Faculty of Engineering

Department of Textile Engineering

PROJECT REPORT

Comparison of Sewing Productivity Among Different Sewing Floors

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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

Duration: Summer, 2019

DECLARATION

We openly declare that,

This Industrial Attachment has been completed to proper works by us. We also declare that the information neither of this Industrial Attachment or any part of it didn't submit elsewhere for offer of any degree.

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Approval Sheet

This report entitled "**Comparison of sewing productivity among different sewing floors"**is prepared and submitted by **Rajesh Kumar Kundu (ID# 163-23-4801) & Md. Farhad Hossain (ID# 163-23-250)** in partial fulfilment of the requirement for the degree of BACHELOR OF SCIENCE IN TEXTILE ENGINEERING has been examined and hereby recommended for approval and acceptance.

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Acknowledgement

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Dedication

We dedicate this project to Allah Almighty my creator, my powerful pillar, my source of the greatest inspiration, knowledge and understanding. He has been the creation of our strength throughout this attachment and on His wings only have we soared. We also dedicate these work to our forthcoming employee and to our dignified honourable parents, teachers .Our respect for yours all can never be quantified. May God bless us & long live.

ABSTRACT

This project is the greatest important of any RMG industry. This paper represents the use of various tools and techniques for taming apparel sewing section efficiency throughout the production process. Now a day's apparel manufacturing industries are annoying to improve their current production system and situation and continuously looking for new production tools and techniques in order to keep quickness with the quick changes of trend in consumers of apparel products. There is no doubt that sewing section in an apparel industry is the most vital and teeming department that plays a vital role in the whole firm. In time study, Standard Minute Value has been calculated for each process or work. Here, by applying these systems significant progresses in the sewing section have been accomplished such as SMV, man power, bottle neck, capacity achievable, production/hr, performance rating, balance % and line efficiency.

1st day when compare O.F 3rd and N.F 4th floor, O.F 3rd become high SMV and complex process so production and efficiency% is low. O.F 3rd production 7664 pcs and efficiency 38%. 6th day when compare N.F 4th, N.F 6th and O.F 4th, here every floor SMV is same. Here SMV, production and efficiency% N.F 4th floor 11.67, 9750 pcs & 49%, N.F 6th 11.70, 10309 pcs & 51%, O.F 4th 11.40, 9435 pcs and 48%. If it should that here O.F 3rd SMV is low other two floor. None the less due to various factor in this floor production efficiency is comparatively low. Like- comparatively unskilled operator, improper line balancing, Delay cutting output, High non- productive time, alter % high, Machine break down etc.

Initailly we know that if the SMV is low that's mean this process simply. So in this process prodution and efficiency is high but some factors proved that my concept was wrong. By the capasity study find out the bottle neck point, Accept to large quantity order, working sharing, proper layout, line balancing to helps ahcieved production and efficiency%.

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CHAPTER-1

INTRODUCTION

1.1 Introduction:

The Ready-Made Garments (RMG) industry conquers a unique position in the Bangladesh economy. It is the largest exporting industry in Bangladesh, which experienced prodigious growth during the last 25 years. Since the late 1970s, the RMG industry started developing in Bangladesh primarily as an export-oriented industry although the international market for RMG has been increasing fast due to increase in personal not reusable income and change in life style. The sector rapidly attained high importance in terms of employment, foreign argument earnings and its contribution to GDP. In 2006, the industry employed directly more than 2.1 million workers, about 80% of whom were female. With the growth of RMG industry, linkage industries providing fabrics, yarns, accessories, packaging materials, etc. have also comprehensive. In addition, demand for services like transportation, banking, shipping and coverage has increased. All these have formed additional employment. The total indirect employment created by the RMG industry in Bangladesh is estimated to be some 250,000 workers. In 1983-84, RMG exports earned only $31.57 million, which was 3.89% of the total export incomes of Bangladesh. Total Export Incomes from Textile & Garments was about US$ 20.13 billion (during FY 2011-12) accounting for 78.60% input in the national export earnings. This Sector provides employment to around 5 million (3.5 million in RMG & 1.5 million in Primary Textile Sector) people, making it the major source of industrial employment in Bangladesh.

Both external and internal factors contributed to the outstanding growth of RMG sector. One external factor was the application of the GATT-approved Multi-fiber Organization (MFA) which accelerated international relocation of garment production. Under MFA, large retailers of RMG like USA and Canada imposed quota restrictions, which limited export of apparels from countries like Hong Kong, South Korea, Singapore, Taiwan, Thailand, Malaysia, Indonesia, Sri Lanka and India to USA and Canada. On the other hand, application of MFA worked as a sanctification for Bangladesh. As a least established country, Bangladesh received preferential management from the USA and European Union (EU). Primarily Bangladesh was granted quota-free status. To maintain competitive edge in the world markets, the traditionally large suppliers/producers of apparels followed an approach of relocating RMG factories in countries, which were free from quota precincts and at the same time had enough trainable low-priced labour. So RMG industry industrialized in Bangladesh. But there are numerous weaknesses of the RMG industry of Bangladesh. Labour productivity in the RMG sector of Bangladesh is lower than many of its challengers. Bangladeshi workers are not as competent as those of Hong Kong, South Korea and some other countries and in most factories, operational systems, expertise used are not the latest. So day by day RMG of Bangladesh is facing cut throat co-operation and challenge in the global market. This is because of reduction in buyer's price but demanding tinier Lead Times with good Quality, and increase in manufacturing cost. In this vital moment factory management techniques of yesterday must be replaced by more efficient methods that greatly minimize waste, reduce costs, lead time and improve quality bringing in maximum value to customers. Lean Manufacturing System doesn't tolerate any kind of waste such as overproduction, waiting, WIP, processing waste, transportation, motion, making defective products, underutilized people etc. Lean Manufacturing is a whole-systems policy that creates a culture in which everyone in the organization continuously increases processes and production. So, we can say Lean is the ultimate solution. A number of measures should be undertaken to substantially

improve productivity. One of the most important tool to be implemented is Cellular Manufacturing (Team work) approach that helps build a variety of products with as little waste as possible. This is inline with Lean Manufacturing philosophy also 3. The thesis work aims at the application of different Lean Manufacturing concepts, including the establishment of Cellular Manufacturing system in the Garments Industry.

1.2 Objectives:

The particular objectives of the present research work are as follows:

- Decrease of idle time in the production line through line balancing.
- Decrease of materials movement time through change in facility layout.
- Amount of quality status through quantitative indices.
- Amount of Productivity.
- Identification of essential measures to implement Cellular Manufacturing System to maximize labour utilization time and minimalize waste (Non-Value-Added activities)

CHAPTER-2

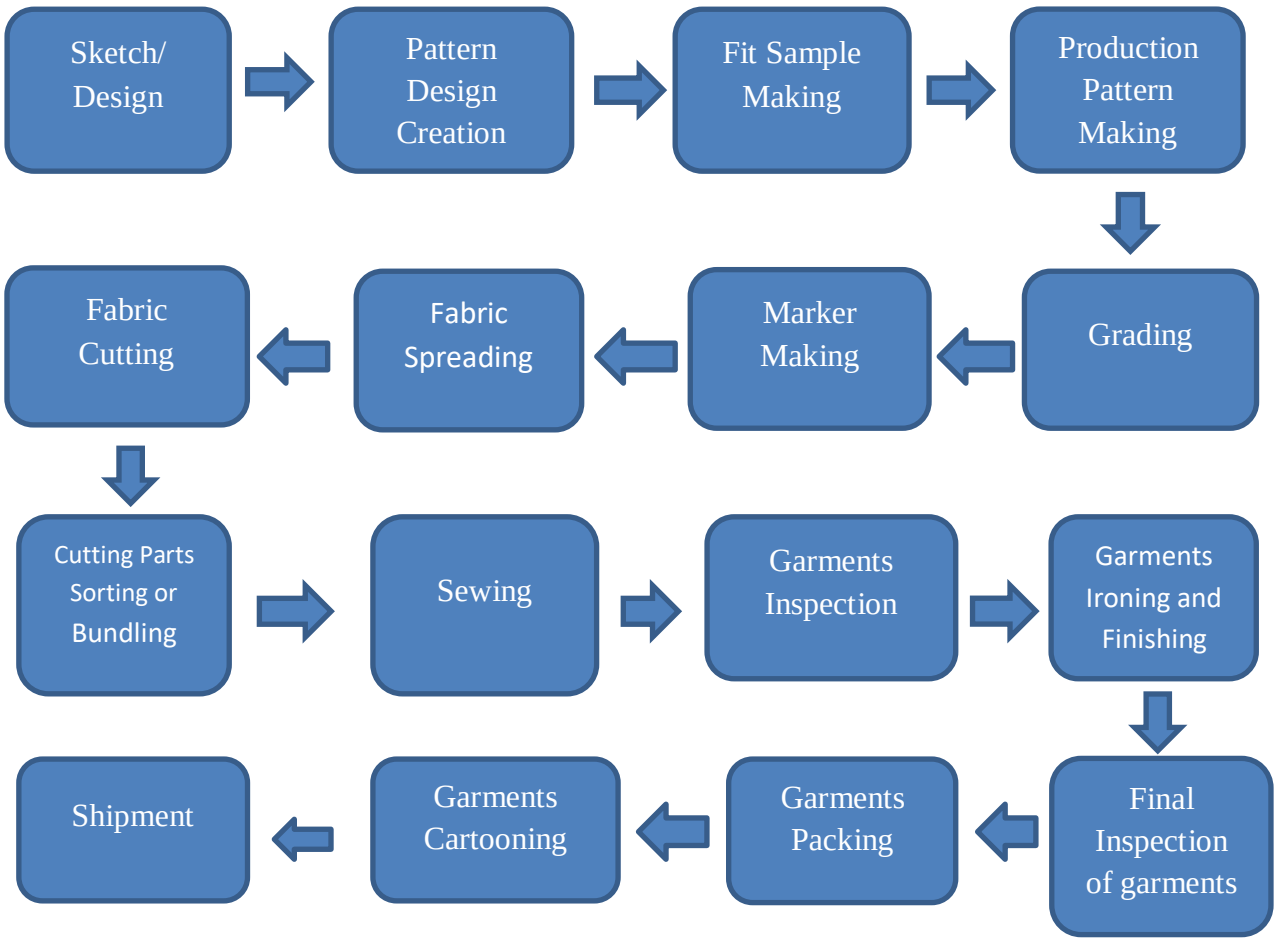
LITERATURE REVIEW

2.1 Garments Manufacturing:

A complete garments must face many process from its order receiving to cargo. Throughout clothes producing, a method flow chart should be required to finish associate in nursing order simply. Also, a method flow chart helps to know a garments producing technic that however the raw materials square measure reborn into the wearable clothes.

2.2 Flow Chart of Garments Manufacturing Process / Technology:

A basic garments producing flow chart is given within the below:



2.2.1 Design:

The design is provided by the client when inserting associate order emptor send the technical sheet associated art-work of an order to the Merchandiser. This method is completed by each manually or by using computer.

2.2.2 Pattern Making:

By following technical sheet and art-work, pattern of every garment vogue ought to be created. It's done by each manually and by victimization processed technique.

2.2.3 Fit Sample Making:

The main target of creating a fit sample is to follow the details information about that garments style. Once creating it's sent to the buyer to rectify. It's done by manually.

2.2.4 Production Pattern Making:

For bulk production, allowance supplementary here with internet dimension. Production Pattern creating is finished by each manually and by using computer.

2.2.5 Grading:

During associate order confirmation, the customer suggests concerning the scale quantitative relation of that order. So order ought to be stratified in line with the buyer's instruction. Grading is finished by manually or by using computer.

2.2.6. Marker Making:

Marker may be a terribly skinny paper that contains all the components of a selected garment. To form the cutting method simple, it's should be required. Marker creating method is done by each manually and by using computer.

2.2.7 Fabric Spreading:

To cut the material properly fabric is unfold in lay type cloth Spreading is completed by manually or by exploitation processed technique.

2.2.8 Fabric Cutting:

Fabrics need to cut here in step with marker of clothes. Cloth cutting method is completed by mistreatment manual technique or processed technique

2.2.9 Cutting Parts Sorting or Bundling:

Here, cutting elements ought to delineated or build bundling to send these simply into successive method. This method is completed by manually.

2.2.10 Sewing:

All of the portion or pieces of a garment are joined here to make a complete garment. Sewing process is done by manually.

2.2.11 Garments Inspection:

After finishing stitching scrutiny ought to be done here to create fault free clothes. Clothes scrutiny is completed by victimization manual technique.

2.2.12 Garments Ironing and Finishing:

Here clothes area unit treated by steam additionally needed finishing ought to be completed here. This method is finished by exploitation manual technique.

2.2.13 Final Inspection:

Finally the entire clothes are inspected here consistent with the buyer's specification. Final scrutiny is completed by manual technique.

2.2.14 Garments Packing:

Complete clothes are packed here by mistreatment consumers schooled poly bag. Clothes packing are done by mistreatment manual methodology.

2.2.15 Cartooning:

To minimize the damages of garments, all the clothes got to cartooned by maintaining consumers instruction. This method is finished by manually.

2.2.16 Shipment:

After completing all the required processes it's finally sent to the buyer.

2.3 Industrial Engineering:

Industrial Engineering is concerned with the design, Improvement, and installation of integrated system of men, material, and machines for the benefit of humankind .It draws upon specialized knowledge and abilities in the mathematical and physical sciences together with the principles and methods of engineering investigation and design to specify, predict and evaluate the results to be obtained from such systems.

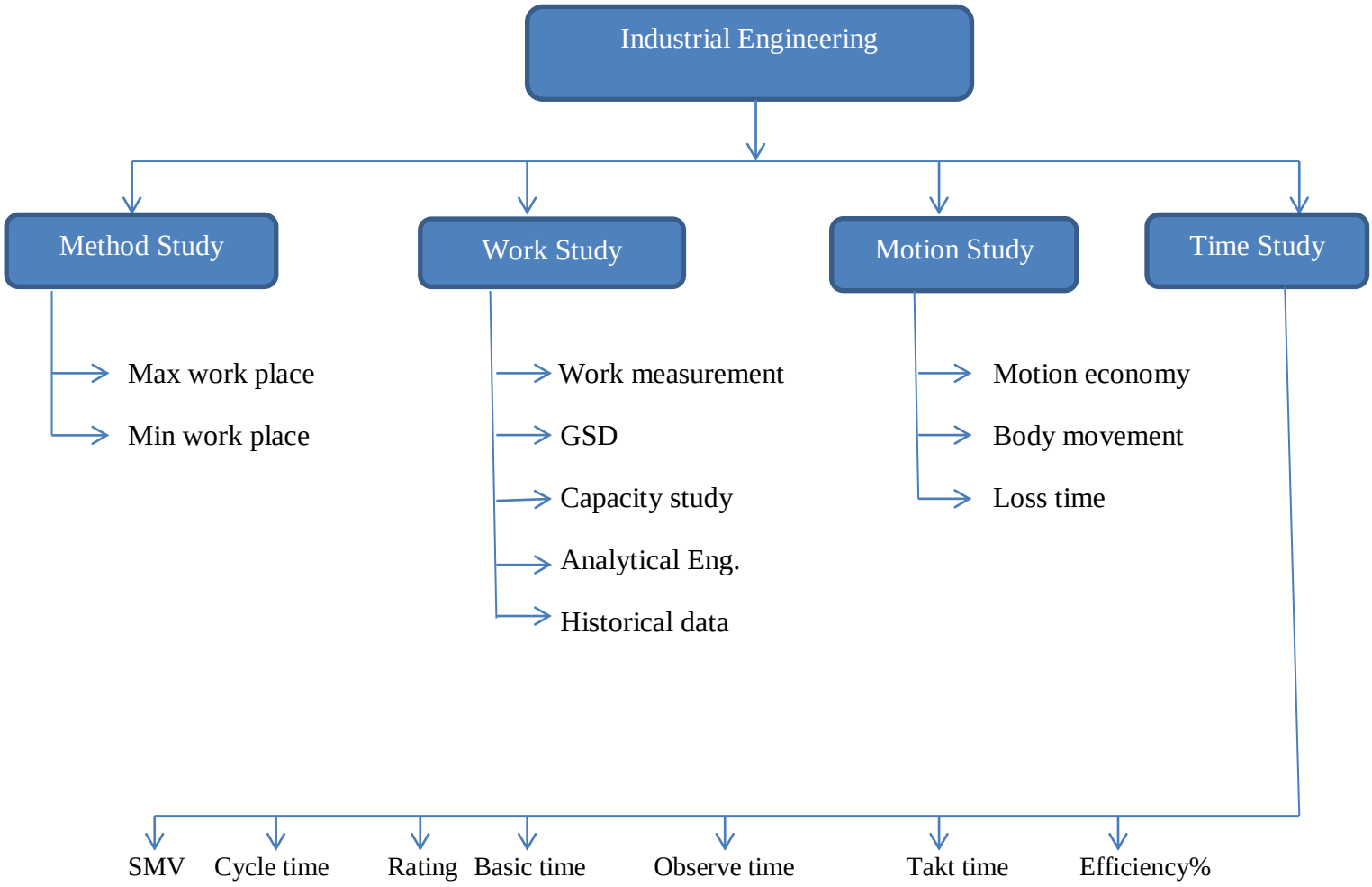
Industrial Engineering (IE) =production↑ cost↓ proper use of all elements↑ Efficiency↑ Revenue↑

2.4 Responsibilities of an Industrial Engineer:

- Operation breakdown
- Machine Layout.
- Buyer & Style wise operation Layout.
- Create Man machine report.
- Buyer & style wise capacity study.
- Buyer & style wise line balancing
- Production Monitoring.
- Achieve the line Target.
- Hourly, Daily, Weekly, Monthly line wise Target setup.
- Wastage resistor at the production floor.

- Arrange trims & accessories in just time.
- Prepared daily Crisis report
- SMV calculation.
- Follow up daily output per production line .
- Follow up daily output per achieve the line.
- Method study and Motion Study to improve the process.
- Data collect & create efficiency report.
- Non-productive time (Lost Time) record and create report.
- Monthly production and shipment closing report create..

2.5 Process flow of Industrial Engineering:



2.5.1 Method study:

Method study is a systematic and scientific assessment of existing and proposed plans and performance of any work system and the evaluation of improvement, through analytical process of critical examination.

2.5.2 Work Study:

Work study is the study by which minimum utilization of man, machine, materials is possible.

Importance/purpose of work study-

- To decrease unnecessary work or excessive work or the non-productive time.
- Systematic study where no issues of production is overlooked.
- Reduce cost.
- Minimum use of resources.
- Upturn profitability.
- Upturn productivity.
- Decrease time.
- To find out the best possible method.
- Create work easier.

2.5.3 Motion study:

Motion study is a technique of analyzing the body motions employed in doing a task in order to short out or reduce ineffective movements and facilitates effective movements. By using motion study and the principles of motion economy the task is redesigned to be more operative and less time consuming.

Classification of body movement-

Operators use their body for different operations and spend their supreme time. The motion time is high but sewing time is low. So, body movement is classified by 5 divisions. They are as below-

- **Knuckle:** only using finger movement
- **Wrist:** using hand and finger movement
- **Elbow:** For arms, hand and finger movement

- **Shoulder:** Upper arm, forearm hand and finger movement.
- **Trunk:** For so upper arm, for arm hand and finger movement.

2.5.4 Time study:

A work measure technique for recording the times and rates of working for the elements within specific conditions, and for analyzing the data so as to determine the time necessary for carrying out a work at a defined level of performance .

Figure: Stop watch

2.6 Line lay out:

A line lay out operates on the standard that each unit is produced exactly the same and those operations are performed in an identified sequence. Work often flows from the back of the layout to the front and from workstation to work station till the garment is completed. Line layout is most efficient with long runs (high volume of identical products) when the sequence of processes and equipment does not have to be changed repeatedly. Depending on the volume required, a plant may have some lines making the same style or several lines each making dissimilar styles. Line layout does not essentially mean each m/c is different. Several workers and helpers may perform the same operation. The objective is steady work movement through succeeding operations. If a style requires only one operative to hem the pockets and three operators to set pockets in order to keep work in process moving slickly, then engineers will form that into the layout. Advantages of line layout may be less work in method than a skill center configuration and fewer handling between operations. This means faster output time and less buildup of parts between operations with high quality. Disadvantages of a line layout include possible bottlenecks (work buildup) and work load difference. Each operation depends on the previous one, and downtime, absenteeism, and slow operators may interfere the workflow. To counter these problems, some operators may need to cross-trained to perform more than one operation, and substitute machines must be cheerfully available for immediate replacement if equipment breaks down. New trainees may be predictable to meet production standards before being placed in a line position. Failure to meet creation schedules for whatever reason may

create a need to reroute work, shift personnel, or schedule to avoid further days. The managerial wants of operation design in the PBU relate to the need for operators to be highly trained on the exact tasks that form the sequence of operations in the assembly of a particular garment style, and for the flow of work through these operators to be forcefully controlled and well balanced

2.7 Capacity Study:

It is exactly the measurement of the operator same as capability. It means the operator is capable of accomplishing the performance measured by the study. The major Want for capacity study is to set Quotas, to motivate operator, and to measure the productions section capacity. By measuring the different operator capacities, supervisor can determine the overall capacity of their section. It is simply the some of specific capacity.

2.7.1Procedure:

1. Use of a stop watch
2. Measure the exact time study
3. Calculate average the time cycle

2.8 Cycle time:

Total time taken to do all works to complete one process, i.e. time from pick up part of first piece to next pick up of the next piece.

2.9 SAM (Standard allowed minute):

The amount of time required to complete a exact job or operation under existing condition, using the specified & standard technique at a standard pace when there is plenty of repetitive work.

Standard time = (Average observed time X Rating %) + Allowance%.

2.10 Allowance:

Dissimilar types of allowances are allowed in apparel production floor. Such as special time allowance, Delay allowances, Fatigue allowances etc.

2.11 Balance:

Balance is an important factor. In traditional performance measurement line, the most important goals of evaluation is performance measurement while modern approach has focused on evaluated growth and increase capacity. Peter Drucker in 1954 argued that one potential solution was to introduce ‘’balanced’’ sets of measures. Market standings, innovation, productivity, physical and financial resources, profitability, manager performance and development, worker performance and attitude, and public responsibility are proper performance standards. Modern estimate system results in satisfaction improvement, efficiency improvement, and finally improvement in effectiveness of organizational activities.

2.12 Bottleneck:

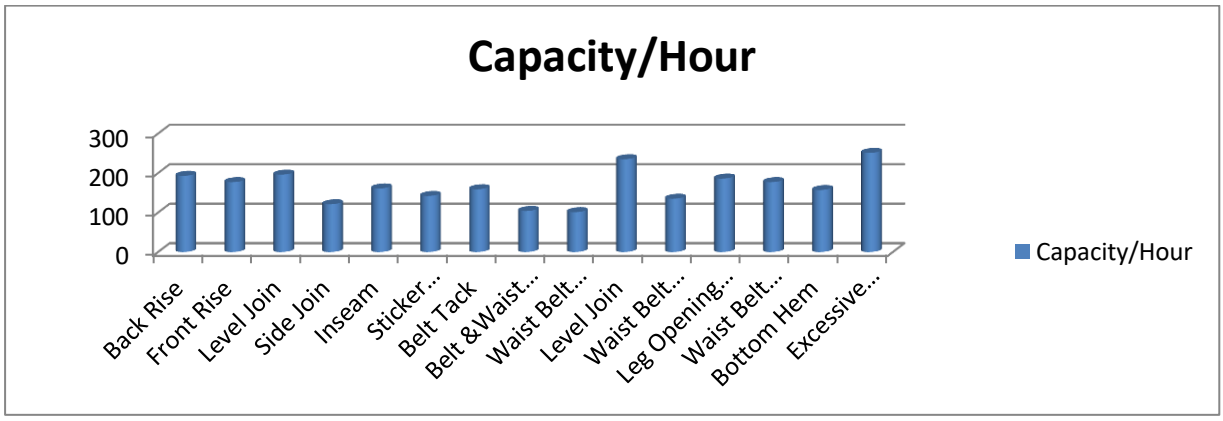
A restraint for smooth flow of operation, limits the flow of production rate, productivity, efficiency is usually termed as bottleneck.

2.13Capacity study:

Buyer Name: Carefour
Style No: I841673
Item: Bottom
Table 2.13.1 Capasity study

S/L	Operation Description	M/C Type	SMV	Cycle Time			Avg.Time in(Sec)	Shared Process	Capacity/ Hour	Bottle Neck Rank
01	Back Rise	O.L	5.98	19	18	19	18.66		193	
02	Front Rise	O.L		22	18	19	20.33		177	
03	Level Join	P.M		18	19	18	18.33		196	
04	Side Join	O.L		48	52	51	60.33	59.66	60 121	
05	Side Join	O.L		46	51	50	59		61	
06	Inseam	O.L		34	35	38	45.67	44.83	79 161	
07	Inseam	O.L		31	37	34	44		82	
08	Sticker Remove	H/P		21	18	22	25.33		142	
09	Belt Tack	P.M		21	19	21	22.66		159	
10	Belt &Waist Tack	P.M		33	35	36	34.66		104	2nd
11	Waist Belt Join	O.L		36	34	37	35.66		101	1st
12	Level Join	P.M		14	15	17	15.34		235	

13	Waist Belt Fold & Tack	P.M		26	29	25	26.67		135	
14	Leg Opening Servicing	O.L		21	20	17	19.33		186	
15	Waist Belt Top Seam	F.L	5.98	21	19	21	20.34		177	
16	Bottom Hem	F.L		25	20	24	23		157	
17	Excessive Thread Cut	H/P		17	15	11	14.33		251	



Graph Chart 2.13.2- Capacity study

2.14 Some Important Formula Industrial Engineering:

- **GSD** = (Man power * Work hour) / Target
- **SMV** = Basic time + (Basic time * Allowance)
- **Basic time** = Observed time * Rating
- **Observed time** = Total Cycle time / No. of cycle
- **Basic pis time** = Total garment SMV / Total Man-power
- **Capacity** = 60 / Capacity time in minute
- **Cycle Time** = 60 / Team target

- **Standard Pitch Time** = Basic Pitch Time + Allowances(%)
- $\textbf{Efficiency}\% = \frac{\textbf{Total production} \times \textbf{SMV}}{\textbf{Total Manpower} \times \textbf{Working hours}} \times \mathbf{100}$
- $\textbf{Production} = \frac{\textbf{Total Manpower} \times \textbf{working hrs} \times \textbf{effieiency}\%}{\textbf{SMV} \times \mathbf{100}}$

CHAPTER-3

METHODOLOGY

3.1 Methodology:

The project work was done by collecting necessary information step by step. The data were collected by monitoring and recording throughout the period of implementation for analysis purposes. The impact of cut panel (faulty) replacing system was analyzed via discussing and observation of the personnel who were directly involved in the implementation process.

3.2 Procedure:

1. A literature review has been made by studying journals, books, articles, report, blog, website, online newspaper and online magazine.

2. Then a suitable factory has been selected where in Interstoff apparels likes old floor-3, New floor-2 and New floor-4. According to procedure doing to task. Material used in following orders are given below-

Table 3.2.1 Old 3rd floor:

	Buyer Name	Vertbaudet
	Style No.	70235-0220
	Item	Hoody
	Colour	Red
	Size Range	S,M,L
	GSM	280

Table 3.2.2 Old 3rd floor:

	Buyer Name	Kariban
	Style No.	K 386
	Item	Hoody
	Colour	Black
	Size Range	S,M,L
	GSM	270

Table 3.2.3 Old 4th floor:

	Buyer Name	M&S
	Style No.	3105-E
	Item	Long Sleeve T shirt
	Colour	Black
	Size Range	S,M,L,XL,XXL
	GSM	130

Table 3.2.4 Old 4th floor:

	Buyer Name	M&S
	Style No.	1002.E
	Item	Polo Shirt
	Colour	Green
	Size Range	S,M,L
	GSM	180

Table 3.2.5 Old 4th floor:

	Buyer Name	M&S
	Style No.	5513.P
	Item	Long Sleeve Polo Shirt
	Colour	Black
	Size Range	S,M,L,XL,XXL
	GSM	140

Table 3.2.6 Old 4th floor:

	Buyer Name	M.care
	Style No.	TB-266
	Item	Bottom
	Colour	White(AOP)
	Size Range	S,M,L
	GSM	190

Table 3.2.7 New 4th floor:

	Buyer Name	M.care
	Style No.	TA-894
	Item	B. T shirt
	Colour	Yellow
	Size Range	S,M,L,XL,XXL
	GSM	140

Table 3.2.8 New 4th floor:

	Buyer Name	M.care
	Style No.	TB-158
	Item	Long Sleeve Pocket T shirt
	Colour	Red
	Size Range	S,M,L,XL,XXL
	GSM	180

Table 3.2.9 New 4th floor:

	Buyer Name	M.care
	Style No.	TB-142
	Item	Baby boys long Sleeve polo shirt
	Colour	Ash
	Size Range	2-3yrs,4-5yrs
	GSM	210

Table 3.2.10 New 6th floor:

	Buyer Name	Tesco
	Style No.	AN.925420
	Item	Bottom
	Colour	Red
	Size Range	S,M,L,XL
	GSM	190

Table 3.2.11 New 6th floor:

	Buyer Name	Tesco
	Style No.	AG9394321
	Item	Top
	Colour	Sky Blue
	Size Range	S,M,L,XL
	GSM	120

Table 3.2.12 New 6th floor:

	Buyer Name	Tesco
	Style No.	KM-926418
	Item	Baby Jumpsuits
	Colour	White (AOP)
	Size Range	1-2yrs,2-3yrs,4-5yrs
	GSM	180

3. Production target should be set here according to buyer requirement, it helps to respect the shipment date.

4. Machine layout is set here according to total process needed to complete a garments item.

5.This process actual line balancing should properly done to utilize the garments worker. If it takes more time in line setup then garments production decreased.

6. To minimize the number of work station, cycle time, line balancing is done, it is very important process to achieve production target.

7. Production data should be collected then analysis production report.

8. Calculate the target efficiency, target production and achieve efficiency using below formula-

$$\textbf{Efficiency}\% = \frac{\textbf{Total production} \times \textbf{SMV}}{\textbf{Total Manpower} \times \textbf{Working hours}} \times \textbf{100}$$

$$\textbf{Production} = \frac{\textbf{Total Manpower} \times \textbf{working hrs} \times \textbf{effieiency}\%}{\textbf{SMV} \times \textbf{100}}$$

9. Compare sewing productivity and efficiency among old 3rd floor, old 4th floor, new 4th floor and new 6th floor.

Chapter-4

RESULT AND DISCUSSION

4.1 1st day Compare of sewing productivity and efficiency between Old 3rd floor and New 4th floor-

Table 4.1.1 Sewing production & efficiency report Old 3rd floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 3rd floor	Vertbaudet	70235-0220	Hoody	22.85	690	9	7664	6190	47%	38%

$$Target = \frac{Total\ Manpower \times Working\ hours \times Trg.Efficiency\%}{SMV \times 100}$$

$$= \frac{690 \times 60 \times 9 \times 47}{22.85 \times 100}$$

$$= 7664\ pcs$$

$$\text{Achieve } Efficiency\% = \frac{Total\ production \times SMV}{Total\ Manpower \times Working\ hours} \times 100$$

$$= \frac{6190 \times 22.85}{690 \times 60 \times 9} \times 100$$

$$= 37.96\%\ ; or = 38\%$$

Table 4.1.2- Sewing production & efficiency report New 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency %	Achieved Efficiency%
New 4th floor	M-Care	TB-266	B.Top & bottom	7.08	312	9	16420	15468	69%	65%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{312 \times 60 \times 9 \times 69}{7.08 \times 100}$$

$$= 16420\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

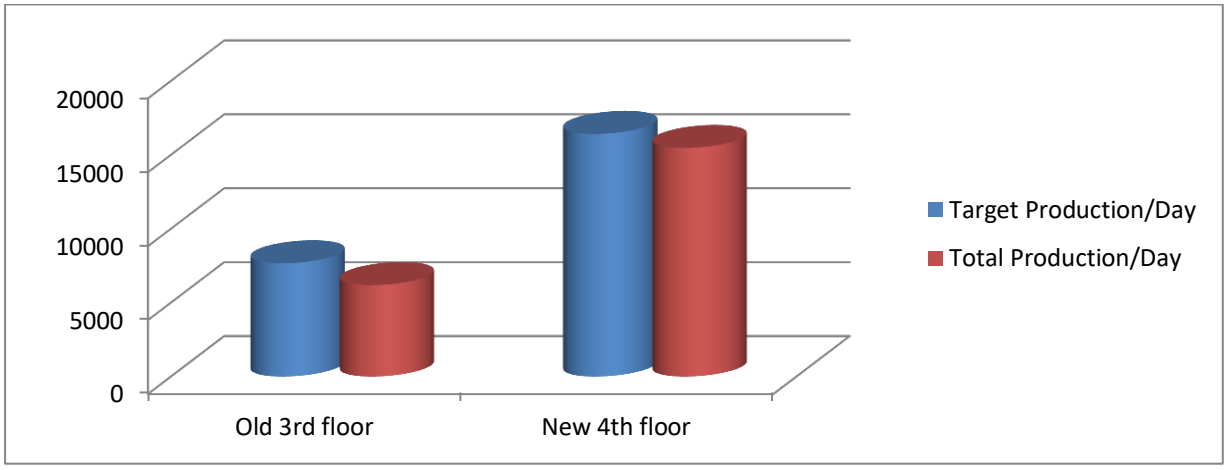
$$= \frac{15468 \times 7.08}{312 \times 60 \times 9} \times 100$$

$$= 65\%$$

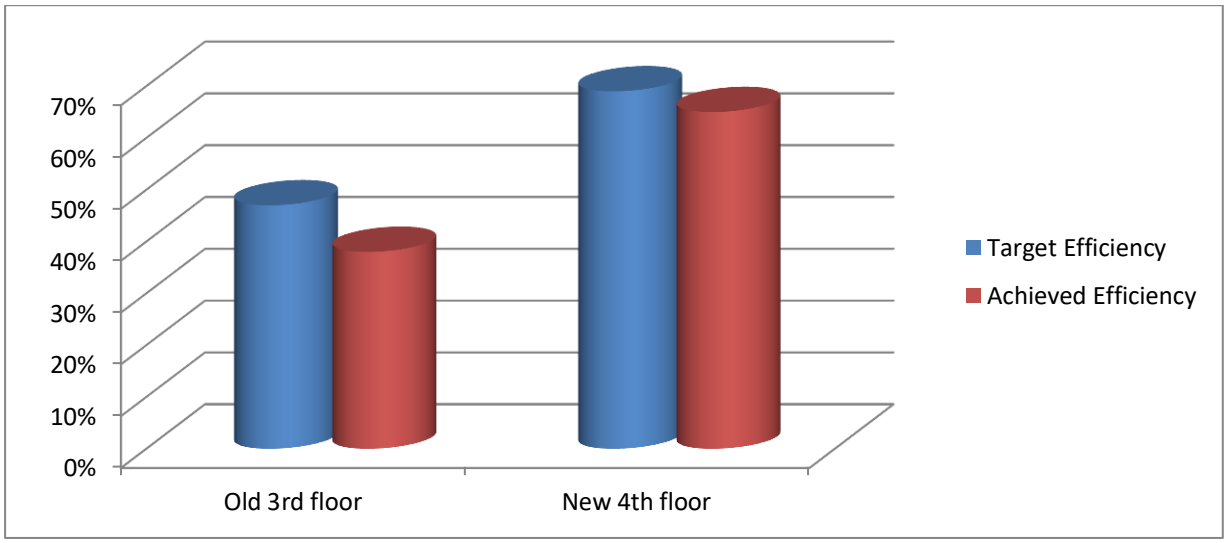
4.1.3 1st day comparison between 3rd old and New 4th floor in Production and Efficiency:

Floor no.	Item	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
Old 3rd floor	Hoody	7664	6190	47%	38%
New 4th floor	B. Top & bottom	16420	15468	69%	65%

4.1.4 Production graph chart:



4.1.5 Efficiency graph chart:



Remarks:

- The old 3rd floor manufactured more complex or critical process than New 4th floor.
- Old 3rd floor becomes a critical process, so line balancing is difficult than New 4th
- Old 3rd floor order quantity is short than New 4th floor.

4.2.2nd day Compare of sewing productivity and efficiency between New 6th floor and Old 4th floor-

Table 4.2.1 Sewing production and efficiency report New 6th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 6th floor	Tesco	AN. 925420	B.Top & bottom	6.55	234	9	13697	12925	67%	71%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{234 \times 60 \times 9 \times 71}{6.55 \times 100}$$

$$= 13697\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

$$= \frac{12925 \times 6.55}{234 \times 60 \times 9} \times 100$$

$$= 67\%$$

Table 4.2.2 Sewing production and efficiency report Old 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 4th floor	M&S	3105.E	Polo, Top & bottom	6.72	236	9	13814	11868	61%	71%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{236 \times 60 \times 9 \times 71}{6.55 \times 100}$$

$$= 13814\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

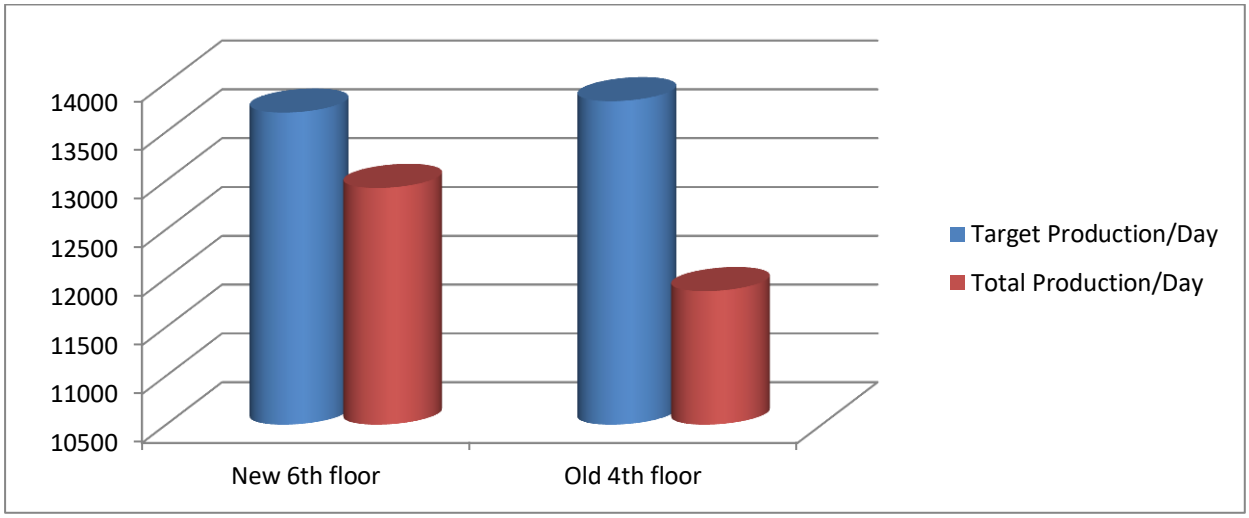
$$= \frac{11868 \times 6.55}{236 \times 60 \times 9} \times 100$$

$$= 61\%$$

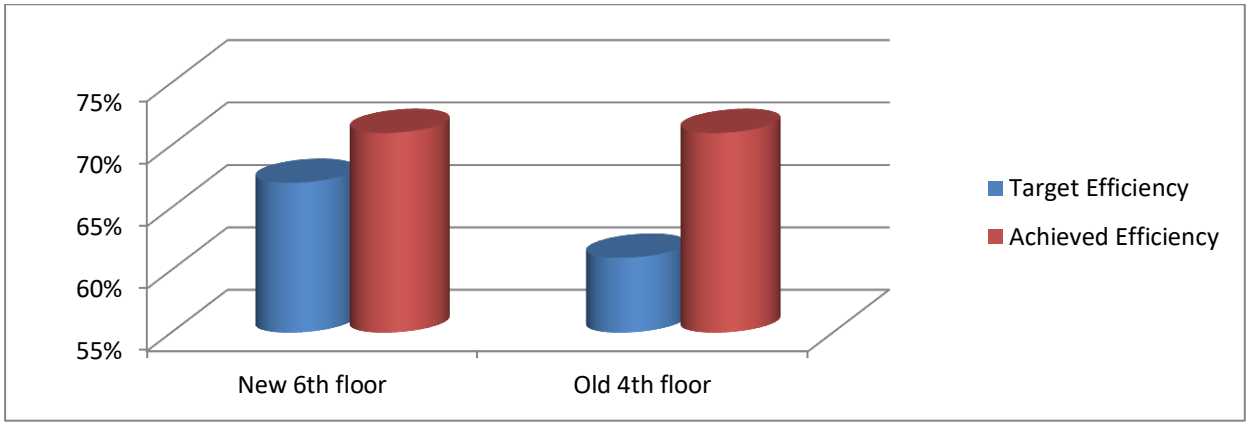
4.2.3 2nd day comparison between New 6th and Old 4th floor in Production and Efficiency:

Floor no.	Item	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
New 6th floor	B. top & Btm	13697	12925	71%	67%
Old 4th floor	B. top & Btm	13814	11868	71%	61%

4.2.4 Production graph chart:



4.2.5 Efficiency graph chart:



Remarks:

- New 6th floor operator comparatively more skilled than Old 4th floor operator.
- Old 4th floor order quantity is short than New 6th floor.
- New 6th M/c break down time is less than old 4th floor.

4.3 3rd day Compare of sewing productivity and efficiency between Old 3rd floor between before line balancing and after line balancing-

4.3.1 Before line balancing & work sharing:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 3rd floor	Karibaan	K-386	Hoody,polo	16.6	520	9	7105	4567	42%	27%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{520 \times 60 \times 9 \times 42}{16.6 \times 100}$$

$$= 7105\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

$$= \frac{4567 \times 16.6}{520 \times 60 \times 9} \times 100$$

$$= 27\%$$

4.3.2 After line balancing & work sharing:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 3rd floor	Karibian	K-386	Hoody,polo	16.6	520	9	7105	6090	42%	36%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{520 \times 60 \times 9 \times 42}{16.6 \times 100}$$

$$= 7105\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

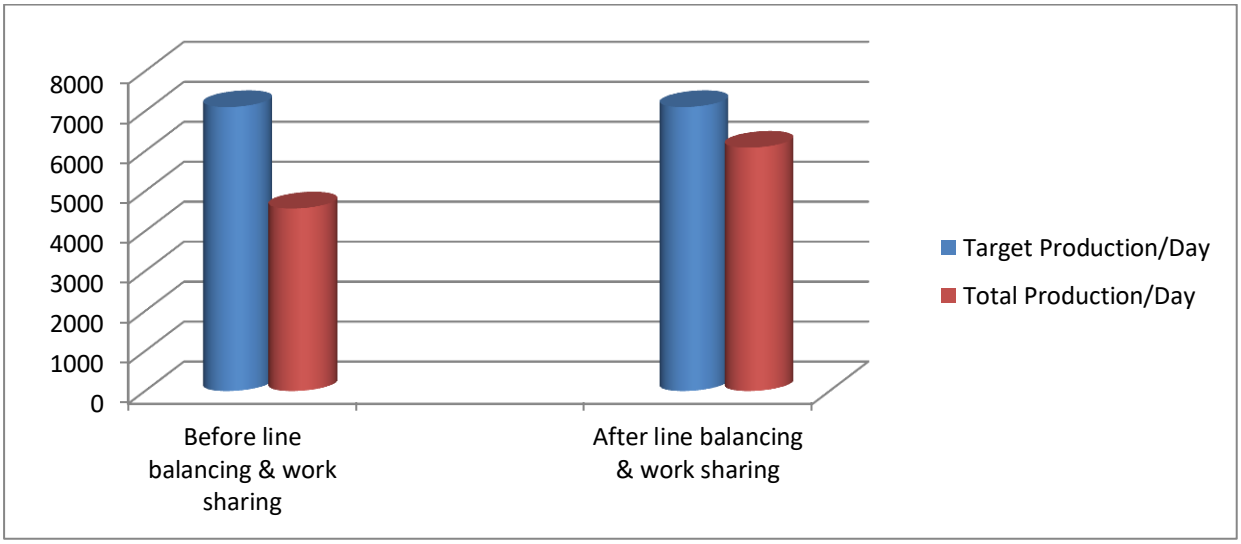
$$= \frac{6090 \times 16.6}{520 \times 60 \times 9} \times 100$$

$$= 36\%$$

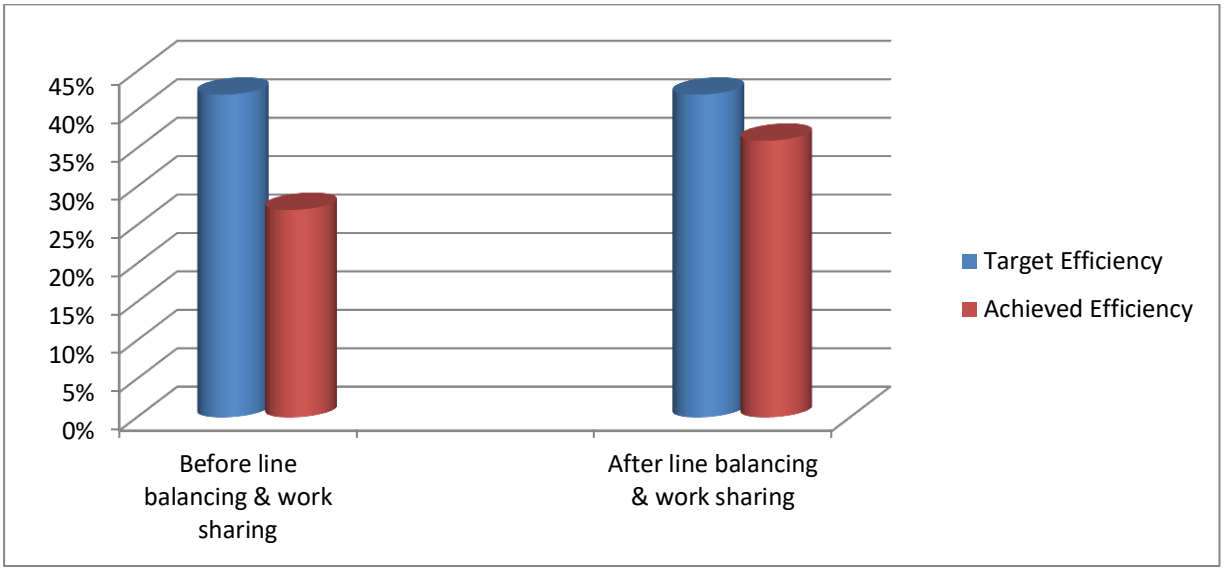
4.3.3 3rd day Old 3rd floor production and efficiency comparison between before and after line balancing & work sharing:

Floor no.	Process	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
Old 3rd floor	Before line balancing & work sharing	7105	4567	42%	27%
Old 3rd floor	After line balancing & work sharing	7105	6090	42%	36%

4.3.4 Production graph chart:



4.3.5 Efficiency graph chart:



Remarks:

- Proper line balancing.
- Work sharing.
- Find out bottleneck point.

4.4. 4th day Compare of sewing productivity and efficiency between New 6th floor and New 4th floor-

Table 4.4.1 Sewing production and efficiency report New 6th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 6th floor	Tesco	AG-939432	B.Top & bottom	9.10	364	9	13392	11664	62%	54%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{364 \times 60 \times 9 \times 62}{9.10 \times 100}$$

$$= 13392\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

$$= \frac{11664 \times 9.10}{364 \times 60 \times 9} \times 100$$

$$= 54\%$$

Table 4.4.2 Sewing production and efficiency report New 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 4th floor	M-Care	TA-894	B.Top & bottom	8.10	340	9	14733	12240	65%	54%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{340 \times 60 \times 9 \times 65}{8.10 \times 100}$$

$$= 14733\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

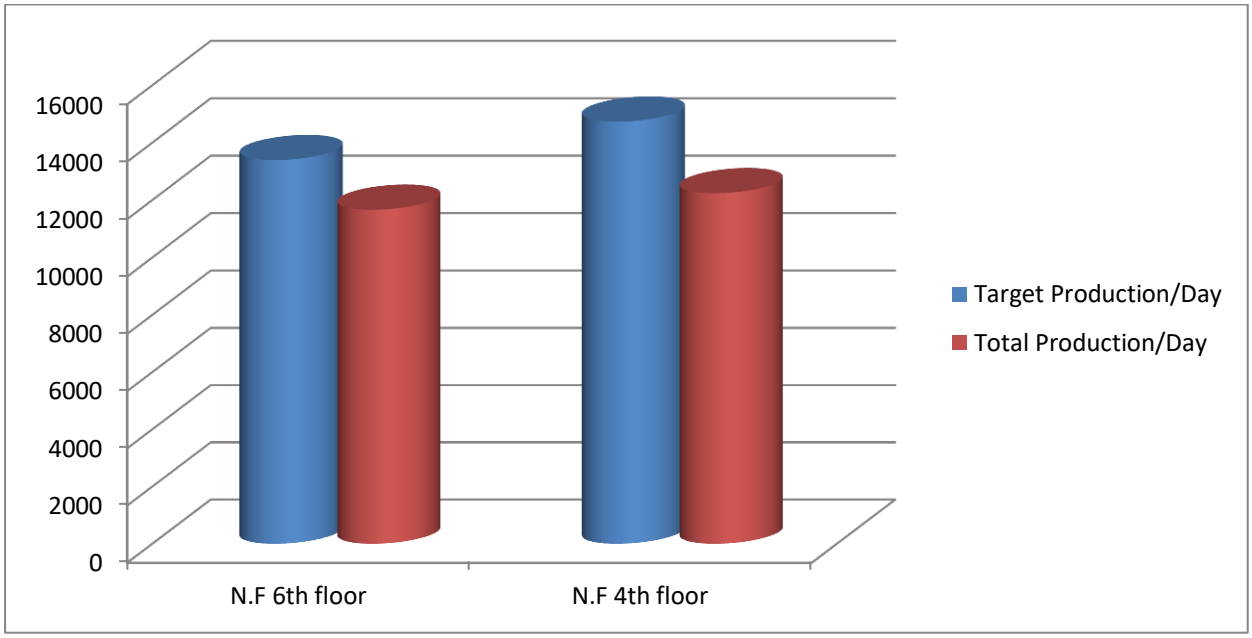
$$= \frac{12240 \times 8.10}{340 \times 60 \times 9} \times 100$$

$$= 54\%$$

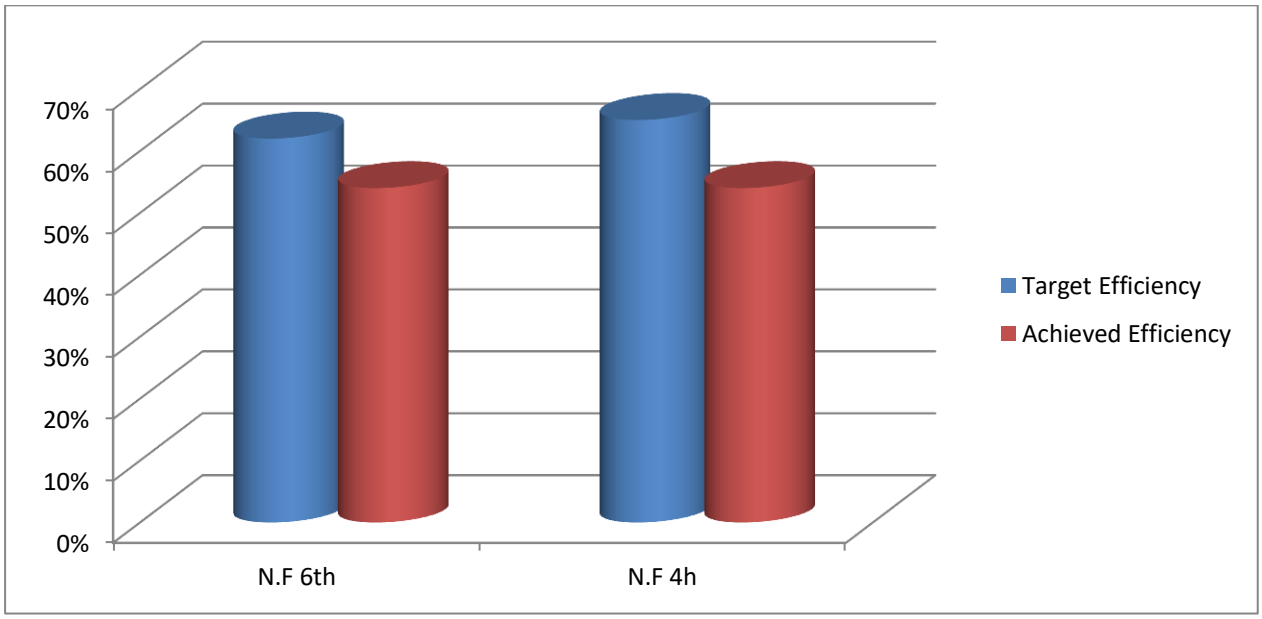
4.4.3 4th day comparison between New 6th and New 4th floor in Production and Efficiency:

Floor no.	Item	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
New 6th floor	B. top & Btm	13392	11664	62%	54%
New 4th floor	B. top & Btm	14733	12240	65%	54%

4.4.4 Production graph chart:



4.4.5 Efficiency graph chart:



Remarks:

- New 6th floor alter percentage is less than New 4th floor.
- New 6th floor non-productive time is less than New 4th floor.
- New 6th bottle neck is less than New 4th floor.

4.5 5th day Compare of sewing productivity and efficiency between Old 4th floor and New 4th floor-

Table 4.5.1 Sewing production and efficiency report Old 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 4th floor	M&S	3106.Q	Polo, Top & bottom	9.55	377	9	13856	11937	65%	56%

$$Target = \frac{Total\ Manpower \times Working\ hours \times Trg.Efficiency\%}{SMV \times 100}$$

$$= \frac{377 \times 60 \times 9 \times 65}{9.55 \times 100}$$

$$= 13856\ pcs$$

$$Achieve\ Efficiency\% = \frac{Total\ production \times SMV}{Total\ Manpower \times Working\ hours} \times 100$$

$$= \frac{11937 \times 9.55}{377 \times 60 \times 9} \times 100$$

$$= 56\%$$

Table 4.5.2 Sewing production and efficiency report New 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 4th floor	M-Care	TB-142	B.Top & bottom	6.80	300	9	17152	14292	72%	60%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{300 \times 60 \times 9 \times 72}{6.80 \times 100}$$

$$= 17152\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

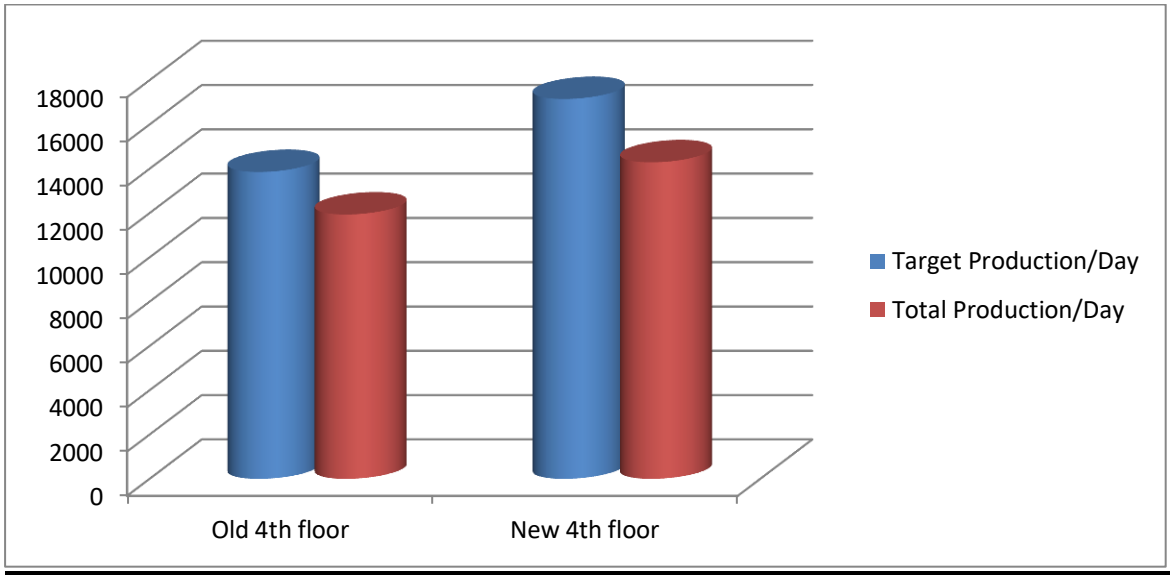
$$= \frac{14294 \times 6.80}{300 \times 60 \times 9} \times 100$$

$$= 60\%$$

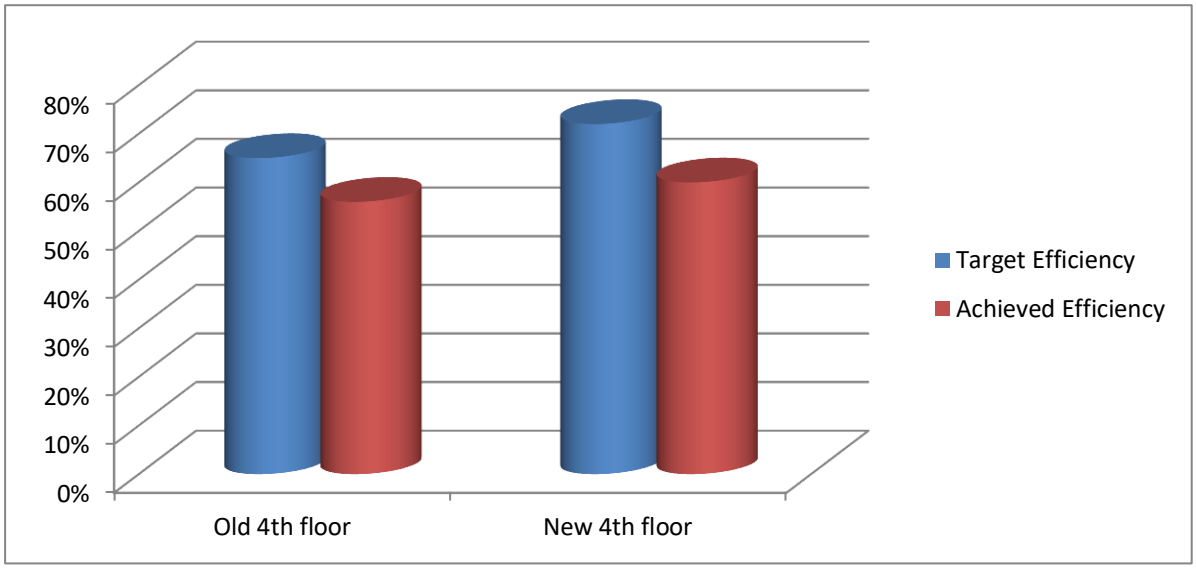
4.5.3 5th day comparison between New 6th and New 4th floor in Production and Efficiency:

Floor no.	Item	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
Old 4th floor	Polo, Top & bottom	13856	11937	65%	56%
New 4th floor	B. top & Btm	17152	14292	72%	60%

4.5.4 Production graph chart:



4.5.5 Efficiency graph chart:



Remarks:

- Over lock machine break down.
- Old 4th floor Alter percentage is less than New 4th floor.
- Old 4th floor comparatively high skilled operator than New 4th floor.

4.6 6th day Compare of sewing productivity and efficiency between New 4th floor, New 6th floor & Old 4th floor-

Table 4.6.1 Sewing production and efficiency report New 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 4th floor	M-Care	TB-158	B.Top & bottom, polo, Baby-wear	11.67	430	9	11540	9750	58%	49%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{430 \times 60 \times 9 \times 58}{11.67 \times 100}$$

$$= 11540\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

$$= \frac{9750 \times 11.67}{430 \times 60 \times 9} \times 100$$

$$= 49\%$$

Table 4.6.2 Sewing production and efficiency report New 6th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
New 6th floor	Tesco	KM-926418	B.Top & bottom,Polo,B. Jumpsuit	11.70	438	9	11522	10309	57%	51%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{438 \times 60 \times 9 \times 57}{11.70 \times 100}$$

$$= 11522\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

$$= \frac{10309 \times 11.70}{438 \times 60 \times 9} \times 100$$

$$= 51\%$$

Table 4.6.3 Sewing production and efficiency report Old 4th floor:

Floor no.	Buyer Name	Style No	Item	Avg. SMV	Total Man-power	Avg. Working hrs	Target Production/Day	Total Production/Day	Target Efficiency%	Achieved Efficiency%
Old 4th floor	M&S	5513.T	Polo, Long sleeve T shirt,Short Pant	11.40	415	9	12187	9435	62%	48%

$$\text{Target} = \frac{\text{Total Manpower} \times \text{Working hours} \times \text{Trg. Efficiency\%}}{\text{SMV} \times 100}$$

$$= \frac{415 \times 60 \times 9 \times 62}{11.40 \times 100}$$

$$= 12187\ pcs$$

$$\text{Achieve Efficiency\%} = \frac{\text{Total production} \times \text{SMV}}{\text{Total Manpower} \times \text{Working hours}} \times 100$$

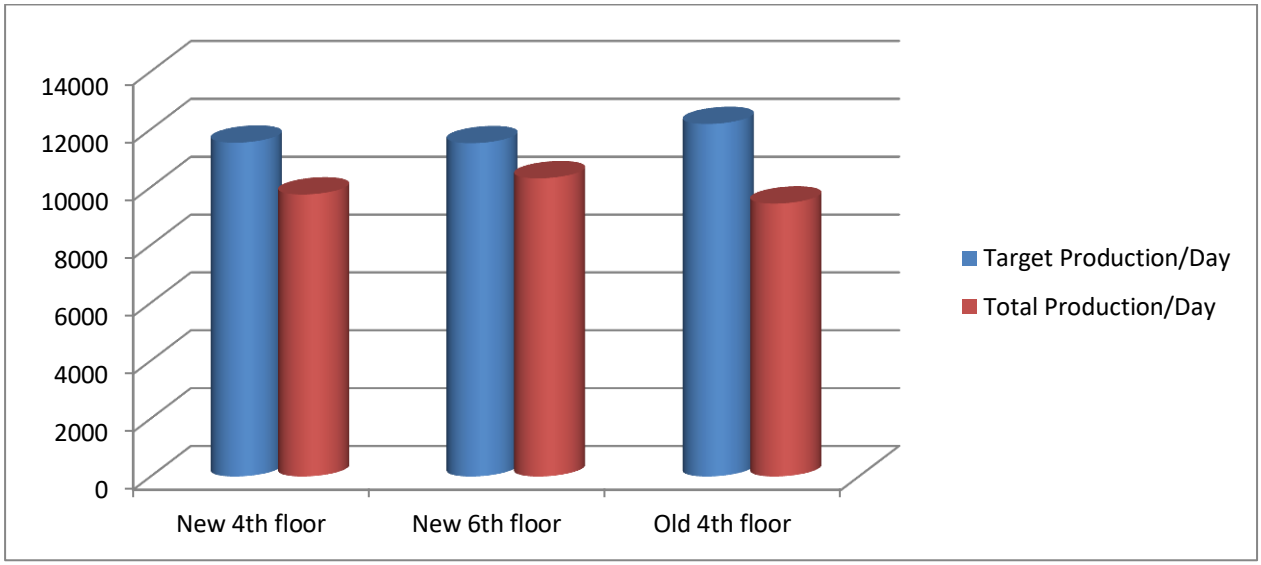
$$= \frac{9435 \times 11.40}{415 \times 60 \times 9} \times 100$$

$$= 48\%$$

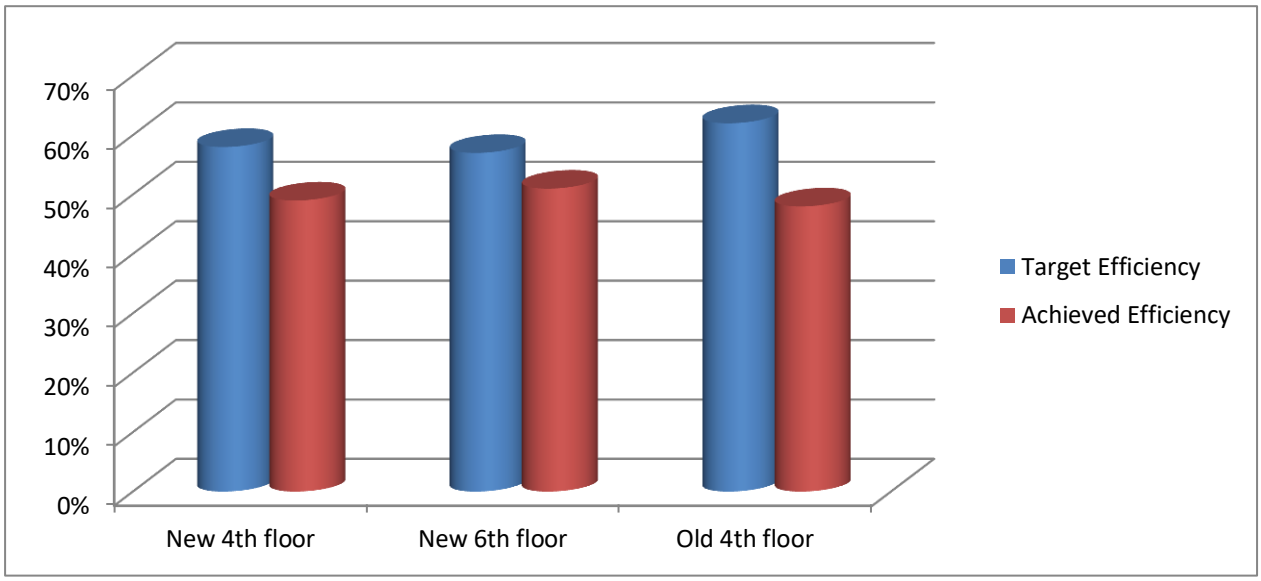
4.6.4 6th day comparison between New 4th floor, New 6th floor & Old 3rd floor in Production and Efficiency:

Floor no.	Item	Target Production/Day	Total Production/Day	Target Efficiency	Achieved Efficiency
New 4th floor	B.Top & bottom, polo, Baby- wear	11540	9750	58%	49%
New 6th floor	B.Top & bottom,Polo,B. Jumpsuit	11522	10309	57%	51%
Old 4th floor	Polo, Long sleeve T shirt,Short Pant	12187	9435	62%	48%

4.6.4 Production graph chart:



4.6.5 Efficiency graph chart:



Remarks:

- Old 4th floor comparatively high bottle neck point than floor 4th and 6th.
- Thread Supply delay due to production loss.
- Old 4th floor comparatively low skilled operator than floor 4th and 6th.
- Old 4th floor some line O/L machine breakdown.
- Alter percentage and quality issue due to production loss of old 4th floor.

Chapter-5

CONCLUSION

5.1 Limitation:

➢ This project work was carried out in various factories. When we start our capacity study, time study then the operator didn't stay in machine sometimes. It caused some loss of our valuable times.

➢ Firstly when we collect the data, the operator language is not similar to book language. Frist time it was difficulties for us.

➢ Due to the busy schedule of the responsible persons, some necessary data and information could not be obtained.

➢ This study cannot be applied for more orders due to time constraint and lack of managerial permission and support.

5.2 Conclusion:

The importance of material utilization has long been recognized by the apparel manufacturers. The garments manufacture SMV is make an impact of garments cost. The material usually shares the largest portion of a garments cost. A considerable value of increased profit can be brought by increases productivity and efficiency.

5.3 Future Scopes:

This methodology is very effective for comparison of garments sewing productivity and efficiency among different floor and find out easily production and efficiency following formula. We conducted this study only for different item garments likes top, bottom, hoody, s-suit. If the SMV is similar then all process is ok then get production and efficiency is similar. Due to line balancing, short order quantity, Cutting output delay, Bottle neck, lay out, Machine break down, quality issue, Non-Productive time issue the floor production and efficiency is increases and decreases. So in this factors is so much essential to achieve target production and efficiency.

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