Applying lean tools to improve the sewing line efficiency: A case study

1. Abstract

In a garments manufacturing industry for selling as well as exporting ready-made-garments quality improvement is a vital task. Industry will not be able to build up a good business relationship with the buyer if they fail to timely dispatch quality samples and finished product to buyers.

This paper aims to investigate the changes in various aspects such as productivity, efficiency, capacity etc. of a readymade garment industry in Bangladesh by applying the 5's lean tool. There is an improvement in production, WIP inventory reduction, Space utilization, Transport by applying the lean tool compared to conventional method. This study is based on both primary and secondary data. Here, quantitative method for data analysis is used. Data are tabled firstly in accordance with traditional operation break down, then according to lean line operational breakdown. Here data for jacket operation are shown. Results are compared with the help of bar charts.

In this study the production data of Knitted Jacket are taken. The SMV data in two phases are considered, one with the traditional production process and the other one is with the implementation of Lean technique. Beside SMV data it has been shown productivity, efficiency, capacity etc. By comparing these data, it is assured that it is more preferable to choose Lean techniques to ensure better productivity level.

There are several tools of lean manufacturing. This study is worked with 5's. 5's helps a manufacturing company to increase its improvement and the company will turn into a self-improving company.

Key Words: SMV, Lean, 5'S, Line Target

2. Introduction

Lean is based on "The Toyota Production System" or TPS which has originated to a large scale with Japanese production system [2]. "Lean would be benefited to production employees as this promotes higher degree of participation from them and continuous elimination of waste of non-value-added process during production" [3]. "Lean always influences on identifying and eliminating waste and fully utilizing the activities that add value that customer willing to pay for the product or services that he receives". [3] By eliminating waste, the product's lead time can be greatly reduced which results in operational benefits such as enhancement on productivity, reduced WIP inventory, quality improvement in final product.

A garment industry is an independent industry from the basic requirement of raw material to final products, with huge value addition at every stage of processing, Apparel industry is the largest foreign exchange earning sector contributing 81% of the total country export. In this scenario, the Bangladeshi garment industries have witnessed substantial improvements in recent years. But the unnecessary capital investment is not going to solve the problem entirely; moderately this will turn out the waste in long run. In an organization the prime importance is given to the quality and productivity, which is solely depends upon on the defects in the product accidents, down time in the production, working conditions, housekeeping etc. Lean tools are the fundamental tool to promote continuous improvement process in organizations and represents a transformation in 5 steps of a job, which is characterized by maximum efficiency at the micro level and minimum loss. The implementation of lean tools is greatly recommended, in order to identify the waste and to eliminate them. There are several tools in lean manufacturing but in this case study it has been worked with 5'S. It has been revealed that how 5'S tools can be integrated to show a best picture of non-value-added activities present in the system and, hereby eliminating the problem that causes wastes.

3. Literature Review

"5S is a holistic application used to raise moral, ethical standards and strongly associated with Japanese culture and society. 5S not only improves organizational working environment but also improves the overall industrial management process performance as well" [4]. "This practice is based on neatness, cleanliness, standardization and discipline in order to achieve quality standards in goods and services" [6]. "Most of the organization workplaces face the problems of disorder, wastage of time and cost due to non-value-added activities. These problems affect the work environment adversely, and accumulate to bigger problems such as long lead times, higher defects, low productivity, frequent breakdowns of machines and hidden safety hazards, thereby critically affecting the cost competitiveness of the organizations. These problems can easily control and reduced by holistic 5S implementation at workplace. The implementation of 5S methodology not only play significant role in the development of manufacturing sector, but it also makes remarkable evolution in defense, banking, mining, agriculture, hospitals and construction sector" [5]. "It is also analyzed that the practice of 5S become the supporting activity or in some cases as a base foundation for the implementation of other lean tools such as TPM, TQM, JIT, TPS and ISO standards" [6]

Abramovich (1994) concluded that "5S is driven from the bottom to up level in an organization, when it is implemented effectively with dedication of sincere efforts by every employee from top management to bottom management of staff".

Brayer and Walsh (2002) have implemented "5S Technique in the office of the mast international group (Australia) in order to rediscover the value of TQM with the practice of 5S. The results of the study revealed that there were significant improvements realized by the organization, which helped in development of learning's for the encouragement of 5S practice in other international groups".

Maddox (2006) has concluded that "commitment of management and need of leadership for the program of 5S are the most important requirement for its implementation in an organization. He demonstrated the importance of management and various initiatives through their actions".

Moreira et al. (2008) have implemented "the 5S technique to maintain the complex and dynamic system of digital libraries. The authors developed 5'S Qual tool which perform automatic evaluation to remove the problems before they occur. It is applicable to various digital libraries and sceneries due to its generic architecture. The evaluation performed with 5'S Qual guided the design, development and improvement of digital libraries and demonstrated the evaluation of many aspects of the evaluated system".

Hunglin (2011) has implemented "the principles of 5S in Wang Chen manufacturing company in order to organize the tools, improving the work environment and efficient productive process. He introduced 5S methodology at Wang Chen Company for addressing the problems like messy environment, inefficiency, wastage of time and money. The study revealed that 5S implementation led to reduction in time wastage by 49% and provided more productive time to meet the customer demands along with good profits".

Pasale and Bagi (2013) have stated "the practice of 5S technique in small scale manufacturing industries has resulted in enhancement of efficiency of production system from 67% to 88% within a short span of few weeks".

Ikuma and Nahmens (2014) showed that “safety is an inbuilt part of 5S in healthcare system. They concluded that 5S can facilitate process improvement, work environment and safety”.
Sánchez et al. (2015) have studied that “implementation of 5S at SMEs in Bogota (Colombia) considerably improved the selected four study factors namely with a rise of productivity (44%), quality (44%), organizational climate (52%) and reduction of risk (90%)”.
“The ultimate goal of a lean system is to focus on the creation and preservation of value for the customer. Value is often defined as any action or process that a customer who uses and consumes the product is willing to pay for. As a means of creating value, lean methods focus on eliminating all waste from the production system. By focusing on the elimination of waste, all actions except the actions the customer is willing to pay for have the potential to be reviewed and eliminated. As a result of the continuous elimination of waste in lean systems, production time and cost are reduced and overall profitability and quality is improved within the manufacturing system. In case of Progressive Bundle System until the defect is noticed operators may have piled up bunch of WIP and it is very difficult to clear defective parts. But in case of Cellular layout WIP is reduced and it is easy to observe any defects if present and can be cleared in line also and so help to reduce rework to greater extent. The number of operation and operator needed to complete a job is reduced by eliminating some non-value-added operations from the process”. [8]
Definition of Lean: The popular definition of Lean Manufacturing and the Toyota Production System usually consists of the following: “Lean is the systematic approach to identifying and eliminating waste through continuous improvement by flowing the product or service at the pull of your customer in pursuit of perfection” [8]. Taichi Ohno once said that “Lean Manufacturing is all about looking at the time line from the moment the customer gives us an order to the point when we collect the cash. And we are reducing that time line by removing the non –value added wastes” [9]. “Lean always focuses on identifying and eliminating waste and fully utilizing the activities that add value to the final product” [11]. “From the customer point of view value is equivalent to anything he is willing to pay for the product or service he receives. Formally value adding activities can be defining as activities that transform materials and information into products and services the customer wants. On the other hand, non-value adding activities can be defined as: activities that consume resources, but do not directly contribute to product or service. This non-value adding activities are the waste in Lean Manufacturing. Waste can be generated

due to poor layout (distance), long setup times, incapable processes, poor maintenance practices poor work methods lack of training, large batches, ineffective production planning, lack of workplace organization etc" [13]. "By eliminating wastes in the overall process, through continuous improvements the product's lead time can be reduced remarkably. By reducing lead time organization can obtain operational benefits enhancement of productivity, reduction in work-in –process inventory improvement in quality, reduction of space utilization and better workplace organization) as well as administrative benefits" [12].

Kinds of Wastes: According to David Magee (Magee 2007, p 67) different kinds of wastes in a process can be categorized in following categories. These wastes reduce production efficiency, quality of work as well as increase production lead time.

1. Transport: Carrying of work in process (WIP) a long distance, insufficient transport, moving material from one place to another place is known as the unnecessary transport.

2. Inventory -This includes excess raw material, WIP, or finished goods causing longer lead times, obsolescence, damaged goods, transportation and storage costs, and delay. Also, the extra inventory hides problems such as production imbalances, late deliveries from suppliers, defects, equipment downtime, and long setup times.

3. Motion –Any wasted motion that the workers have to perform during their work is termed as unnecessary movement. e.g.; Movement during searching for tools, shifting WIP etc.

4. Waiting: Workers waiting for raw material, the machine or information etc. is known as waiting and is the waste of productive time. The waiting can occur in various ways for example; due to unmatched worker/machine performance, machine breakdowns, lack of work knowledge, stock outs etc.

5. Over Production: Producing items more than required at given point of time i.e., Producing items without actual orders creating the excess of inventories which needs excess staffs, storage area as well as transportation etc.

6. Over processing: Working on a product more than the actual requirements are termed as over processing. The over processing may be due to improper tools or improper procedures etc. The over processing is the waste of time and machines which does not add any value to the final product.

7. Defects: Defects in the processed parts is termed as waste. Repairing defective parts or producing defective parts or replacing the parts due to poor quality etc. is the waste of time and effort.

8. Unused Employee Creativity: Loosing of getting better ideas, improvement, skills and learning opportunities by avoiding the presence of employee is termed as unused employee creativity.

4. Methodology

The main goal of this study is to ascertain how lean manufacturing (LM) practices affect layout facility designing. In order to investigate this effect, one can classify concerned company as traditional or lean. For investigation it has been selected a line of a particular style product (jacket). At first, in a Capacity Study Sheet where it has been found out basic time, SMV and capacity by Time Study method. It has been made the job done while the factory run the desired technique and got our desired data for particular style of product. It has been found the difference between traditional line and lean line from there during making the study. It has been collected data for each and every operation and got understood about the advantages of lean tools application in case of best utilization of man, machine and materials. This continuous feedback and improvement procedure is in agreement with the spirit of lean thinking.

In this case study it has been worked with the 5'S.

5S: The first pillar of TPM is called 5S, which organize and cleans work place; this helps to make problems visible and attracts the attentions of everyone. Brief description of 5S elements are as follows:

- ✓ i. SEIRI-Sort: The first step in making things cleaned up and organized.
- ✓ ii. SEITO-Set in Order: Organize, identify and arrange everything in a work area.
- ✓ iii. SEISO-Shine: Regular cleaning and maintenance.
- ✓ iv. SEIKETSU-Standardize: Make it easy to maintain, simplify and standardize.
- ✓ v. SHITSHUKI-Sustain: Maintain what has been achieved.

4.1 Comparing Productivity:

For comparing productivity, data has been collected from sewing floor of Croydon Kowloon Designs Ltd, a concern of Biotope Group. It has been considered one line in Croydon Kowloon Designs Ltd. It has been shown the previous data where the line was without lean and beside this it has also shown data after Lean is applied in the same line. There is difference between them in the term of productivity, efficiency, SMV, Capacity. To calculate standard time for each operation, time study is conducted in the shop floor. To do this, the standard Jacket line is selected as a base line because operations differ from style to style and it is difficult to correlate all these operations of individual styles. After that, two operators were selected for each operation so that the difference in timing can be cross checked from the observed data of these two operators. To get better results, each operation time is taken for at least 5 cycles. Once time study is made by collecting raw data, the actual time is calculated for particular operation. Finally, the Personal Fatigue and Delay (PFD) component as an allowance is added on the calculated time and the operation time is standardized.

4.2 Method of project

Here quantitative data is used for the analysis of this project. Firstly data are tabled in accordance with traditional operation break down, then according to lean line operational breakdown. Here it has been shown data for jacket operation. Results are compared with the help of bar charts.

4.3 Method of Data Collection

The format of time study data collection sheet is attached. While conducting time study some parameters are kept fixed (for example machine speed, stitches per inch, type of machine used etc.). To get consistent results, the PFD factor is taken as 20% of total time. This PFD is a little bit higher than normal industry standard; it is taken higher considering the standing operation and operator's movement inside the line. Similarly, the average performance rating is taken 100% for the ease of calculation only. This rating is adjusted average of actual ratings.

5. **Result of the case study**: Time study is used to balance the sewing line which is a part of work study. It implements the use of SMV calculation to identify the points where production has gone below the standard level and the places where the production is above the standard. Then it is balanced to remove bottle neck in order to increase productivity. This system was effective and helpful. Considerable improvement observed by using time study as a line balancing technique changing form traditional layout to balanced layout model. The exchanges of work between the operator & helper caused a significant change in line results of reducing wastage of time, minimum no. of worker and which caused high productivity in the manufacturing process. This balancing process also leads to increased output per day, labor productivity, machine productivity and overall line efficiency. The overall results relay on maximum profit of the company with effective use of its available resources. This analysis says it is an effective method that helps to increase productivity. It is easy and can be applied in a simple way. Here lean can help to get the right results as it has some more potential tools and systems.

Style name: 113539 (Jacket)

Buyer: Decathlon

Table 1: Operational breakdown for Jacket line (Conventional system)

S/L	Operations	No. of workers	Machine	Standard SMV	Actual time in sec	Allowance 20%	Standard Time Sec.	Capacity
1	PKT Bone mark	1	MNL	0.25	15	3	18	200
2	Bone corner cut	1	MNL	0.42	25.2	5	30.2	119
3	Bone attach for PKT	1	SNL	0.50	30	6	36	100
4	Body mark for PKT	1	MNL	0.30	18	3.6	21.6	165
5	PKT attach	1	SNL	1.0	60	12	72	50
6	PKT Cut	1	MNL	0.67	40.2	8	48.2	74
7	PKT Top stitch	1	SNL	0.40	24	4.8	28.8	125
8	Bone inside Tack & PKT top stitch lower	1	SNL	0.80	48	9.6	57.6	62
9	PKT bag close both side	1	OL	0.40	24	4.8	28.8	125
10	PKT bag mouth close & scissoring	1	SNL	0.80	48	9.6	57.6	50
11	PKT tack	1	SNL	0.35	21	4.2	25.2	142

12	Care label join	1	SNL	0.15	9	1.8	10.8	333.33
13	Shoulder join	1	OL	0.30	18	3.6	21.6	166.67
14	Sleeve cuff servicing	1	OL	0.33	19.8	3.96	23.4	153.8
15	Sleeve cuff join	1	OL	0.33	19.8	3.96	23.4	153.8
16	Sleeve cuff top stich	1	FL	0.30	18	3.6	21.6	166.67
17	Arm hole TS	1	FL	0.30	18	3.6	21.6	166.67
18	Side seam join	1	OL	0.55	33	6.6	39.6	90.90
19	Panel join at bottom rib	1	OL	0.30	18	3.6	21.6	166.67
20	Panel mouth tack	1	SNL	0.22	13.2	2.64	15.84	227.27
21	Panel TS	1	SNL	0.30	18	3.6	21.6	166.67
22	Bottom rib join position mark	1	MNL	0.30	18	3.6	21.6	166.67
23	Bottom rib join	1	OL	0.75	45	9.0	54	66.66
24	Bottom rib TS	1	FL	0.60	36	7.2	43.2	83.33
25	Zipper cover mark	1	MNL	0.12	7.2	1.44	8.64	416.67
26	Zipper cover make	1	SNL	0.25	15	3.0	18	200
27	Zipper cover Turn and top stitch	1	SNL	0.30	18	3.6	21.6	166.67
28	Zipper cover attach	1	SNL	0.22	13.2	2.64	15.84	227.27
29	Zipper piping	1	FL	0.30	18	3.6	21.6	166.67
30	Zipper edge fold & tack	1	FL	0.20	12	2.4	14.4	250
31	Zipper attach left	1	SNL	0.4	24.0	4.8	28.8	125
32	Zipper attach right	1	SNL	0.4	24.0	4.8	28.8	125
33	Collar inner part rolling	1	SNL	0.25	15	3.0	18	200
34	Collar inner part mark	1	MNL	0.25	15	3,0	18	200
35	Collar 2 part join	1	OL	0.22	13.2	2.64	15.84	227.27
36	Collar mark for join	1	MNL	0.22	13.2	2.64	15.84	227.27
37	Collar join	1	SNL	0.50	30	6.0	36	100

38	BK tape piping	1	FL	0.4	24	4.8	28.8	125
39	BK tape TS	1	SNL	0.50	30	6.0	36	100
40	Final thread trimming	3	MNL	0.50	30	6.0	36	100
	Total	42		15.43			1135.6	

- Productivity = $\frac{Output}{Input}\ x\ 100$

  $= \frac{60}{100}\ x\ 100$

  = 64%

- SMV = $\frac{1135.6}{60}$ = 18.93

- Standard SMV= 15.43

- SMV increased = $\frac{18.93-15.43}{15.43}\ x\ 100$

  = 22.68 %

- Efficiency% of line = $\frac{Total\ iproduction\ ix\ iSMV\ ix\ i100}{\text{No of operator x working hour x 60}}$

  $= \frac{64\ ix\ i18.93\ ix\ i100}{\text{42 x 1 x 60}}$ = 48%

- SMV target fulfillment = $\frac{100-64}{100} x100$

  =66%

- Basic peace time (B.P.T) = $\frac{Total\ itime}{\text{Total manpower}}$

  $= \frac{1135.6}{42}$

  = 27.038 sec.

- Capacity/hour = $\frac{3600}{27.038}$

  =133 pieces

Table 2: Operational Breakdown for jacket Line (Lean system)

SL no.	Operations	No. of workers	Machine	Standard SMV	Actual time in second	Allowance 20%	Standard Time Sec.	Capacity
1	PKT Bone mark & corner cut	1	MNL	0.25	15	3	18	200
2	Bone attach for PKT	1	SNL	0.50	30	6	36	100
3	Body mark for PKT & attach PKT	1	SNL	0.30	18	3.6	21.6	165
4	PKT Cut	1	MNL	0.67	40.2	8	48.2	74
5	PKT Top stitch	1	SNL	0.40	24	4.8	28.8	125
6	Bone inside Tack & PKT top stitch lower	1	SNL	0.80	48	9.6	57.6	62
7	PKT bag close both side(2)	1	OL	0.40	24	4.8	28.8	125
8	PKT bag mouth close & scissoring	1	SNL	0.80	48	9.6	57.6	50
9	PKT tack	1	SNL	0.35	21	4.2	25.2	142
10	Shoulder join(2)	1	OL	0.30	18	3.6	21.6	166.67
11	Sleeve cuff servicing & join	1	OL	0.33	19.8	3.96	23.4	153.8
12	Sleeve cuff top stich	1	FL	0.30	18	3.6	21.6	166.67
13	Sleeve join	1	OL	0.30	18	3.6	21.6	166.67
14	Arm hole TS(2)	1	FL	0.30	18	3.6	21.6	166.67
15	Side seam join(2)	1	OL	0.55	33	6.6	39.6	90.90
16	Panel join at bottom rib	1	OL	0.30	18	3.6	21.6	166.67
17	Panel mouth tack	1	SNL	0.22	13.2	2.64	15.84	227.27

18	Panel TS(2)	1	SNL	0.30	18	3.6	21.6	166.67
19	Bottom rib join position mark & rib join	1	OL	0.30	18	3.6	21.6	166.67
20	Bottom rib TS	1	FL	0.60	36	7.2	43.2	83.33
21	Zipper cover mark & cover make	1	SNL	0.12	7.2	1.44	8.64	416.67
22	Zipper cover Turn and TS	1	SNL	0.30	18	3.6	21.6	166.67
23	Zipper cover attach	1	SNL	0.22	13.2	2.64	15.84	227.27
24	Zipper piping	1	FL	0.30	18	3.6	21.6	166.67
25	Zipper edge fold & tack	1	FL	0.20	12	2.4	14.4	250
26	Zipper attach left	1	SNL	0.4	24.0	4.8	28.8	125
27	Zipper attach right	1	SNL	0.4	24.0	4.8	28.8	125
28	Collar inner part rolling	1	SNL	0.25	15	3.0	18	200
29	Collar inner part mark & join	1	SNL	0.25	15	3,0	18	200
30	Collar mark & join	1	SNL	0.22	13.2	2.64	15.84	227.27
31	BK tape piping	1	FL	0.22	13.2	2.64	15.84	227.27
32	BK tape TS & corner fold	1	SNL	0.4	24	4.8	28.8	125
33	Final thread trimming	3	MNL	0.50	30	6.0	36	100
	Total	35		11.75			845.6	

- Productivity = $\frac{Output}{Input}\ x\ 100$

  $= \frac{78}{100}\ x\ 100$

  = 78%

- SMV = $\frac{845.6}{60}$

  = 14.09

- Standard SMV=11.75
- SMV increased = $\frac{14.09-11.75}{14.09}\ x\ 100$

= 16.6 %

- Efficiency% of line = $\frac{Total\ iproduction\ ix\ iSMV\ ix\ i100}{\text{No of operator x working hour x 60}}$

  = $\frac{78\ ix\ i14.09\ ix\ i100}{\text{35 x 1 x 60}}$

  = 52.33%

- SMV target fulfillment = $\frac{100-78}{100}x100$

  =78%

- Basic peace time (B.P.T) = $\frac{Total\ itime}{\text{Total manpower}}$

  = $\frac{845.6}{35}$

  = 24.16 sec.

- Capacity/hour = $i\ i\frac{3600}{B.T.P}$

  = $\frac{3600}{27.038}$

  =149 pieces

In the above analysis it has been found that the productivity and the line efficiency is improved after applying lean manufacturing compared to conventional method.

Transport Analysis

Table 3: Transport Analysis

KPI	Unit of measure	Time Hour	Traditional Line	Average	Lean Line	Average	Improvement %
Transportation	Feet	1st	351	345	145	143	58.55%
		2nd	350		143		
		3rd	348		144		
		4th	349		143		

		5th	350		142		

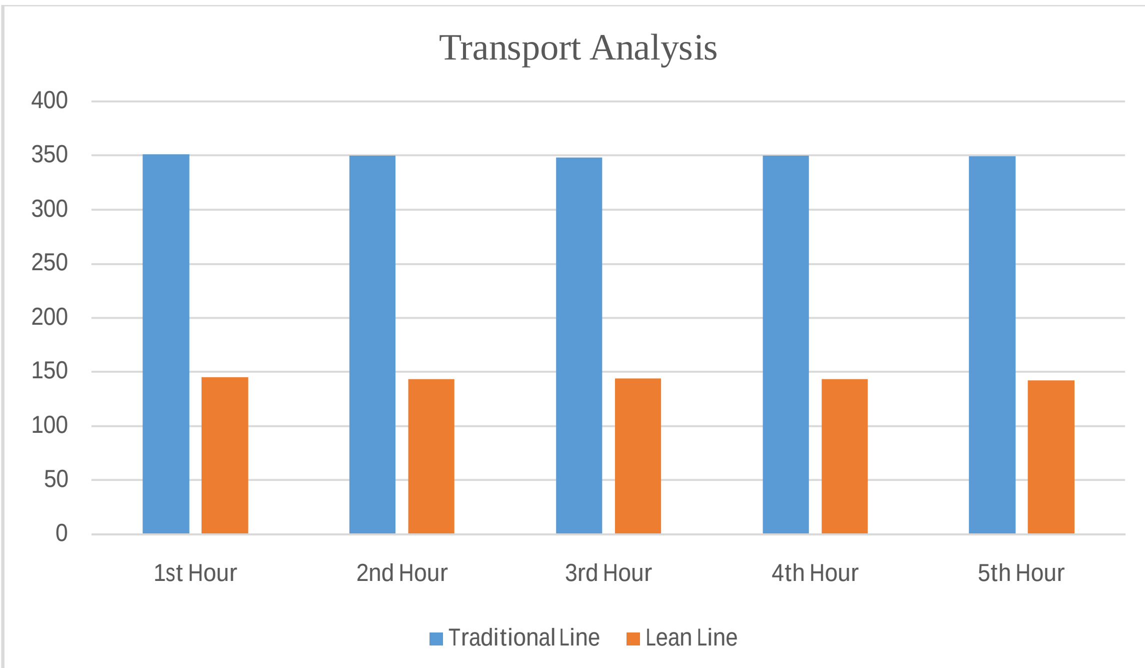

Figure 1: transportation analysis

WIP Analysis:

Table 4: WIP Analysis

KPI	Unit of measure	Time Hour	Traditional Line	Average	Lean Line	Average	Improvement %
		1st	815		400		
		3rd	810		398		

WIP	Quantity	4th	812	813	402	400	50.79%
		6th	816		396		
		8th	810		402		

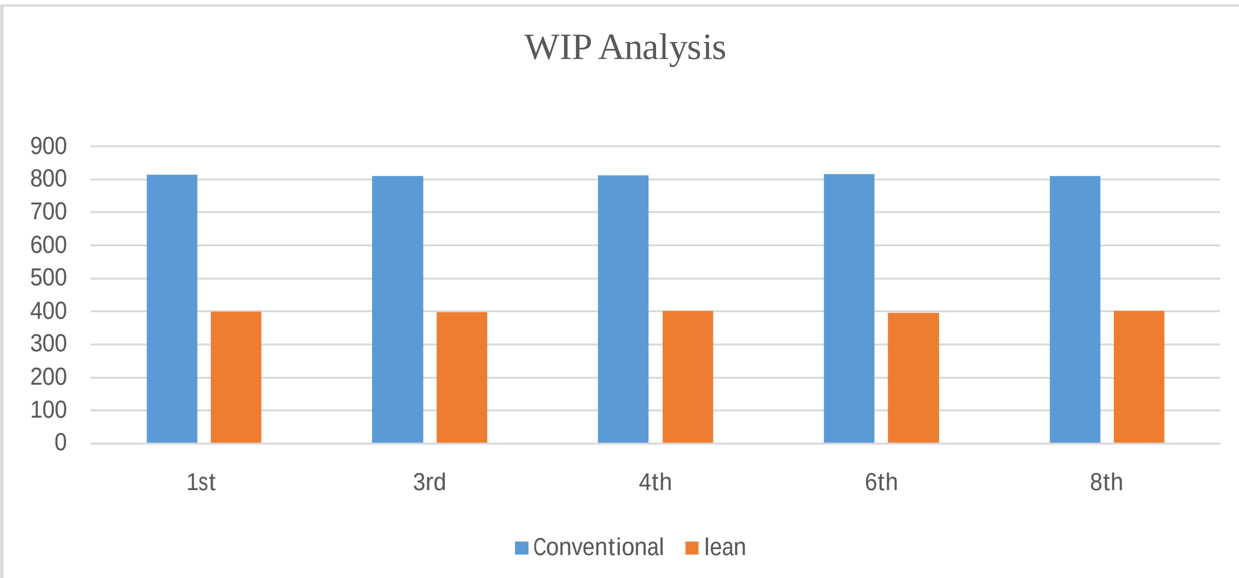

Figure 2: WIP Analysis

Space Utilization

Implementing lean in production system ensures maximum space utilization and thus reduces cycle time & increases efficiency.

Table 5: space utilization

KPI	Unit of measure	Time Hour	Traditional Line	Average	Lean Line	Average	Improvement %
		1st	5.77		4.62		
		2nd	5.55		4.60		

Space utilization	Minute	3rd	5.10	5.55	4.62	4.52	18.55%
		4th	4.96		4.45		
		5th	5.60		4.50		

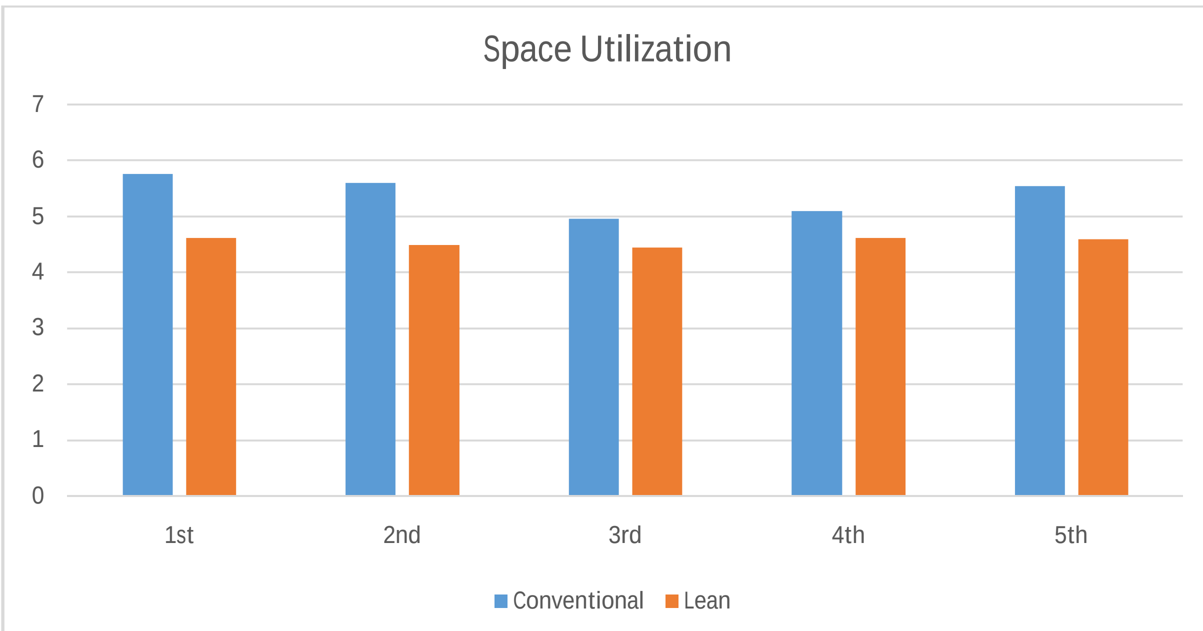

Figure 3: Space Utilization

Defects

Poor quality and the resulting defects are a major source of cost for many companies. This is also a cost that is often under reported as there are direct and indirect effects of defects. A defect is any error in a process that makes a product or service less valuable.

Table 6: Defects

Defects	Traditional Line	Lean Line
Seam Puckering	30	18
Slipped stitch	27	9
Staggered stitch	18	5
Thread Breakage	16	8

Variable Stitch density	27	11

Figure 4: Defect Analysis

Discussion of Findings:

Comparing key productivity indicator (KPI):

Table 7: Comparing Key Productivity Indicator

Topics	Unit of Measures	Traditional Line	Lean Line	Improvement
Transport Analysis	Feet	345	143	58.55%
WIP	Quantity	813	400	50.79%
Space utilization	Min	5.55	4.52	18.55%

In the above analysis it has been found that there is an improvement in production, WIP inventory reduction, Space utilization, Transport by applying the lean tool compared to conventional method.

Productivity analysis:

Table 8: Productivity Analysis

Topic	Tradition Line	Lean Line
Productivity (%)	64	78
Line efficiency (%)	48	52.33
SMV increased (%)	22.68	16.6
SMV target Fulfillment (%)	64	78
No of worker	42	35
Bottlenecks	2	Nil
Capacity/hour utilization	133	149

7. Conclusion

Though the lean technique is new for most of the apparel industry in Bangladesh but if an industry implements this technique it helps them to increase their overall productivity.

For a Jacket production, using traditional system the input was 100pcs/hour and output was 64 pcs/hour with a productivity of 64%. But when lean system was applied then the input was same but the system was so efficient that an increase output of 78 pcs/hour. This is a clear indication of increasing productivity.

Before lean line the capacity was 133 pieces per hour but when the line is converted into lean line, the capacity increased to 149 pieces per hour. There is improvement in WIP inventory reduction, Space utilization, Transport by applying the lean tool. In spite of some limitations, it has been managed to assure the results.

In this case study it has been managed to work on 5'S. There are many tools through which one can get more efficiency like as KAIZEN, KANBEN, JIT, PDCA, POKO Yoke etc. There are many scopes to work on the other tools in Lean Manufacturing.

Lack of knowledge, specifically in production systems and resources management of the operations manager of Garments, resulted to the low productivity and efficiency of manpower. The lean manufacturing system is a continuous improvement method; thereby, its implementation helps the company minimize waste, enhance quality of products and definitely create its sustainability. Lean manufacturing tools contribute to the productivity of both workers and the company. The Time Study monitoring system, an output of the study, is an effective and efficient tool to enhance productivity in the entire sewing section, whose benefits extend to the whole organization.

In order to maintain the competitiveness of organizations, the top management has to continuously strive to imbibe innovative tools and techniques. 5S initiatives offer significant benefits to manufacturing and service organizations to attain drastic improvements at workplace, thereby motivating the organizations to learn more knowledge about 5S technique for its effective implementation in their organizations. But the challenge is, how effectively, they implemented the 5S technique into day to day activates of the organization for successful running of program in the long term. The paper highlights the success factors and obstacles of 5S implementation for the organizations in the support of knowledge who are interested to run the program. An insight into 5S implementation methodologies will be significantly helpful for researchers and practitioners to understand 5S program from its meaning to the end of its successful implementation and sustainability.

8. References:

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