance is allowed in apparel production floor. Such as personal time allowance, Delay allowance, fatigue allowance [4]. On-Productive Time: - Time that is spent by an operator without producing any garment (standard minutes) like 'set up time' is called non-productive time. In garment production Non-productive time is measured to analyze how much standard time is lost due to machine downtime [12]. Lost time is recorded to show management a reason for low production in a particular day or lower line efficiency. Here are a few example of lost time [6]. Productivity plays an important role behind the sustainability of the of every textile manufacturing sectors, and various types of studies are carried to improvise the productivity such as improvement in loom shed efficiency by effective stretch control, improvement in loom shed efficiency by effective control of humidity [8,9]. The supply chain management plays an important role in garment industry and design to be selected by the manufacturer depends on the requirement from the industry [5, 13]. This reflects those actions & values which are responsible for the continuous improvement of the design along with the process of development & management of an organization's with the concept of improving its profitability & ensuring its survival and stand in the market toward this tough competition which will not only improve the profitability but

will also give a satisfactory service to the customer. New ideas came out from innovation and strategies helps to improve the quality by utilizing the knowledge bringing necessary information, technology, mass customization, and some others means to raise the productivity with improved quality [14]. The author has outlined several methodologies which created foundations for transforming a company into a Factory. The innovative cycle designed by the author is an important tool toward understanding what a customer wants and how these resources are found to be helpful to understand the requirement of the society. We can evaluate the corresponding design with best solution and its value-adding potentials [6]. Empowering the technical and managerial staff by enhancing their knowledge and ability and taking all the necessary steps in favour of the industry is of prime importance that the company should think toward increasing the productivity along with efficiency and labor attribution. So, it is needed to concentrate and identify the real issues, and act accordingly to take corrective actions for the upliftment of the company. The author here put strain on the industrial engineering concept which is needed to be imparted to increase the productivity. [7]. The study clearly indicate that eliminating non-productive activities like reworks in the apparel industries time as well as cost are saved by ensuring quality production which have an important impact on overall factory economy. This project sewing and finishing sections is to identify reworks so as to eliminate them for saving time, cost and improved product quality. In the Apparel Manufacturing Industry, main raw material is fabric; others are different types of trimming and accessories [9]. This study is key to apparel industry to improve their work nature & the methods, the apparel industries is identify as buyer driven or costumer driven industry, so the apparel production has become more intensified by global competition. To survive in this comparative world the industry should work more efficient. The concept which are outlined here are the most important factors to improve the productivity & efficiency of the industry the application of industrial engineering methods like method engineering, work study, capacity study, line plan & other operation management system are ultimately lead the industry to timely delivery of goods, high profit & develop the working environment [11]. The modular design for garment manufacturing center around extending the fundamentals of elasticity and economies of scale that modular products used to increase the end user value. Incorporating flexibility, modularity, and adaptability into design to provide additional freedom to adjust and adapt to changes for improving productivity [15]. Considering the requirement of the textile industries and its allied sectors, government of India started a highly ambitious programm 'Make in India' campaign. This study will enhance the productivity of various garment industries to be a part of make in India policy as per government initiatives [16].

II. Material and Method

Material: Two stitching lines are selected for this study, one line shirts and on other line the leggings were stitched. At the time of study industry has maximum order of these two garments. Thus these two stitching lines are more focused on improving the productivity of the garment line. Also it is possible to study the stitching process of these garments thoroughly.

Method: The analysis of major process in this garment lines were done manually, a time was recorded with the help of stopwatch. Following figure1 and figure 2 elaborates the processing sequence of operations involved in shirt manufacturing and legging manufacturing respectively. There are many process involved but here we considered some specific operation which was needed to be controlled so as to shorten the time span. These processes are supposed to be completed in specified time but when actually it was observed the result showed that there is additional time involved which is projected to be reduced.

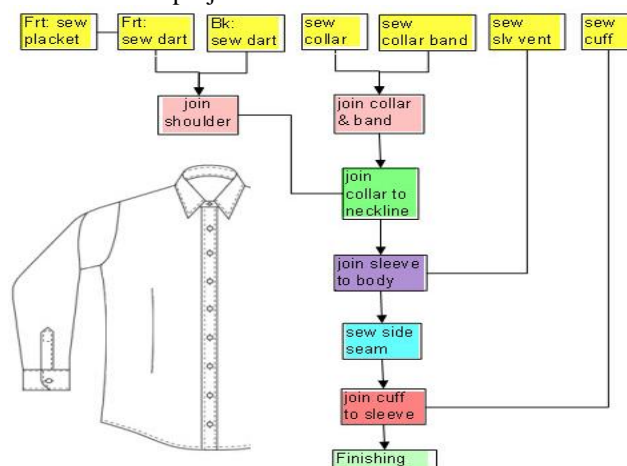


Figure 1: Sequence of Operations Involved in Shirt Stitching

III. Data Collection and observations

The time taken for completing each step in garment manufacturing is measured by taking the average of 20 cycles of each process. For example the total time taken for attaching a care label on 20 pieces is 400 seconds, thus the time taken for attaching one care label is calculated as $400/20 = 20$ seconds. In this manner time taken for each process involved in manufacturing of shirt and leggings were measured and noted as actual time. The industry while preparing a production plan decides the standard time and basic time including 15 % allowance in each operation of the garment manufacturing. The standard time is defined the time required by an average skilled operator, working at a normal pace, to perform a specified task using a prescribed method. In the standard time 15 % allowances are considered for different a cause which leads to more consumption of time to complete given task. The observed data in two garment lines were given in the following tables. It shows that the time taken by each process is more than that of basic time. Thus there is scope for improvement in each operation to reduce the time of production.

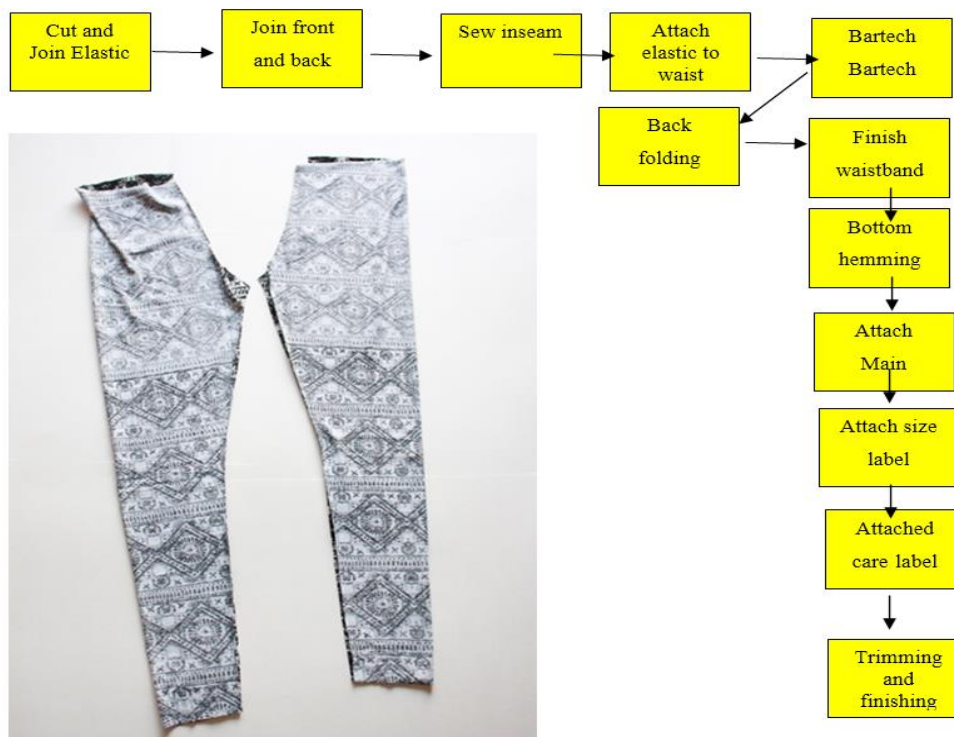


Figure 2: Sequence of Operations Involved in Leggings Stitching

Table: I Time consumption by various operations of leggings manufacturing

| Sr. no | Operation | Standard TimeSecs | Basic Time Std. + All of 15% Std | Actual Time in Sec |
|--|--------------------------|----------------------|----------------------------------|--------------------|
| 1 | Cut and Join Elastic | 30 | 35 | 40 |
| 2 | Join front and back rise | 45 | 52 | 60 |
| 3 | Sew inseam | 112 | 129 | 148 |
| 4 | Attach elastic to waist | 52 | 60 | 69 |
| 5 | Bartech | 30 | 35 | 40 |
| 6 | Bartech | 40 | 46 | 53 |
| 7 | Back folding | 35 | 40 | 46 |
| 8 | Finish waistband | 40 | 46 | 53 |
| 9 | Bottom hemming | 50 | 58 | 66 |
| 10 | Attach Main label | 28 | 32 | 37 |
| 11 | Attach size label | 25 | 29 | 33 |
| 12 | Attached care label | 25 | 29 | 33 |
| 13 | Trimming and Finishing | 35 | 40 | 48 |
| Total | | 547 | 629 | 725 |
| Extra time Consumed per Piece with respect to Basic time | | $725 - 629 = 96$ sec | | |

Table: II Time consumption by various operations of shirt manufacturing

| Sr. no. | Operation | Standard time (Sec) | Basic Time Std. + All of 15% Std. | Actual Time in Sec |
|---|------------------------------|------------------------------|-----------------------------------|--------------------|
| Cutting Room Operations | | | | |
| 1 | Fuse Placket | 15 | 17 | 19 |
| 2 | Hem Front Placket | 20 | 23 | 25 |
| 3 | Bottom Hem | 20 | 23 | 26 |
| Stitching Operations | | | | |
| 4 | Shoulder attachment | 35 | 40 | 44 |
| 5 | Armhole | 56 | 64 | 70 |
| 6 | Attach placket to front | 24 | 28 | 35 |
| 7 | Cut placket | 28 | 32 | 39 |
| 8 | Front placket edge stitch | 35 | 40 | 55 |
| 9 | Sew box at placket | 29 | 33 | 39 |
| 10 | Yoke attach to back | 56 | 64 | 70 |
| 11 | Sholder overlock | 35 | 40 | 49 |
| 12 | Top Stitch Shoulder | 28 | 32 | 39 |
| 13 | Tack piping at collar ends | 28 | 32 | 36 |
| 14 | Attach piping to collar | 26 | 30 | 35 |
| 15 | Turn placket ends inside out | 28 | 32 | 39 |
| 16 | Finish piping | 35 | 40 | 49 |
| 17 | Cuff O/L | 28 | 32 | 36 |
| 18 | Cuff Topstitch | 25 | 29 | 68 |
| 19 | Sleeve attach | 56 | 64 | 69 |
| 20 | Sleeve topstitch | 28 | 32 | 39 |
| 21 | Slits Making | 25 | 29 | 35 |
| 22 | Sides seam | 30 | 35 | 39 |
| 23 | Bottom Placket | 30 | 35 | 40 |
| 24 | Tack at Sleeve ends | 26 | 30 | 36 |
| Finishing Operations | | | | |
| 25 | Button Hole 6 + 2 | 80 | 92 | 112 |
| 26 | Button attaching 6 + 4 | 100 | 115 | 127 |
| 27 | Thread Trimming Garment | 60 | 69 | 78 |
| Total | | 986 | 1134 | 1348 |
| Extra time Consumed per Piece with respect to Basic time | | 1348 - 1134 = 214 sec | | |

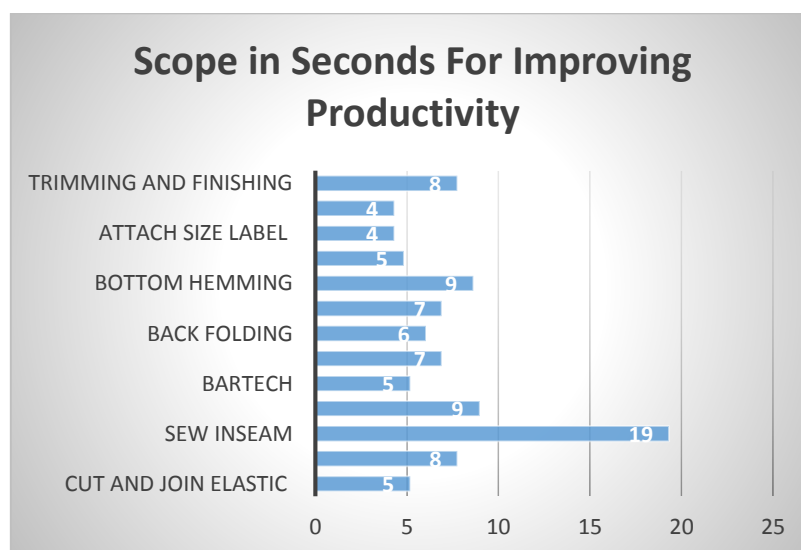


Figure 3: Scope of Improving Productivity in Individual Operations of Leggings Manufacturing Observations:

It has been observed that in this study that sew inseam consume more time for in this garment industry and this can be reduced by giving training to the workers with proper method that not only will reduce the time but also will improve the quality of the product. In overall performance it was observed that the time consumed for the operation was increased due to lack of material provided to the workers to continue this stitching operation so care has to be taken by the management to supply with ample of stock on their table so that they could not sit idle in absence of material.

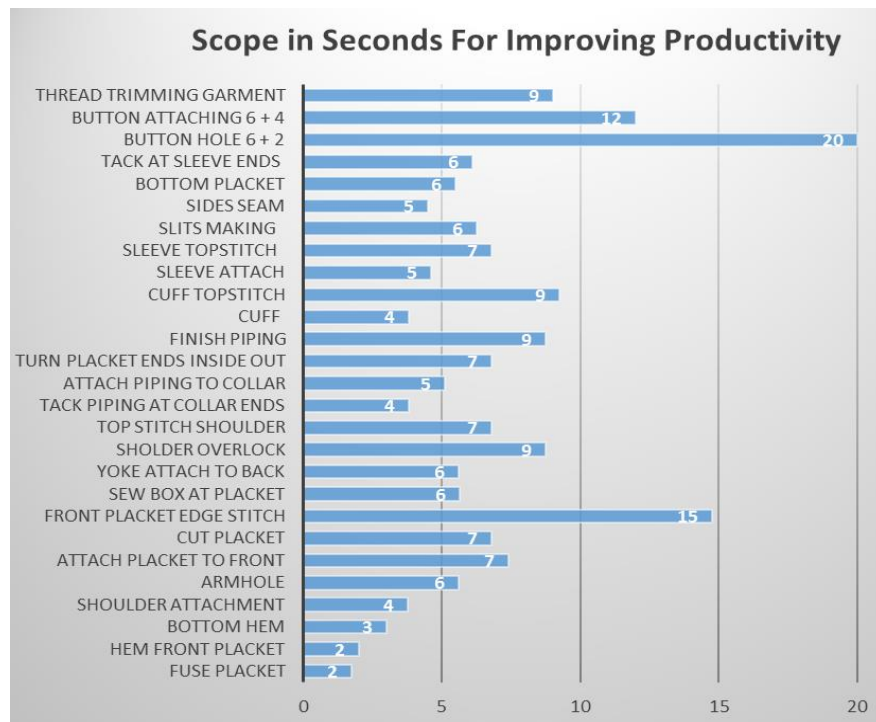


Figure 4: Scope of Improving Productivity in Individual Operations of Shirt Manufacturing

Observations:

As it is found that button hole is consuming 20 secs more for the operation in garment so it is required to provide with special training to the operator for attaching hole which will improve their efficiency and productivity, similarly front placket edge stitching also required special technique which can be practiced by continuous application. so a training should be provided to the workers in in this line so that by continuous practicing the same task with ease and proficiency they can improve the efficiency along with the rise in production.

Recommendation

- 1] Provide material to operator as in ample before process start.
- 2] At least require number of bone should be provided near the operator table.
- 3] It was observe in the above operation most of the time was spend in elastic attachment for drinking water so it was recommended to provide water bottle on machine table for saving a time in this section.
- 4] It was observe that after completion of the sewing operators was found idle as there was not availability of feed material by the supervisor line, so here care is needed to be taken to see that there should be adequate stock material which will prevent the operator sitting idle thus proper utilization of time management will be carried out.
- 5] It was suggested to have a strict schedule for the time allotted to the task that the operator is performing so that after completion of the shift he can analyze the work done by him and in the same way management should encouraged and award the operator for his performance given in the industry.
- 6] Reduce downtime by taking preventive maintenance step to improve productivity.

IV. Conclusion

As it is found that garment manufacturing is gaining its importance thorough out the world due to its demand which is coming from various places. To facilitate the entire world it is required to provide with huge supply which can be fulfilled with proper time management with improvised quality of the garment, which can be achieved by special training and some steps needed to be taken to improve the productivity. The observations of the time study elaborate on the scope for reduction in the time taken and improvement in the production of the garment industry. It was observed more time consumption occurred during operations like sew inseam, button

hole stitching and front placket edge stitching which can be reduced by providing a special training from the experts which will not only improve the efficiency but will also increase the productivity. Apart from this there are some operations which require pieces to be stitched should be available in ample, as the lack of availability will lead the workers to sit idle and hence reduction in the production rate.

Acknowledgment

The author is also highly grateful to Mr. Jainath Rana General Manager and Mr. Raj Kumar plant head of Pratibha Syntex Indore, for their technical support and guidance.

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