

Impact of ‘check sheet’ and ‘flow chart’ to improve quality and efficiency of finishing unit in a garment industry

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Abstract

Rapid development of textile enterprises in Bangladesh led the sector competitive both locally and internationally. However, to ensure competitive advantages, textile industries are applying modern approaches to enhance overall productivity growth, product quality, standardization, efficiency and effectiveness, reduction of manufacturing cost etc. to recover the enterprise fall down to critical point due to effects of liberal policies in international markets. Recently, various total quality management (TQM) tools are playing important role as a function of modern approaches. TQM tools are practical methods, skills, means or mechanisms that can be applied to particular tasks. In this study, two TQM tools, ‘check sheet’ and ‘flow chart’ (or run chart) are used in finishing unit of a garment industry in Bangladesh to find out the ways to mitigate significant amount of alter, rework, rejection and improve quality and efficiency. Here, check sheet is used to count the number of defects for the selected items. Then, counter measures against the root causes is defined and implemented to improve the quality as well as to reduce the rework. Finally, a flow chart is developed. After several analyses, it is found that, in finishing unit, rejection or scrap decreases by 29.29%, alter or defect per hundred unit (DHU) decreases by 44.60% and significant amount of alter, rework and rejection or scrap per style, per month is minimized without any additional investment but by proper utilization of internal resources.

Keywords

Total Quality Management (TQM), Just-in-Time (JIT), Lean manufacturing, Operation layout, Line efficiency, Productivity

1. Introduction

Garment manufacturing industry is complex for many reasons. The product line is a complex array of styles, seasons, varying life cycles, and multidimensional sizing. TQM is a powerful technique to control, manage, analyze and improve the performance of a process by eliminating special causes of variation in processes such as tool wear, operator error, errors in measurements, use of improper raw materials and so on [1]. Tools for quality management can help companies to reduce costs, realize zero defects and thus achieve better results. Quality management is now extremely important for all organizations, especially for the textile and apparel industry where quality is one of the key competitive factors [2]. The goal is to deliver the highest value for the customer at the lowest cost while achieving sustained profit and economic stability for the company [3]. With growing global competition, by applying quality management principles, organizations will produce benefits for customers, owners, employees, suppliers and society as a whole. There are 7 (seven) basic TQM tools which can be used to analyze to find out the root causes and eliminates them from the production system, thus the manufacturing process can be improved. Based on long experience in quality issues, a renowned quality expert Dr. Kaoru Ishikawa stated that as much as 95% of quality related problems can be solved with seven fundamental quality tools [4].

2. Methodology

This research has been carried out in a selected garments factory located at Valuka in Mymensingh, Bangladesh with the duration of one month. The main product of this factory is knit based garments like t-shirt, polo shirt, ladies tops etc. Following processes are followed to conduct the research work to improve quality and efficiency of finishing unit. Figure-1 shows the research process flow chart.

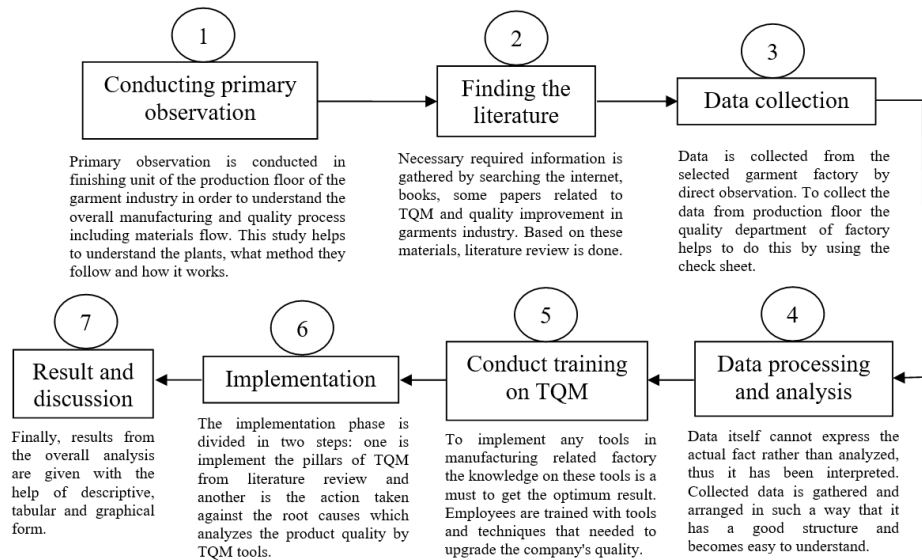


Figure 1. Research process flow chart

3. Data collection

3.1 Check sheet for finishing unit

In finishing section, after pressing the garments is checked by finishing QC or QI. After pressing, different defects (spot, pleat, point up-down, skip stitch, broken stitch, uneven stitch, open seam, label missing, shading, hole, needle cut etc.) are visible. Table-1 is used to count defect in finishing unit.

Table 1. Defect check sheet for finishing unit

FINISHING DEFECT PERCENTAGE AND QUALITY IMPROVEMENT GOALS						
Unit	Finishing-01	Goal set: 0%			Report date	7 Sep. 2018
Production date	5 Sep. 2018	Actual found: 5.04%				
Sl. no.	1	2	3	4	5	Total
Buyer	Tezenis	Tezenis	Tezenis	Tezenis	Tezenis	
Order no.	1PL-224(BTM)	3PL-283(BTM)	3PL-283(TOP)	4SB-224	1pv-439	
Inspection and quantity	1060	749	367	1229	1635	5040
OK quantity	978	708	337	1166	1595	4784
Defect	82	41	30	63	40	256
Defect %	7.74%	5.47%	8.17%	5.13%	2.45%	5.08%
Spot						0
Skip stich	2	6		10		18
Broken stich	24	10	8	4	16	62
Uneven stich	20	13	8		3	44
Pleat	18		3	17	13	51
Open seam	18	12			10	40
Label problem			4			4
Point up down			3			3
Tack problem						0
Size mistake				16		16
Sharing				16		16
Reject						0
Total defect	82	41	26	63	42	254
Total defect %	7.74%	5.47%	7.08%	5.13%	2.57%	5.04%
Total defect return from finishing						0
Remarks						

3.2. Defect and reject quantity

Defects in finishing unit

Existent defect quantity of finishing unit (before implementation of TQM tools) is collected from defect check sheet (Table-1). Rejection quantity is collected within the duration of one month. In finishing unit total production is found 500,775 pieces and defect 91,859 pieces. Table-2 shows defect wise quantity of one month in finishing unit.

Rejection in finishing unit

Existent rejection quantity of finishing unit (before implementation of TQM tools) is collected from check sheet (Table-1). In finishing unit total production is found 500,775 pieces and rejection 4,973 pieces. Table-3 shows rejection wise quantity of one month in finishing unit.

Table 2. Defects in finishing unit

Defect Name	Quantity
Iron Problem	25487
Dirty Spot	20671
Oil Spot	16393
Pleat	7760
Reverse	6954
Broken Stitch	5283
Point Up-down	4294
Skip Stitch	3152
Open Seam	1065
Uncut Thread	432
Label Problem	368
Total	91,859

Table 3. Rejection in finishing unit

Rejection Name	Quantity
Fabric Hole	1283
Needle Cut	1064
Insecure Button	634
Color Shade	545
Wash Fell	487
Scissor Cut	367
Print Fault	309
Yarn Missing	167
Lycra Missing	117
Total	4,973

3.3. Process flowchart in finishing unit

Figure-2 shows general flow chart of finishing unit of a garment industry.

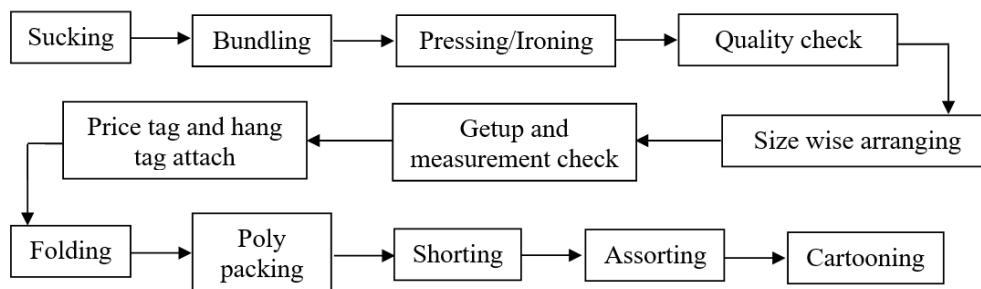


Figure 2. Process flowchart of finishing unit

4. Implementation of TQM tools

The implementation phase is divided in three steps important steps. These are as follows:

Step-1: Implement the pillars of TQM from literature review.

Step-2: Taking action against the root causes that analyze the product quality by TQM tools.

Step-3: Modification of process flow.

4.1. Implement the TQM pillars

TQM pillars is implemented through highlighting some points such as creation of Quality Management (QM) environment, introduction of employees with TQM, use of Statistical Process Control (SPC) tools, identification of starting point [5], information sharing in decision making, encouraging cooperation and teamwork, customer focus as an element of design, modification of reward systems, benchmarking and building continuous improvement goal.

4.2. Action taken against root cause

After defining what problems appear frequently; root cause (through men, machine, operator, operation, accessories, sewing thread, method etc.) of those problems is found out. Then, countermeasures against the root causes are defined and implemented to improve the quality as well as to reduce the rework.

4.3. Modified process flow chart of finishing unit

Figure-3 shows modified process flow chart of finishing unit. In finishing unit after iron quality check ‘Alter or Repair’ stage added. In ‘Alter or Repair’ stage a skill operator from sewing section recruited and three basic sewing machines (a plain machine, an over lock machine and a fed lock machine) added. As a result, problem quickly solved and increases the efficiency and quality of finishing unit. And also increase the efficiency of sewing unit due to reduce the rework from finishing unit [6].

Another modify stage ‘Shading Confirmation’ is also added. It is included after folding and before poly packing. Due to this stage, shading defect is reduced during final inspection by buying QC.

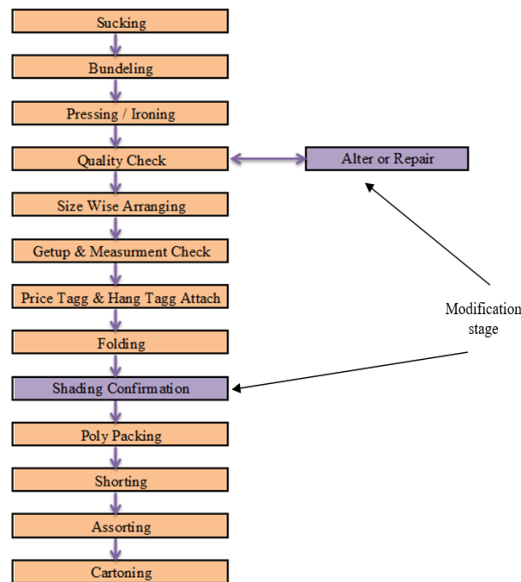


Figure 3. Modified process flow chart of finishing unit

5. Results and Discussions

After applying TQM tools, satisfactory results are found. The team working approach also helps a lot to solve the problem. Also reward system is improved. Table-4 shows the improvement results of different parameters before and after implementation of TQM tools i.e. check sheet and flow chart.

Table 4. Results in different improvement parameters

Improvement Parameter	Before Implementation	After Implementation	Improvement
DHU of finishing unit	18.34%	10.16%	44.60%
Reject/Scrap % of finishing unit	0.99%	0.70%	29.29%
Process control	Not good	Good	Improved
Team work	Not Strong	Stronger than previous	Improved
Reward system	No	Yes	Improved

5.1. DHU improvement of finishing unit

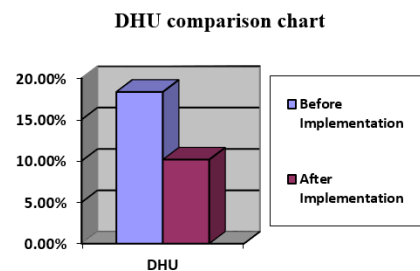


Figure-4 shows DHU improvement of finishing unit before and after implementation of TQM tools. As the main objective of this study is to improve the quality so from the figure it is seen that DHU of finishing unit goes down from 18.34% to 10.16% and the improvement is 40.60% which is satisfactory improvement in the short span of time.

Figure 4: DHU Comparison chart of TQM tools before and after implementation

5.2. Reject/Scrap % improvement of finishing unit

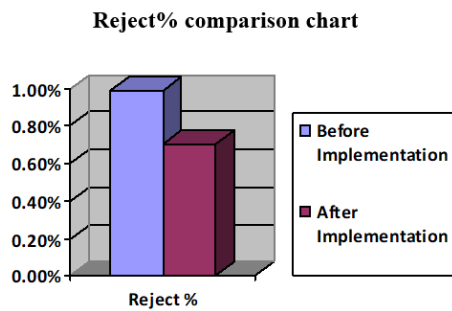


Figure-5 shows Reject% improvement of finishing unit before and after implementation of TQM tools. As the main objective of this study is to improve the quality so from the figure it is seen that Reject% of finishing unit goes down from 0.99% to 0.70% and the improvement is 29.29% which is satisfactory improvement in the short span of time.

Figure 5. Reject% comparison chart of TQM tools before & after implementation

6. Conclusion

This study has extracted an overall scenario of the finishing unit of a garments factory in the context of improving quality. The study found that there are some common and repetitive defects which happen almost every day during production. It is found that by implementing tools and the pillars of TQM, a garment factory can improve quality, efficiency, satisfy the employee by providing a good approach in creation of QM environment, introduction of employees to TQM, encouraging cooperation and teamwork. Analyzing the product quality and process by using the TQM tools can give a remarkable improvement by reducing defect and rework.

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Biography / Biographies

Anowar Parvez is working as a lecturer in BCMC College of Engineering and Technology, Bangladesh. He completed his M.Sc. in Textile Engineering from Mawlana Bhashani Science and Technology University. He earned his B.Sc. in Textile Engineering degree from University of Dhaka in 2011.

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