

## Work Study might be the Paramount Methodology to Improve Productivity in the Apparel Industry of Bangladesh

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### Abstract

Bangladesh has disappeared all the way through and unprecedented augmentation of export-oriented apparel industries. The augmentation rate is extravagant if seen from the observation point that progress in any other sector of industry was lethargic and of indispensable textile sector, in particular, was pessimistic and had been a source of drain on our possessions. Productivity of apparel items is rather a very multifaceted work under a lot of anxiety points and the obligatory methodical operations. Added to the particular intricacy and inimitable features of apparel production there is the lack of aposite management procedures. A numeral of actions should be undertaken to substantially improve productivity. The first and foremost measure to be implemented is introduction of work study principles in the apparel industries of Bangladesh. Work Study is a management technique that agrees on standard time requisite to complete a task and ascertains the best methodology to bring about the task in the easiest and cheapest manner. As manual work abounds in the apparel industry of Bangladesh, work study might be the only methodology to stipulate a time frame to complete each task. Work study also specifies the precise method of doing the task. Thus work study helps to enhance productivity to the preferred level as a paramount methodology evidently. In a nutshell, this is a science of setting up standard time of a job (work measurement) and discovering the best and the easiest way of performing the task in a production floor of an apparel industry like Bangladesh because work study might be the only systematic method of examining existing ways of doing a task so as to improve productivity up to the mark and to set up standard time to maximize production efficiency.

**Key Words:** Apparel Industry, Productivity, Production, Work Study, Efficiency, Method, Process and System.

### 1. Introduction

Apparel is one of the three basic needs of the mankind. Hence textiles and apparel have retained an important place in human life starting from historical era to today's modern world. It is well-documented fact that the textile and apparel industries have been the driving force for all developing countries like Bangladesh. So productivity is one of the majors concerns to execute the apparel industry into the success in terms of its requirement and currency earning strategy. Dr. Bheda also points out that companies must be aware of the technologies that improve the effectiveness as well as the efficiency of apparel industry [1]. A tremendous amount of research and experience went into developing the right path of productivity which can ensure the best efficiency to the final production for an order in an apparel industry of Bangladesh. Productivity is a frequently talked about phase in any production oriented enterprise like Bangladesh apparel industry. Providence of an organization ultimately depends upon quality and productivity. Productivity actually always encompasses quality. Productivity recounts to all actions in the enterprise. This study illustrates how low productivity brings in a chain of vicious cycle in the organization, the procedures to be taken to heighten productivity in totality and how systems and processes endorse productivity through work study. Work study always involves it self in though investigation of all processes and factors that impair productivity by close supervision.

### 2. Pre-Discussion

Productivity always refers to speed. It is conceived of how speedily a product or service of desired quality is produced. Work study can manage productivity is thus defined as a rate of production per unit of time or per unit of qualified worker or per unit faultless machines. It is also measure of how much output is generated from a certain amount of input or resources. It is thus ratio of output and input expressed in percentage.

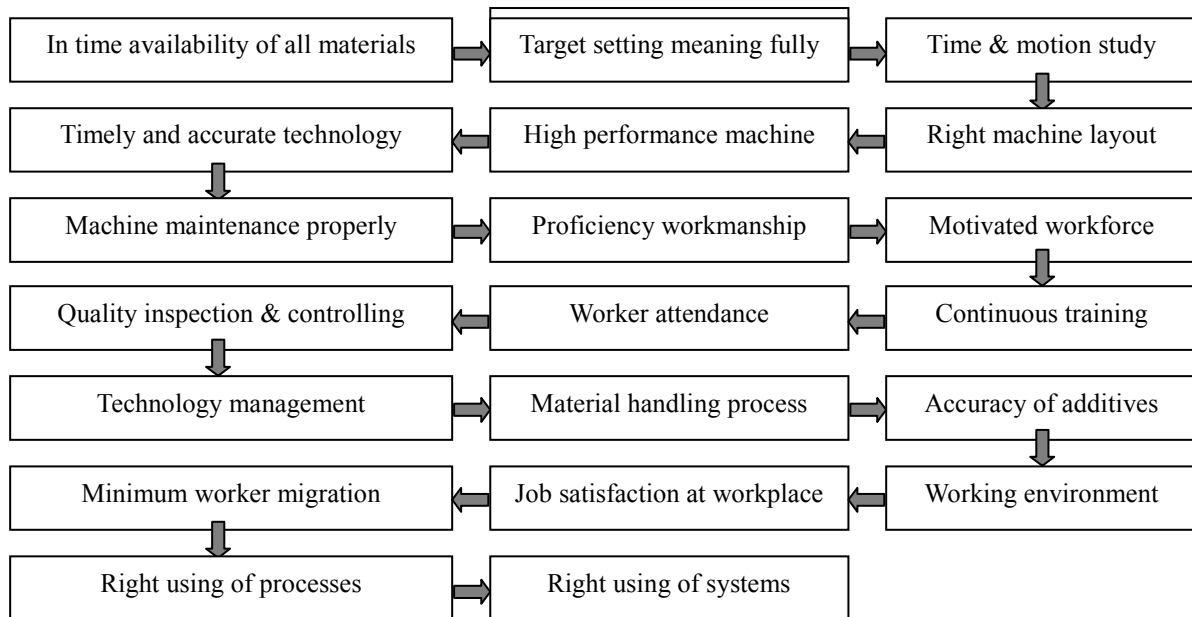
Thus **Productivity = (Output / Input) \* 100**.

Production generally refers to activities that convert resources into product or services while productivity is related with how speedily products or services are produced. There are some criteria which are affecting the apparel industry productivity in Bangladesh such as: [2]

- a. Direct Labor Productivity: It is the quantity of product or services produced by unit worker.
- b. Indirect Labor Productivity: Total Man-Hour = Operators \* Hours

- c. Productivity per Unit Time:  $\text{Time Value} = \text{Produced Quantity} * \text{Dozen} * \text{Standard Time}$
- d. Productivity in Totality: Productivity of all activities should be improved rather than improving productivity of production in segregation.
- e. Daily Production Target:  $\text{Daily Possible Production Target} = \text{Daily Clock Minute} / \text{standard Time}$
- f. Daily Expected Production Target:  $\text{Daily Expected Production} = \{ \text{Daily Clock-Minute (Operators} * \text{Working Hours} * \text{Minuets)} / \text{Standard Time} \} * \text{Efficiency}$
- g. Productivity in a Production Line:  $\text{Indirect Productivity} = (\text{Output-Hour}) * 100 / \text{Input-Hour}$ ;  $\text{Direct Productivity} = \text{Productivity per Worker per Hour} = \text{Production in the Line per Hour} / \text{Number of Workers in the Line}$ ;  $\text{Productivity per Hour in the Line} = \text{Number of Garments Produced per Hour} / \text{No of work Hours}$
- h. Variables of Productivity:  $\text{Production Quantity} = (\text{N} * \text{T} * \text{Efficiency}) / \text{Standard Time}$ , Here N = Number of Operators or machines in a production Line, T = Working Hours Converted into Seconds

**Diagram 1:** Basic Productivity Improvement Intermediates



### 3. Motivation and Productivity

Motivation is one of the prime grounds to promote productivity or efficiency through the workforce at workplace. It is the willingness of workers to exert high level of efforts towards organizational goals, conditioned by the efforts ability to satisfy individual needs. High quality and productivity requires skill and workmanship of the employees. They depend upon the following factors according to the Bangladesh apparel industry environment:

- a. Education
- b. Training
- c. Experience
- d. Willingness
- e. Efforts and
- f. Need to work

Sub Factors

#### *Sturdiness about some of the Motivation Theories*

F. G. Taylor asserted that production can be increased by rationalizing human relations at workplace [3].

Abraham Maslow's Hierarchy Theory,  
 Douglas Mc Gregor's X and Y Theory,  
 Motivation Hygiene Theory,  
 ERG (Existence, Recognition, Growth) Theory,  
 Three Needs Theory,  
 Goal Setting Theory,  
 Expectancy Theory,  
 Reinforcement Theory and  
 Equity Theory.

Motivation Aspects [4]

#### 4. Significant Literature Appraise

##### 4.1: According to In General Methodology

Productivity denotes the productiveness of the factors of production, labor and capital, in creation of wealth (BIMF 1976). In simple words productivity is concerned with the efficient utilization of resources (inputs) in producing goods (outputs). [5] But utilization depends on the effectiveness of the company. Sometimes an industry can be misguided to its proper utilization so that productivity may not be the high range of measure as reached. Adjustment may be necessary before the new system starts to work. There can be a 'dip' in productivity when organizational changes are introduced, followed by a strong improvement if they are done well, while implementing change and offers several procedures for involving workers in the process of that change, Section will assist you in assessing the impact of change on productivity [6]. So the new management absorbance are totally catalyzing by the workforce of an apparel industry. Conventional system of production can only ensure the productivity but not the higher range of it. The industry's perception of world standard of productivity level for a shirt manufacturer varied a lot from factory to factory. The highest standard reported by respondents was 38 shirts per machine/operator per shift, where as the lowest reported was 8 shirts per machine/operator per shift [7]. On the contrary, Work Study must ensure the highest production range due to its line balancing procedure. Towards the end of a study of the technology of clothing manufacture, it is appropriate to consider the way forward for the clothing industry, in terms of likely technological developments. Reference has been made many times to the labor-intensive nature of the sewing process and to the small proportion of a sewing machinist's time which is actually spent sewing, and it is the sewing area of garment manufacturer which has long been expected to offer the widest scope for imaginative research and development [8]. Sewing balance only possible in case of work study implemented because it shows the clear direction.

##### 4.2: According to Work Study

It identifies the reasons for performance measurement in apparel industry and the failings of many "traditional" measurement systems that rely principally on financial indicators. It describes the factors of work study underlying an effective measurement regime and comments briefly on some of the more modern approaches to performance measurement of work study, such as the balanced scorecard and activity-based costing [9]. There are several issues involved in the implementation of large scale of automation concerning work study. Automation historically has involved improving efficiency through the automation of task. This has resulted in the removal of direct labor from the manufacturing process and some easily quantifiable savings against which cost of the automation could be balanced [10]. Work study can help a production system to manage its automated standard time to make production automated and efficient successively. It is difficult to measure the effects of management practices on organizational performance. In spite of these difficulties, a collage of evidence suggests that innovative workplace practices can increase performance, primarily through the use of systems of related practices that enhance worker participation, make work design less rigid, and decentralize managerial tasks [11]. Work design is the attempt of work study and it can design a Line imbalance to balance and ensure the productivity. These apparel industry responses to this challenge. Industry initiatives, such as the Apparel Industry Partnership Agreement and the National Retail Federation Statement of principles on Supplier Legal Compliance, are discussed, and the content of codes of conduct from major manufacturers and retailers are analyzed. The review indicates that while many firms have codes of conduct, there is only limited uniformity across codes, the codes lack substantial detail, and the codes are particularly lax in the area of monitoring and enforcement [12]. Work study maintains the supply flow according to the production and it's automatically set up its balance to maximize the productivity. Another aspect of Quick Response (QR) that has become common in the Apparel Industry is partnering with suppliers and customers. This is now commonly called supply chain management (SCM) (Lowson, King, & Hunter, 1999) [13]. QR is one of the most implemented tools for Work Study and it directs the productivity up to the margin and maintains the workforce accordingly. Work study motivates the supply chain management gravely.

#### 5. Quite a Few Productivity Managements

There are several types of Managements already applied on the Apparel Production System but significantly the experiences are not same to each other. Bangladesh Apparel Industry Sector has also engrossed some of them but still these are not significantly persuaded. These are:

- a. Japanese Management and Productivity
- b. Influence of 5S Principle of Performance
- c. Influence of Kaizen on Performance
- d. Quality Circle and Productivity
- e. Customer Supplier Chain and Productivity

Implemented by apparel Experts [14]

## **6. Work Study: At a Fleeting Look**

### **6.1: The Magical Tool of Improving Productivity**

Work study is scientific methods which ensures measurement of work content of a task and takes resource to better method of doing it and thus realize the best utilization of human, machinery and other resources of an apparel industry. A critical role of productivity under work study in the line development process is to establish an effective, creative environment. This involves developing design spaces where all creative personnel can interact and share inspirations and ideas outside the bounds of corporate structures, confining offices, and rigid control [15]. If we cite an example: A factory does not know work study method and produces Shelf Canneds (ladies knitwear) @200 pieces per hour and only 1600 pieces in a day of 8 working hours by employing 24 machines in a production line. But in order to affect shipment in time it needs to produce the item @ 300 pieces per hour or 2400 pieces per day of 8 working hours. Conventional consideration in this county (Bangladesh) to produce 2400 pieces per day is to raise working hours from 8 to 12 hours instead of improving productivity from 200 pieces per hour to 300 pieces per hour by designing proper lay-out & balancing the line. The method that extends a helping hand in improving productivity in such cases is the work study method which is also coined as Time and Motion study. Work study is a component of management science & it was developed by the well-known American scientist F.W. Taylor, generally known as father of modern management science.

### **6.2: Reimbursement and Endeavors**

Companies have been organized traditionally along functional lines through work study. Consider a manufacturing company like apparel industry with an in-house design capability. Traditionally, Design, Production, Sales and Finance are distinct parts of the company, often with their own director and management structure [16]. So work study has some common reimbursement and endeavors such as:

- a. Productivity and efficiency
- b. Cheap cost
- c. Systematic and comprehensive method
- d. Easily and quickly implemented
- e. Provokes benefits as soon as it is applied
- f. Reduce hazards
- g. The most accurate methodology
- h. Settle down standard time
- i. Able to execute the effective planning
- j. Production quota can be determined
- k. Production capacity can be determined
- l. Line balancing

### **6.3: Realization of Work Study**

This method finds easy, better and economical ways of doing a job while work study reduces ineffective time and sets up standard time for accomplishing the job. This is the way work study contributes to productivity in a great way. Work-study method comprises eight steps:

1. Select: Select the job to be investigated
2. Record: Record data by collecting or by direct observation
3. Examine: Examine data critically. Challenge the following: What is the purpose of action, where is the place of performing it, the sequence in which the job is done, the person doing the job, etc.
4. Develop: Develop the easiest and the most economic methods
5. Evaluate: Evaluate the results of alternative ways of doing the job
6. Define: Define new method & time and present them to the concerned people
7. Install: Install new method and train persons to apply them
8. Maintain: Maintain new standard practice and set control procedures.

### **6.4: Some Supplementary Concerns**

#### **6.4.1: Work Measurement:**

Productivity as a whole depends upon how quickly a job can be accomplished in unit time. The lesser the time required the higher the efficiency or productivity. So it is essential to establish Standard Time to produce unit product or service.

#### **Methods of Setting up Standard Time:**

The main objective of work measurement is the establishment of Standard time for completing a job. Standard time can be determined in variety of ways, such as the following:

1. Time study
2. Basic standard time data
3. Pre-determined Time Standard (PTS)
4. Work sampling

5. Structured estimating

**6.4.2: Time Study:**

Time study is a technique of work measurement for recording time of doing a certain job or its elements carried out under certain conditions at defined rate of performance such as:

1. Process Cycle or operation cycle:
2. Qualified worker
3. Observed Time

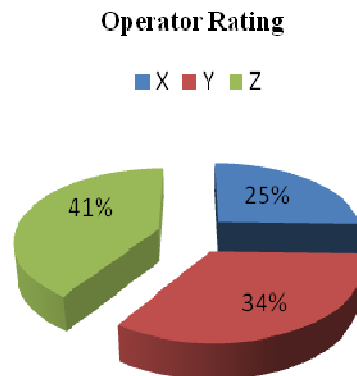
**6.4.3: Rating:**

Different workers perform their job with different efficiencies. Some workers are clever; they learn their job quickly and attain a very high efficiency. Some others may be mediocre and many others may be lenient to learn or may be dull. Thus workers widely vary in their performance. Thus rating is the measure of speed with which an operator works. Rating is the speed of an operator doing a job relative to the observer's idea of standard pace of work. Rating is thus a comparison of the rate of work observed by a work study executive with the idea of some standard level of working in his mind.

**Table 1:** Sample Rating Sheet in Work Study

Operator	Observed Time	Operator Rating	Basic Time
X	16" Seconds	75%	16*75% =12"
Y	12" Seconds	100%	12*100% =12"
Z	10" Seconds	120%	12*120% =12"

**Diagram 2:** Sample Rating Scenario in Work Study



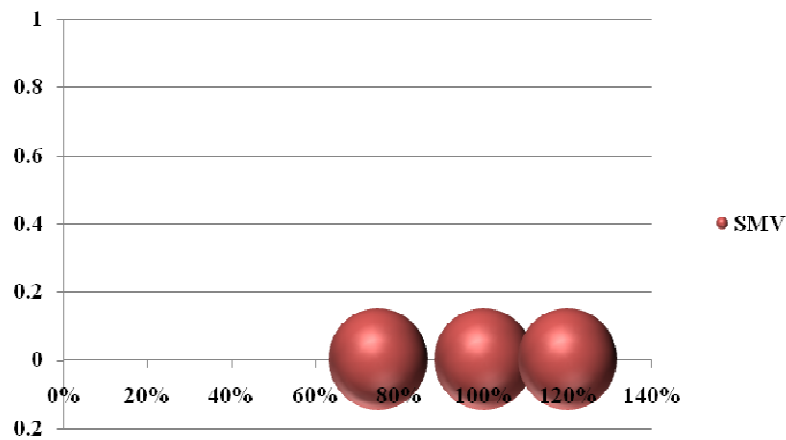
**6.4.4: Standard Time:**

Standard time of an operator is the time which a qualified operator should take to accomplish it if he or she works at standard performance (at the rating of 100) and provided he or she takes extra time allowed to him or her as allowance. If time is counted in second it is called Standard Time (or Standard Second) but if time is calculated in minutes, Standard time is referred to as Standard Minute or Standard Minute Value (SMV).

**Table 2:** Sample SMV Revealing in Work Study

Operator	Observed Time	Operator Rating	Basic Time	Allowance @ 15%	SMV
X	16" Seconds	75%	16*75% =12"	1.8"	13.8"
Y	12" Seconds	100%	12*100% =12"	1.8"	13.8"
Z	10" Seconds	120%	12*120% =12"	1.8"	13.8"

**Diagram 3: Sample SMV (Line Balancing) in Work Study**  
 SMV



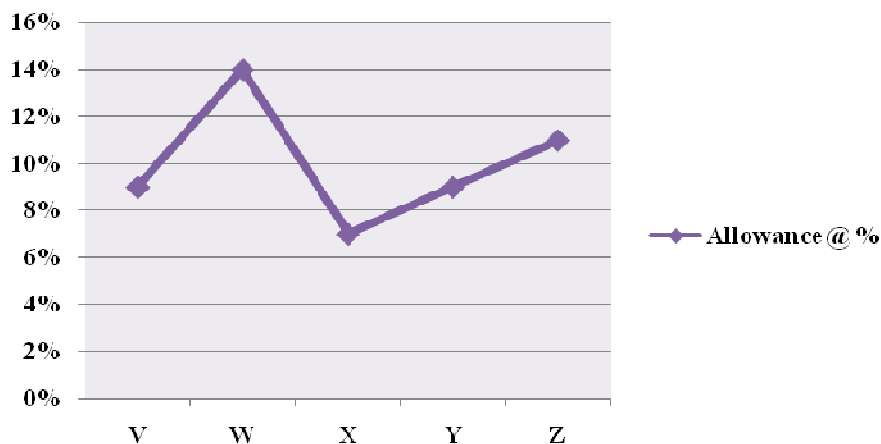
**6.4.5: Allowance Time:**

A worker cannot and does not work continuously throughout his or her full working hours. He or she has to open a bundle, tie it up, go to lavatory, take out bobbin case, replace a blunt needle, talk to the supervisor or line inspector, a small rest to recover from fatigue, etc. He or she cannot avoid doing all these things, because they are beyond his or her control. He or she needs some times for own personal needs. This is why workers are entitled to some type of extra time for these types of circumstances. This type of time allowed to operators for some unavoidable but non-performing task is called allowance. The allowance time ranges from 15-25 %. Allowance time is taken into account during setting up of Standard Time.

**Table 3: Sample Allowance Time Grading @% in Work Study**

Operator	Types of Machine	Allowance @ %
V	1 Needle Lock stitches	9%
W	2 Needle Lock stitches	14%
X	1 Needle 3 Thread Over lock	7%
Y	2 Needle 4 Thread Over lock	9%
Z	2 Needle 5 Thread Over lock	11%

**Diagram 4: Sample SMV (Line Balancing) in Work Study**  
 Allowance @ %



**6.4.6: Calculation of Standard Time:**

Standard Time is calculated by adding Allowance Time to the Basic Time.

Example: An operation has been calculated to have an average Observed Time of 20 seconds. The operator's rating is 90%. Allowance Rate to apply is 15%.

Calculation: Basic Time = Observed Time \* Rating = 20 \* 90% = 20 \* 0.90 = 18 Second. So, Standard Time =



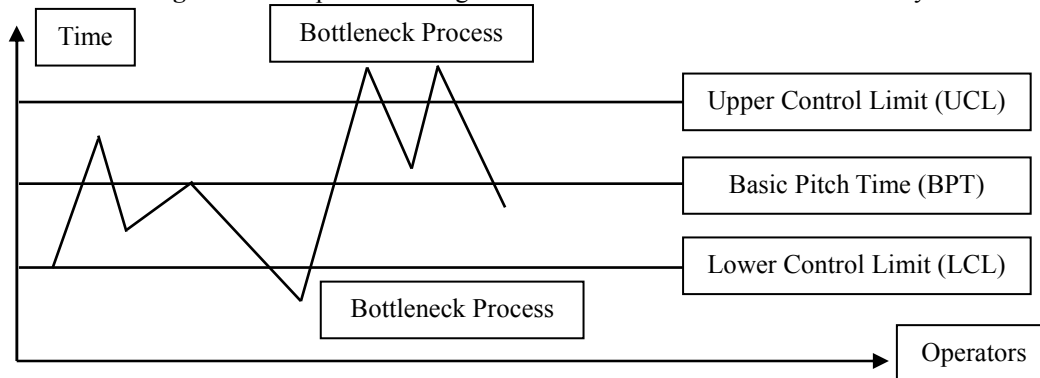
Basic Time + Allowance Time = Basic Time + Basic Time \* Allowance rate =  $18 - 18 * 15\% = 18 + 2.7$  Second.  
Total Standard Time: We now know what Standard Time of an operation is & how to calculate it. But apparel consists of dozens of operations. Thus Total Standard Time of apparel is the sum total of Standard Time of all operations.

#### 6.4.7: Pitch Time:

Let us assume that a shirt has 1,000 Seconds of Standard Time. It has 50 operations which have been divided among 40 operators. An operator may be allotted one or more operations. Time allotted to individual operator is called Pitch Time. Here each operator on average is allotted  $1000/40=25$  Seconds of work. This time (25 Seconds) is called Basic Pitch Time.

So Basic Pitch Time = Standard Time / Number of operators =  $1000 / 40 = 25$  seconds.

**Diagram 5:** Sample Pitch Diagram and Bottleneck Process in Work Study



## 7. Methodology

In this explore, Qualitative Scheme through some basic examples has been used. In the Qualitative Method we can come across out how people feel or what they consider about a particular problem, which are very relevant in this explore. Mainly the Descriptive Explore approach has been used with some significant examples which might face in the work study randomly. Some of the Calculation has been made to understand the ability and the succession of work study. The investigation of this explore is stand on Examples Data specially, together with online and books databases, digital libraries, journals, conference papers, etc. Work Study for Bangladesh Apparel Industry study papers and books of academicians and practitioners are progressed from distinguished international journals, namely International Journal of Industrial Engineering (UK) Business and Management (Canada), SAGE Journal of Clothing Technology, PROQUEST, IJSCM, IEEE, ACM, JSTOR, EMERALD, Science Direct, Journal of Manufacturing Management (Australia) etc. The relevance of Apparel Productivity and the Contemporary Production System like Work Study on Apparel Industry was developed based on the scrutiny of literature.

## Conclusion

Bangladesh earned a dizzying success in the manufacture and export of apparel in the world. In some categories of products, Bangladesh secured top position in terms of export in volume and value. Nevertheless most of the Bangladesh apparel industries are not really productive which is compensated by off the clock work. So Bangladesh apparel industries have no other choice but to improve productivity in a substantial way. So work study might be the pertinent elucidation to recover this actuality straight away. Work study is a constituent of management science and it is ensuring the precise and the immersing productivity which could be the crucial feature for Bangladesh apparel industry and the Bangladesh GDP as well. Work study is a very thorough process in investigating problems in production floor and it is also comprehensive in determining solution of such problems. As work study is involved in rigorous study of problems and thorough working out of solutions, it is a time reducing issue. It succeeds because it is systematic as explained in this study and also developing the coveted solution in terms of productivity, efficiency and the management of production floor or line balancing in the apparel industry. So works study, perceptibly the judicious solution for Bangladesh apparel industry to settle down the position all over the world in apparel sector strappingly.

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