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Minimization of Defects in the Sewing Section of Apparel Industry

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Abstract

This article is inspired by many unavoidable issues in rejection of huge number of finished apparel products after shipment due to quality control failure in apparel manufacturing. The fast changing economic conditions, such as global competition, declining profit margin, customer demand for high quality product, product variety and reduced lead–time etc. play a major impact on apparel manufacturing industries. The demand for higher value at lower price is increasing and to survive, apparel manufacturers need to improve their operations through-producing right first time quality. This paper discusses the quality and productivity improvement in apparel manufacturing by minimizing reworks that usually occur in the production process. The application of this paper improves the process performance of the critical operational process, leading to better utilization of resources, decreases variations and maintains consistent quality of the process output. The outcome of this observation reflected that an industry may gain higher productivity and profitability with improved quality product by minimizing defects. It also minimizes cost and improves internal throughput time. A general overview over the development is given in this paper that suggests how to handle these issues and bring down rejection rate to minimum.

Keywords: Apparel Defects, Cost reduction, Productivity, Profitability, Product Quality, Reworks.

Introduction

As the global economic condition changing in a rapid motion, generally in an industry more focus is given on profit margin, customer demand for high quality product and improved productivity. In garment manufacturing, it is usual that there will be few rejected garments after shipment. Reasons are most of the manufacturers believed that garments are soft goods and non-repairable defect may occur due to low quality raw materials or faulty process or employee casual behavior[1]. However, factory must have check points to control over this issue. There is no ready-made solution that can reduce rejection percentage overnight. Each order is unique. But this paper work suggests how to handle such problems and bring down rejection rate to minimum with quality production. As we see a lot of rejected garment after shipment, most of the organization termed these garments as rejected because those garments can't be repaired by any means. Reworks in the garments industry is a common works that hampers the smooth production rate and focus poor quality products having an impact on overall factory economy. Minimization of reworks is a must in quality and productivity improvement. Reworks are a vital issue for poor quality product and low production rate. Reworks are the non productive activities focusing on any activity that customer are not willing to pay for. Non productive activities describe that the customer does not consider as adding value to his product[2]. By reacting quicker in minimization of reworks to make a product as per customer demand with expected quality, the company can invest less money and more costs savings. Therefore, a study was carried out in the garment industry named Opex and Sinha Textile Group located at Mirpur, Dhaka, Bangladesh at sewing section to identify reworks so as to eliminate them for saving time, cost and improved product quality.

Problem Statement and Methodology

To be effective in defects and rejection reduction, it is essential to establish and maintain clear, complete and current written records of inspection and test procedures for each operation. These records should identify criteria for acceptance/rejection. In the Apparel Manufacturing Industry, main raw material is fabric; others are different types of trimming and accessories. Operational wastages in the Apparel manufacturing process are-top surface rework, printed label rework, sewing defects, pinhole rework, fabric defects, improper fly shape, and other reworks. To achieve the overall objective in minimizing defects and rejection of finished products it is needed to establish document and maintain a system capable of ensuring that products conform in total to standards specifications[2]. This will be required at every stage of manufacture. Records must be maintained to give objective evidence that the specified requirements have been met. Also need to appoint a management representative preferably independent of other functions to be responsible to oversee the total control system and inspection at each stage of manufacture. The person appointed should have the necessary authority to execute any action related to achieving the desired standard of product. To be effective the system requires planned periodic review by senior management to ensure that its effectiveness is maintained. The general methodology followed to minimize defects rate is given in figure 1.

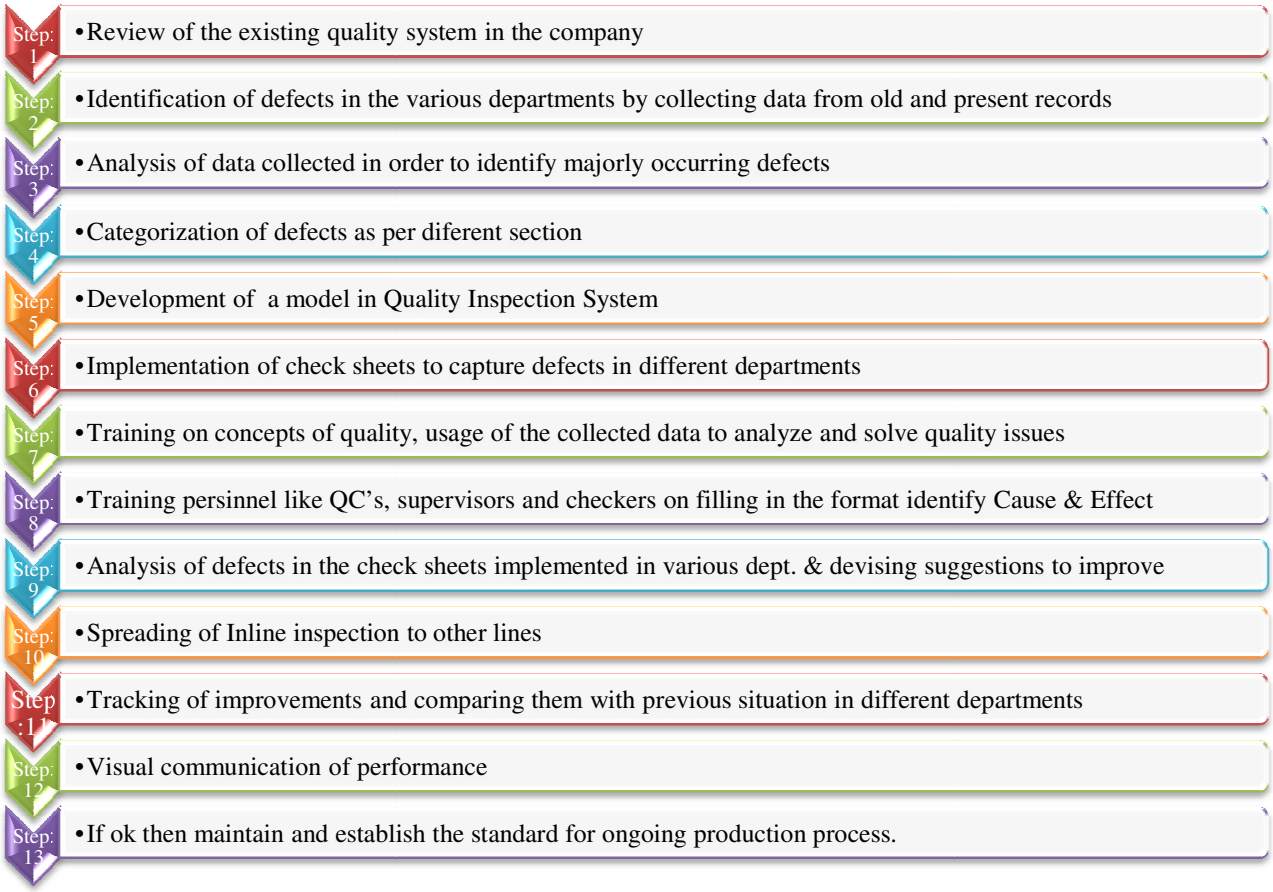

Figure-1
Methodology approach in defects and reworks minimization

Review of factory existing Quality System

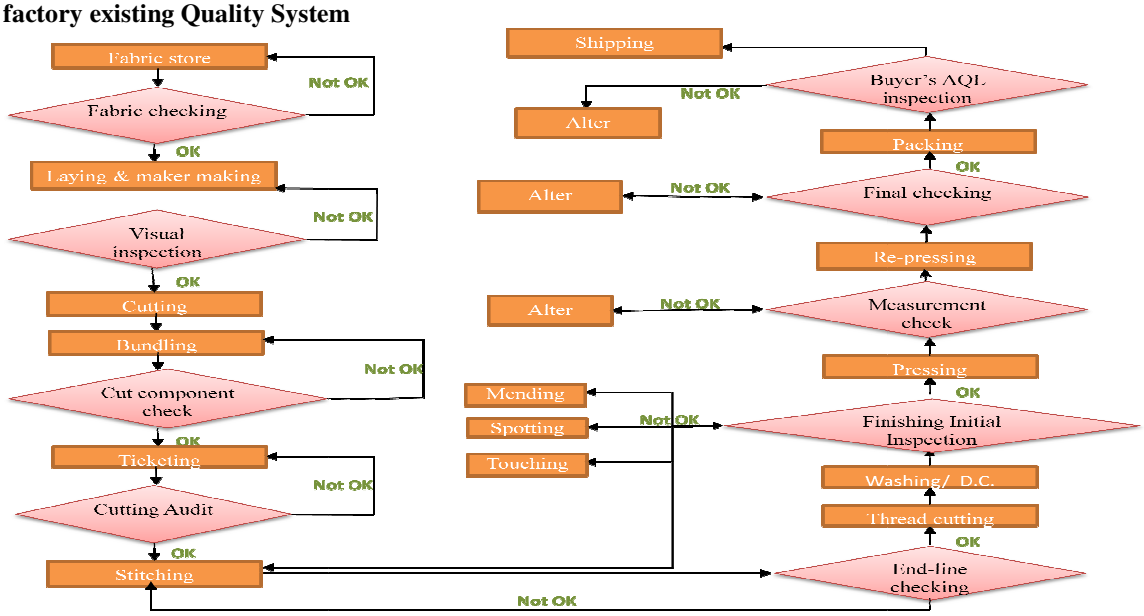

Figure-2
Review of Existing Quality System

Categorizations of Defects

Sewing Defects: These defects are usually caused by errors arising from wrong functioning of sewing machines.

Seaming defects: These defects are usually caused by errors arising from the interaction of the operator and machine in the handling of garment.

Placement Defects: These defects are usually caused by errors arising in marking and cutting as well as sewing operations in the sewing room or a combination of these

Fabric defects: These defects are caused by errors arising from the fabric processing like knitting and dyeing.

Embroidery defects: These defects are caused by errors arising from the embroidery processing of the garments.

Formats introduced in various departments

To carry out the observation and find out the defects we introduced different formats such as

1. Cutting audit format 2. Cutting pattern and check format. 3. Sewing in-line inspection format 4. Sewing end-line inspection format 5. Sewing causes and effect analysis format. 6. Finishing inspection format etc[3].

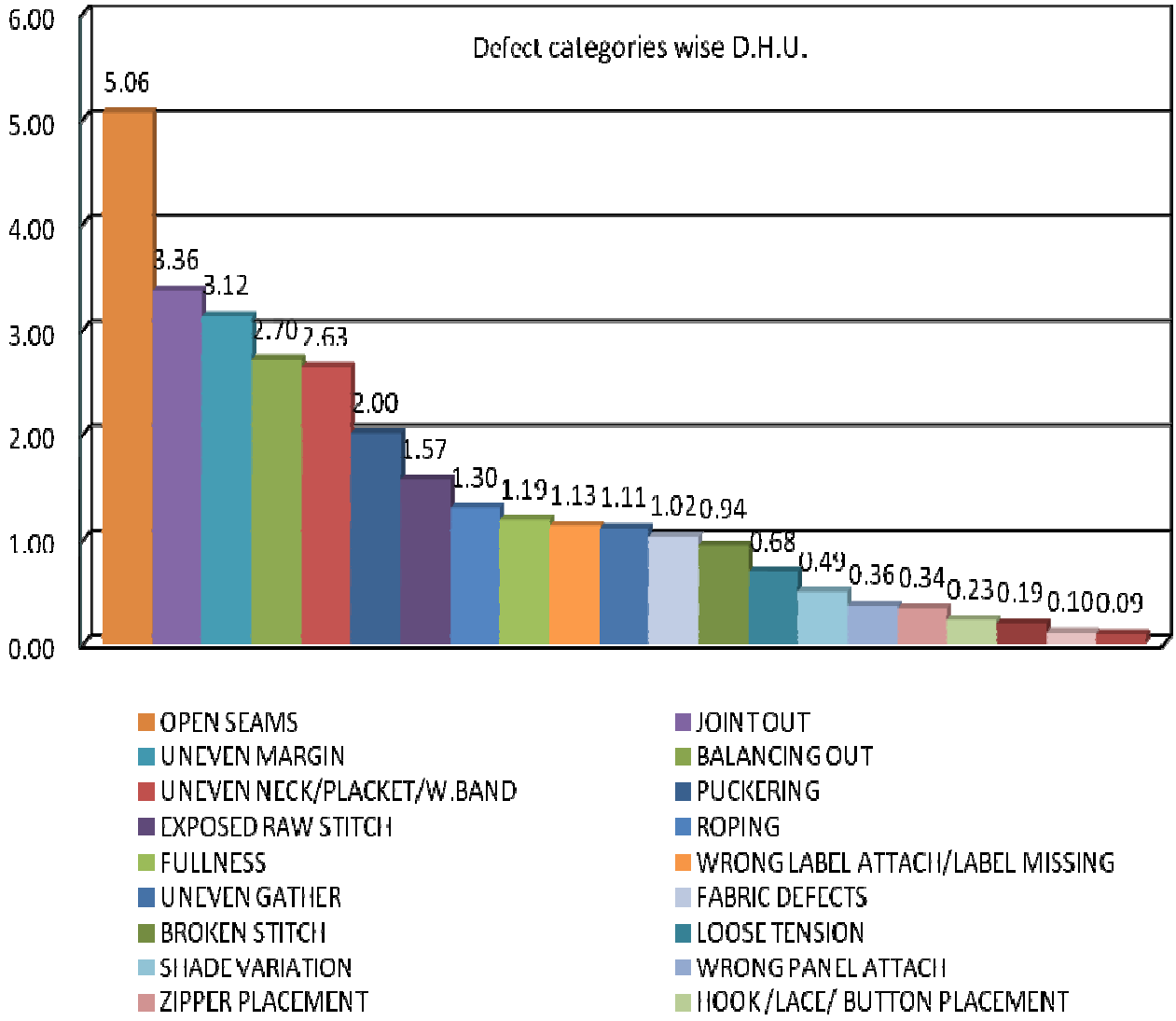

Figure-3
Defects category-wise D.H.U in the sewing department

Table-1
Defect category-wise and percentage defectives in the sewing department

DATE	Thread Tension	Slip stitch	Broken stitch	Miss matched sewing thread	Roping	wrong Interlining placement	Puckering	Improper Fly shape	Improper rolling part	Fusing shining marks	Button Attachment defects	Uneven fly shape	Uneven Top Stitch	Uneven Raw Margin	Exposed Raw stitch	Label Attachment	Measurement out	Others	Total Checked Pieces	Total Defective Pieces	Percentage Defective
1-Mar				5	4												52		61	61	100
3-Mar					6								4				4	8	42	22	52
4-Mar								5					7				5	10	77	27	32
5-Mar						4				3			2		1			2	82	12	14
6-Mar					2				2		5					6		4	88	18	17
7-Mar		1			6											3		6	87	16	28
8-Mar					6			2								7		4	95	19	23
10-Mar	1			1	1							5				2		1	90	11	13
11-Mar		2			3		1			4		3	2			3		9	159	27	17
13-Mar			2		1	3						4						5	65	15	23
12-Mar		4					4						2			3		5	97	17	17
14-Mar		4					2		1		3	1		1		1		3	136	16	12
15-Mar		2			1		2					3	1	2		3		3	223	18	9
17-Mar		3			1	1					1	3				3		4	171	15	10
18-Mar					5											1		11	139	17	12
19-Mar					18			1				2				3		6	227	23	11
20-Mar					4											2		8	155	14	12
21-Mar		2							3			2					1	3	117	11	10
24-Mar		2					3									3		2	89	8	9
25-Mar		3					2			1		2				2		1	95	11	11
TOTAL	1	23	2	6	57	8	14	8	6	8	9	25	18	3	1	42	62	95	2295	380	17

Results and Discussion

Experimental results and discussions on defects reduction in sewing department: Sewing percent defective reduced approximately to 80%. In finishing, stitching D.H.U. came down to approximately 8% from 16% as earlier, uncut thread D.H.U. came down to approximately 10% from 22% as earlier. Reworks increased the cost of the different work categories between 2% to 15%. However, some best practices to control defect generation within the factory were suggested as - Make the workplace clean – from fabric store to cutting to sewing to washing and finishing. Place quality control system in proper place[4-10]. This refer that sufficient no. of checkers, trained checkers, checkers making report while checking, analysis of reports and take action based on the quality check reports. Conduct training program for the checkers on how to check piece correctly to capture defective pieces. Train personnel to make garment checking reports. Run quality awareness program for your employees. Quality standard must be understood by each employee and everybody have to work to meet quality goal[6]. No low standard work should be accepted by the concerned department. In sewing line don't allow operators to keep bundles open and each bundle must be completed before forwarding to the next. It will help you track missing pieces. It is usual experience that operators throw pieces under tables when they make mistake or receive defective (incomplete) garments from previous operator. Nobody keeps track of these missing pieces until you found shortage of garments in finishing. Set standard operating procedures (SOP) for each task performed by your employees. SOP for quality control system for each department. Set audit team to audit your quality system in a regular interval[7]. These recommendations were suggested to the individual department. The defective percentage reduced after implementing the given suggestions is shown here below.

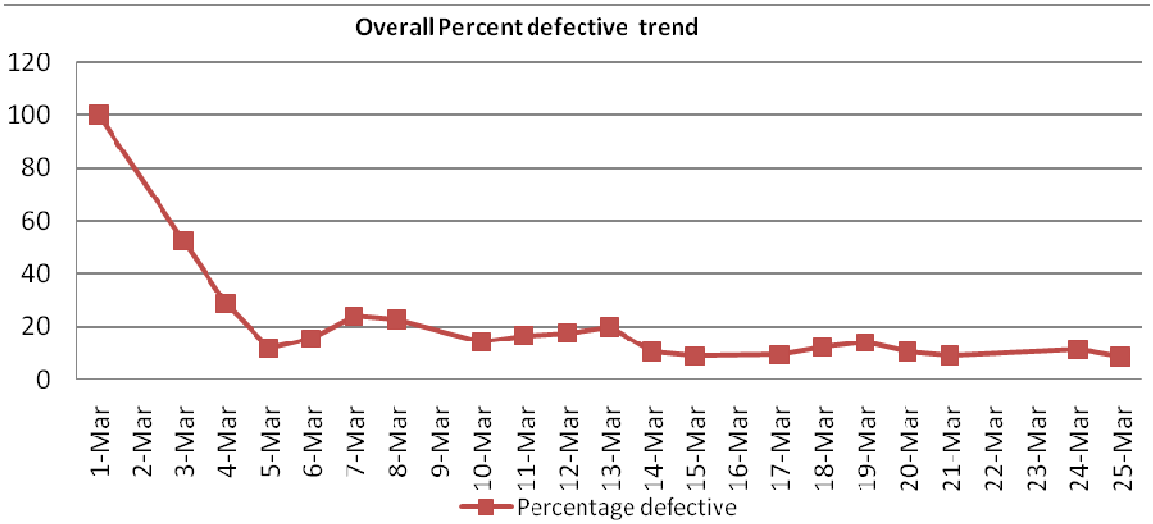

Figure-4
Overall reductions in defects level for sewing department

Recommended suggestions to reduce defects and reworks in sewing section: A manufacturer stays in business only as long as his product quality satisfies his customers at the price they are prepared to pay. Failure to maintain an adequate quality standard can therefore be disastrous[8-9]. However, the suggestion recommended to sewing section of apparel industry to minimize defects and reworks are highlighted here- Prepare garment description with sketch/photograph. Strictly should follow the sample garment properties. During working procedure in the sewing line three quality controllers at in-line and two quality controllers at output table are strongly suggested to identify the causes and effects and to provide proper solution. Records of check list for inspection of accessories and packing material, records of swatch cards of approved accessories, records of production swatch, records of daily QC report, records of cutting problem report, records of inspection report during embroidery as well as others all records should be followed properly. Record seams and stitches for garment assembly[10]. Measure all relevant seam properties e.g. stitches per cm, extensibility, seam strength. Decide on sequence of assembly operations, decide on seams and threads to be used and check machine availability, consider alternatives if machines are not available. Check of finished garment. Examine for appearance and compare with sketch/photograph. Check all technical aspects for any fabric faults, sewing thread, seaming faults, etc. Record all faults found at final inspection for immediate correction and to identify need for preventative -action at a specific stage of production[11]. These recommendations were suggested to the individual department.

Conclusion

The suggestive tools developed in this article play a vital role and cover a series of aspects in minimizing defects and reworks in the sewing section of apparel industries by ensuring quality production. The importance of the textile industry in the economy of Bangladesh is very high. The explosive growth of the RMG industry in the country has not been enough supported by the growth of backward linkage facilities. So manufacturing the quality product is mandatory to sustain in this global competitive market. Quality is ultimately a question of customer satisfaction. Good quality increases the value of a product, establishes brand name, and builds up good reputation for the garment exporter, which in turn results into consumer satisfaction, high sales and foreign exchange for the country. The perceived quality of a garment is the result of a number of aspects, which together help to achieve the desired level of satisfaction for the customer. However, we should bear in mind that 1% defective product for an organization is 100% defective for the customer who buys that defective product. In the long term, clothing with a high level of comfort and best quality finished product is preferred. Finally, a joint effort is highly expected from every related personnel in minimizing defects and reworks and hence to add value, enhance quality and provide the greater levels of service to customers through "Right first time, right on time, right every time.

References

1. Dr P. Khanna, *Work study, time and motion stud*y, Dhanpat Rai and Sons, New Delhi, 21-31 **(2004)**
2. Gryna F.M., DeFeo J.A., *Quality Planning and Analysis for Enterprise Quality,* Tata McGraw-Hill, *Edition,* 23-34 **(2008)**
3. http//www.opexgroup.com **(2013)**
4. PK Balaji, Quality Control in Apparel production, *Research Journal of Management Sciences,* **ISCA, 2(2),** 57-69 **(2012)**
5. http// www.viyellatexgroup.com **(2013)**

6. Saroj Bala, Factors Influencing Costing of Woven Fabrics*, The Indian Textile Journal,* 57-68 **(2003)**

7. Dean J.W. and Bowen D.E., Management Theory and Total Quality: Improving Research and Practice and Theory Development, *the Academy of Management Review,* **19(3),** 392-418 (**1994)**

8. Khan O.H.*, A Study of Six Sigma Implementation and Critical Success Factor, Pakistan's Ninth International Convention on Quality Improvement, Karachi, Pakistan,* 1-12, **(2005)**

9. Hawken Paul, Amory Lovins and L. Hunter Lovins, *Natural Capitalism: Creating the Next Industrial Revolution* (New York Little, Brown and Company, **(1999)**

10. Florida R., Lean and Green the Move to Environmentally Conscious Manufacturing. *California Management Review* **39,** 80-105 **(1996)**

11. Environmental Technology Best Practice Programmed. saving money through waste minimization raw material use, GG25, Crown Copyright **(1996)**

12. Mahajan M.*, Statistical Quality Control,* Dhanpat Rai and Co. (P) LTD**.** 186-206 **(2002)**