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Critical Analyses of Sewing Defects and Minimization of Sewing Reworks in the Apparel Industries

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Abstract- Improving productivity is major concern of apparel industries. There are many factors to increase productivity. The efficiency of workers, tactic and sewing defects of production are interrelation of productivity. Entirely sewing faults are not possible to reduce, but it can improve to minimize the defects of productivity with the help of some technics. This paper considers the quality and productivity enhancement in a manufacturing process through practical study. An experimental investigation for the sewing defects is collect sufficient data from industries. Statistical tools Bar chart, Fishbone diagram, and Regression values help to analysis sewing faults of apparel industries. The outcome of this study is find out the reasons, effects, and remedies of garments sewing defects.

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Critical Analyses of Sewing Defects and Minimization of Sewing Reworks in the Apparel Industries

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Abstract- **Improving productivity is major concern of apparel industries. There are many factors to increase productivity. The efficiency of workers, tactic and sewing defects of production are interrelation of productivity. Entirely sewing faults are not possible to reduce, but it can improve to minimize the defects of productivity with the help of some technics. This paper considers the quality and productivity enhancement in a manufacturing process through practical study. An experimental investigation for the sewing defects is collect sufficient data from industries. Statistical tools Bar chart, Fishbone diagram, and Regression values help to analysis sewing faults of apparel industries. The outcome of this study is find out the reasons, effects, and remedies of garments sewing defects.**

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I. Introduction

The fast-changing economic conditions such as global competition, declining profit margin, customer demand for the high-quality product, product variety, and reduced lead–time, etc. had a significant impacts on manufacturing industries. The demand for higher value a lower price is increasing and surviving apparel manufacturers need to improve their operations through producing right first-time quality and waste reduction. This paper discusses the quality and productivity improvement in a manufacturing enterprise through practical study. The work investigates a framework to identify quantify and eliminate sources of variation in an operational process, to optimize the operation variables, improve and sustain process performance with well-executed control plans. The primary quality characteristics are static physical dimensions, and secondary qualitative are the reactions of the clothes to an applied dynamic force. The apparel manufacturer is primarily interested in the secondary characteristics of the fabric and focuses on the seam quality during the fabrication and production of apparel [1].

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The application of this practice improves the process performance of the critical operational process, leading to better utilization of resources, decreases variations & maintains consistent quality of the process output. The production process includes a set of workstations, each of has a specific task that carried out selected sequence, for the different styles simultaneously [2] The outcome of this observation reflected that an industry might gain higher productivity and profitability with improved quality product by minimizing reworks activities. In the present work, the impact of an increase in needle thread tension [3], [4], [5] on the fabric is analyzed in Single Needle Lock Stitch sewing machine with stitch type Class 300 and Type 301.

At present, the success of the Readymade Garments sector highly depends on several factors such as manufacturing lead time, quality of the product, production cost, etc. Broken stitch, Skipped stitch, Open seam, and others sewing problems are related to the product quality. The lower quality products are hampered productivity. These flaws can be repairable that leads to rework or non-repairable that leads to rejection. Rework in the garments industry is a regular work that hampers the smooth production rate and focuses poor quality products having an impact on overall factory economy. Minimization of reworks is a must in quality and productivity improvement. Rework is a vital issue for inferiority product and low production rate [6]. Reworks are the non-productive activities focusing on any operations that customer is not willing to pay for it. Non-productive activities describe that the customer does not consider as adding value to this product.

II. Material and Methodology

a) Materials Descriptions

Fabric: We have studied 95 % cotton, and 5 % Lycra knit composite fabric for a T-Shirt and the fabric weight was 200 gram per square meter.

Sewing thread: Sewing thread applied 100% cotton spun yarn that counts mentioned 40 Tex and stitches per minute (SPI) 12.

b) Methods and process sequence

We have performed this research work on 32 garments line based in Apparel Industry in Bangladesh. Every garments line contained 26 no of the machine. As per Acceptable Quality level (AQL) inspection system, we selected lot size code "J" and sample size 80. Everyday 80 pcs garments we have inspected and similarly, total 560 pcs sample observed during seven days. Different types of sewing tension like 3, 4, 5, 6, and 7 applied in same garments line and found different kinds of several faults..

III. Data Analysis

Table 1: Total No of Inspected samples- 560 pcs and Sewing Tension used- 3

Day	F1	F2	F3	F4	F5
1st	10	15	5	2	7
2nd	11	13	4	1	8
3rd	14	11	3	2	8
4th	12	15	2	2	7
5th	13	13	3	2	8
6th	10	14	3	2	6
7th	14	15	4	2	8
TD	84	96	24	13	52
DHU%	15	17.14	4.29	2.32	9.29

Table 2: Total No of Inspected samples- 560 pcs and Sewing Tension used- 4

Day	F1	F2	F3	F4	F5
1st	12	12	4	2	6
2nd	10	12	3	3	7
3rd	12	14	5	2	8
4th	11	14	1	1	6
5th	10	13	2	1	8
6th	9	14	3	2	7
7th	15	14	2	2	8
TD	79	93	20	13	50
DHU%	14.11	16.61	3.57	2.32	8.93

F1 = Brocken Stitch, F2 = Skipped Stitch,
F3 = Open seam, F4 = Uneven stitch,
F5 = Others Defects, TD = Total No of Defects,
DHU % = Defects per Hundred Unit

Table 3: Total No of Inspected sample-560 pcs And Sewing Tension used-5

Day	F1	F2	F3	F4	F5
1st	8	10	4	2	5
2nd	9	11	3	1	7
3rd	11	8	4	2	8
4th	10	10	3	3	9
5th	11	11	2	2	8
6th	10	12	1	2	5
7th	10	14	2	0	4
TD	69	76	19	12	46
DHU%	12.32	13.57	3.39	2.14	8.21

Table 4: Total No of Inspected sample-560 pcs And Sewing Tension used-6

Day	F1	F2	F3	F4	F5
1st	14	11	4	2	6
2nd	12	12	3	1	8
3rd	13	15	3	2	7
4th	11	14	4	1	6
5th	13	12	2	0	8
6th	12	14	3	4	6
7th	10	13	2	3	7
TD	85	91	21	13	48
DHU%	15.18	16.25	3.75	2.32	8.57

Table 5: Total No of Inspected sample-560 pcs And Sewing Tension used-7

Day	F1	F2	F3	F4	F5
1st	11	13	3	3	7
2nd	13	14	2	4	6
3rd	15	12	4	2	7
4th	13	14	3	2	8
5th	11	15	4	2	8
6th	14	13	2	3	7
7th	14	14	4	4	7
TD	91	95	22	20	50
DHU%	16.25	16.96	3.93	3.57	8.93

a) *Cause and effect diagram of Skipped and Broken Stitch*

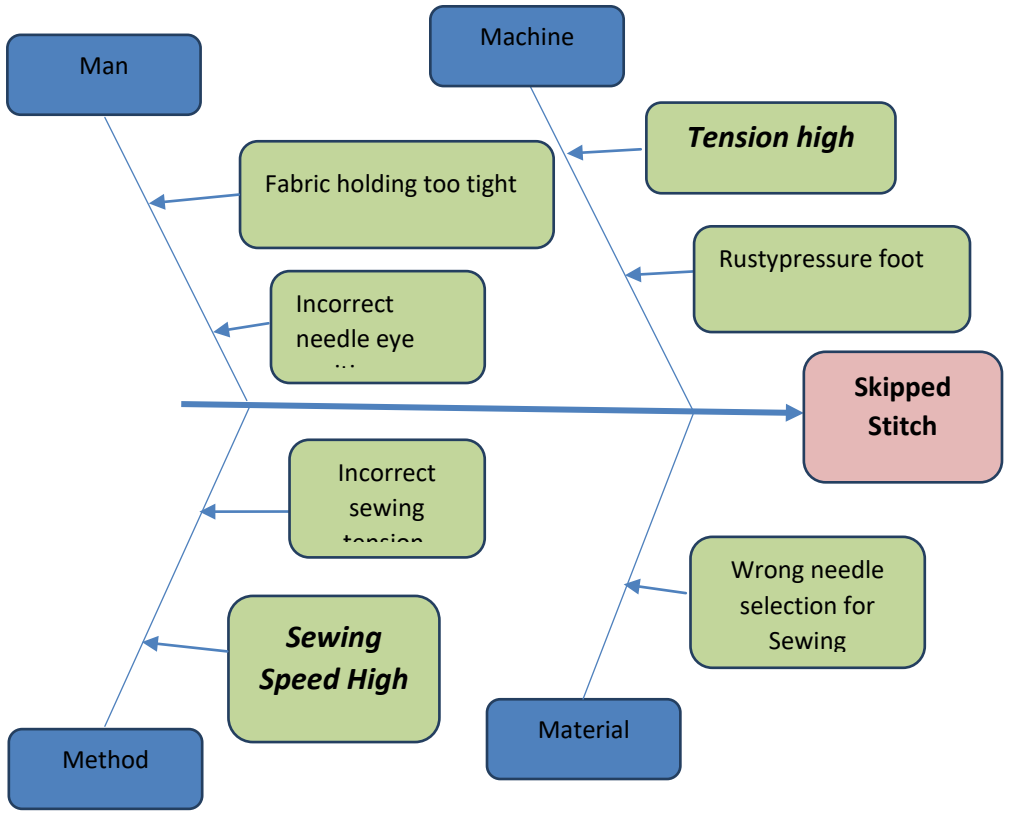

Fig. (a)

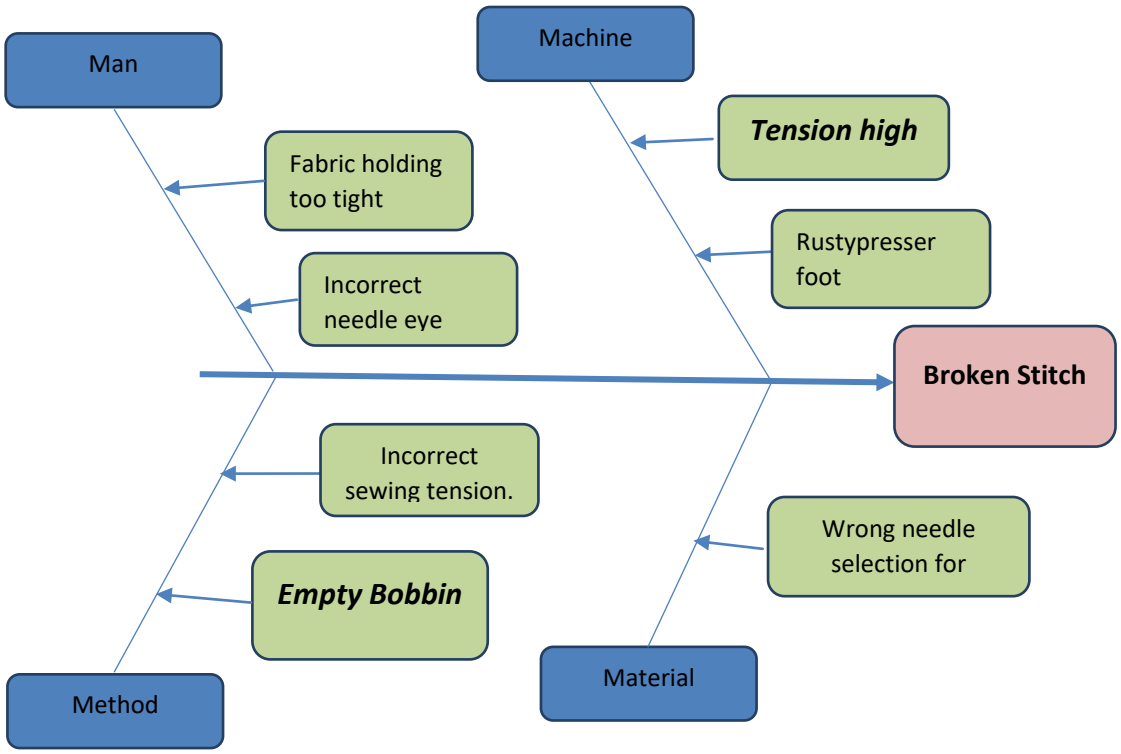

Fig. (b)

IV. Results and Discussion

Table 6: Effects of different tension on sewing faults

Sewing Tensions	Broken stitch	Skipped stitch	Open seam	Uneven stitch	Others defects
3	15	17.14	4.29	2.32	9.29
4	14.11	16.61	3.57	2.32	8.93
5	12.32	13.57	3.39	2.14	8.21
6	15.18	16.25	3.75	2.32	8.57
7	16.25	16.96	3.93	3.57	8.93

By Analysis the defects% from the above research work we have identified that the top defects of sewing problems are Broken and skipped a stitch. These are about 14.6% and 15.94% respectively of total errors. There are many factors which directly influenced by occurred Skipped and Broken stitch. Among them, we have applied different tensions and found the effects. The tension scale shows 0 to 9 categories, from there we have applied stress 3 to 7 category. "0" class tension that shows loose stitch and "9" category tension exposition too tight stitch. As per our assessment sewing tension "5" shows fewer defects compare to others sewing tensions.

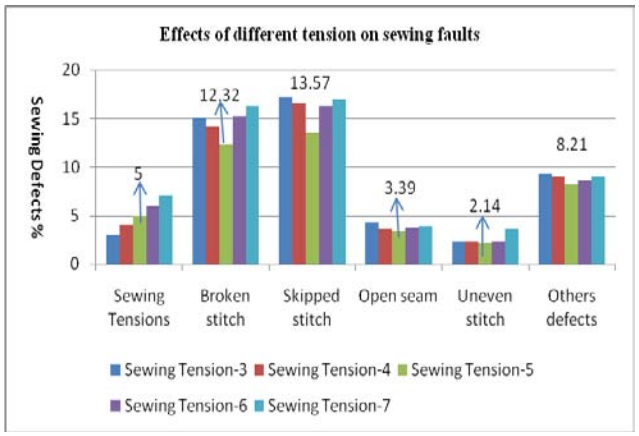

Fig. 1

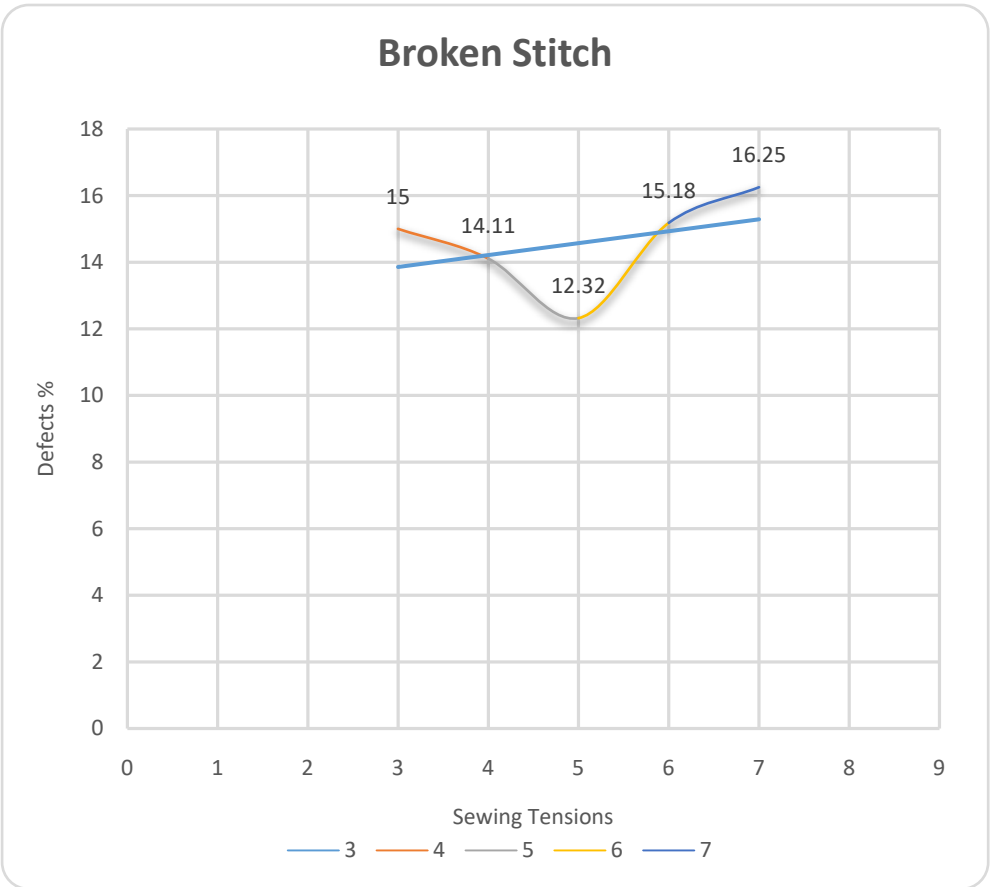

Fig. 2

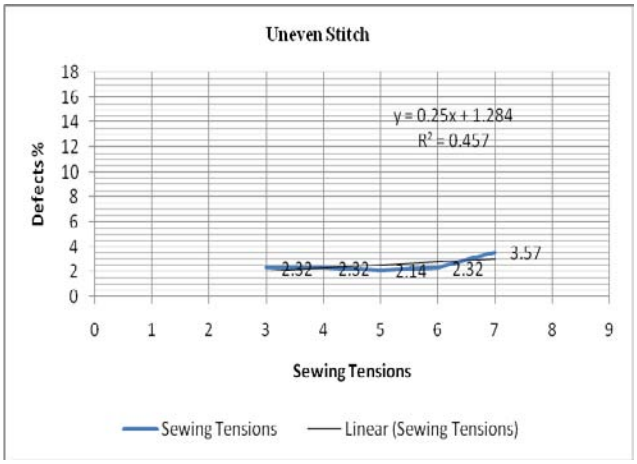

Fig. 3

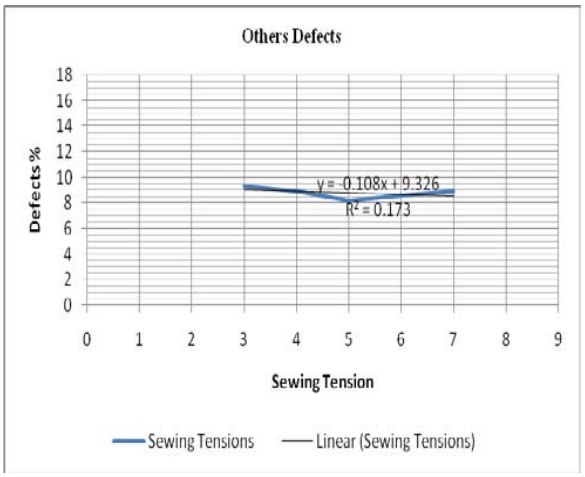

Fig. 4

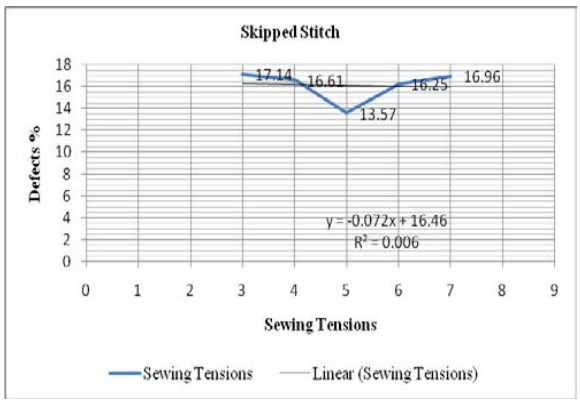

Fig. 5

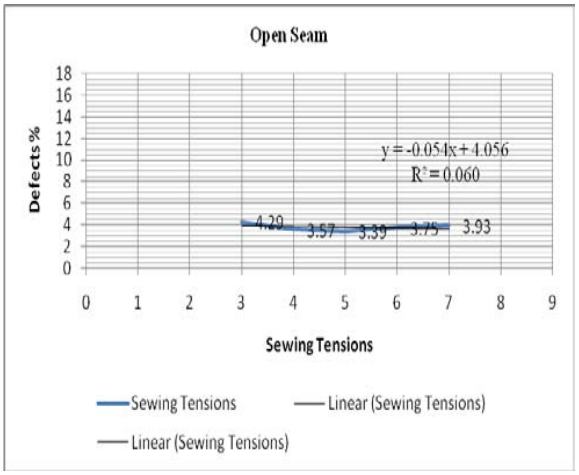

Fig. 6

V. Conclusion

This study indicates that by eliminating non-productive activities like reworks in the apparel industries time as well as cost are saved by ensuring quality products which has an significant impact on the overall factory.

We have implements different sewing tensions that were the leading causes for broken stitch as well as a skipped stitch. Except for this reason many other factors like high speed, empty bobbin, rusty pressure foot and materials handling by the worker also impact on same types of faults. We can have further research work on the way out to minimize those sewing defects by developing some methods to identify the bobbin condition just before empty.

References Références Referencias

1. A. K. Choudhary1 and Amit Goel1, 2, Effect of Some Fabric and Sewing Conditions on Apparel Seam Characteristics, Hindawi Publishing Corporation, Journal of Textiles, Volume 2013, Article ID 157034, 7 pages, 2013. http://dx.doi.org/10.1155/2013/157034
2. Chuter, A. J. Introduction to Clothing Production Management. Oxford: Blackwell Science, 1988.
3. FBN Ferreira, SC Harlock and P Grosberg, A Study of Thread Tensions on a Lockstitch Sewing Machine (Part I), International Journal of Clothing Science and Technology, 1994, 6(1), 14 – 19.
4. FBN Ferreira, SC Harlock and P Grosberg, A Study of Thread Tensions on a Lockstitch Sewing Machine (Part II), International Journal of Clothing Science and Technology, 1994, 6 (5), 26 - 29.
5. FBN Ferreira, SC Harlock and P Grosberg, A Study of Thread Tensions on a Lockstitch Sewing Machine (Part III): Further Stitch Formation Analysis,

International Journal of Clothing Science and Technology, 1994, 6 (5), 39–42

6. [6] Md. Mazedul Islam1, Adnan Maroof Khan1 and 2 Md. Mashiur Rahman Khan "MINIMIZATION OF REWORKS IN QUALITY AND PRODUCTIVITY IMPROVEMENT IN THE APPAREL INDUSTRY" International Journal of Engineering and Applied Sciences, January 2013. Vol. 1, No.4, ISSN 2305-8269, pp-147© 2012 EAAS & ARF. All rights reserved. www.eaas-journal.org.