Reduction of Final Inspection (FQC) Returns to Sewing by 25%

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Abstract: **The fast-converting economic situations which include international opposition, declining income margin and purchaser demand for excessive first-rate product at low fee push the manufactures to reduce their production price without compromising satisfactory so that it will live on in enterprise arena. Defects minimization is the primary condition of decreasing production price and improving the satisfactory. It'll additionally reduce the cycle time by lowering reworks and subsequently result higher productivity. Regarding this remember, the present have a look at explores using DMAIC methodology of six sigma to reduce the defects rate in a specific garment factory. This is a systematic approach closer to defects minimization through 5 stages of DMAIC technique named define, degree, examine, enhance and control. Special six sigma tools were used in different phases. Pareto evaluation turned into performed to become aware of the important kinds of defects. Root causes of these defects have been detected via reason-and-impact evaluation (fishbone). Finally, some capacity solutions are cautioned to overcome those reasons.**

Keywords: **DMAIC, root cause, fishbone diagram, pareto chart.**

1. Introduction

Garment industry is one of the largest growing industries in the world. Garment manufacturing is one of the India's largest manufacturing activities not only in India but also in worldwide.

In 2021/2022 garments manufacturing is accounted for about 7 percentage of India's total industrial production and it accounted of 10% the earnings from exporting in with global textile market having value of 611 billion in 2023 at a compound annual growth rate (CAGR) of 6.6 percentage. Quality is the main factor in garment industry. There is a term in garments manufacturing FPY - first piece yield, which means the subjected garment doesn't undergone any subsequent rework and it's directly finished and packed in the first sequence of operations itself. Higher the rate of FPY better the garment quality. Also, by increasing the FPY; production efficiency is also subsequently increased. In this paper shirt and T- shirt garment manufacturing techniques will be discussed. Every industry will be following their own production system, but in general it is subdivided into 2 – Unit production system and Bundle production system. A garment manufacturing industry will have 7 departments:

1. STORES
2. CAD
3. CUTTING
4. SEWING
5. FINISHING
6. DISPATCH
7. PLANNING

In general fabric is the most significant factor contributing in the cost of the garment. The fabric contributes around 70% of the price of the end product.

A. Literature Review

[1] Studies relating to the factors which affect the results of returns management. [2] The quality improvement of garment industry by applying quality tools. [3] The need for companies in the clothing industry to progress. [4] Issue of garment quality and how it can be connected to product lifetime. [5] Determine the importance of quality in the Portuguese textile firms. [6] A Quality Cost procedure was refined and implemented in the textile industry. [7] studied the time taken in each step of garment manufacturing.

2. Methodology

Various techniques are implemented in garment industry to sort out the defects.

The bar graphs can be used to distinguish between the different types of defects in garment industry.

Pareto chart can be used to represent defects in a particular industry, it represents the most significance defects which covers almost 80% of the total defects so that we can able to differentiate between in which frequencies the problems are occurring in an industry. The purpose of this chart is to highlight the main factors that affect the rise of defects, and also it is useful to prioritize the defects in order to keep track the overall improvement.

Cause and effect diagram can be used to identify the potential causes for a problem. Cause and effect diagram is also called as fish bone diagram. In which the fish face represents the problem and the bones represents the root causes for the occurrence of the problem.

While using Pareto chart while analyzing the defects in an industry the top defects which covers 80% of the problems are taken and the action plan is planned according to rectify the problem.

In general, the root causes or subdivided into four categories

- Man
- Machine
- Method
- Material.

Problems and its root cause in the above four areas is identified and optable solution is given to the problem to overcome defect.

Table 1
Data in an industry which is manufacturing Louis Philippe product

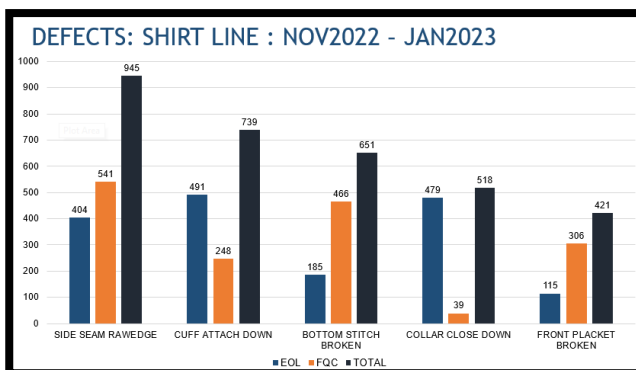|	PRODUCT	PRODUCTION QUANTITY	REWORK	REWORK IN %	DAILY AVERAGE
NOVEMBER	SHIRT	141493	4382	3.09	174.32
	T-SHIRT	29588	1826	6.17	101.52
DECEMBER	SHIRT	148156	4571	3.08	169.29
	T-SHIRT	32983	1689	5.12	62.55
JANUARY	SHIRT	115008	4207	3.65	175
	T-SHIRT	27117	1412	5.2	58.33
FEBUARY	SHIRT	127223	4806	3.77	200.25
	T-SHIRT	21396	1343	6.27	58.31
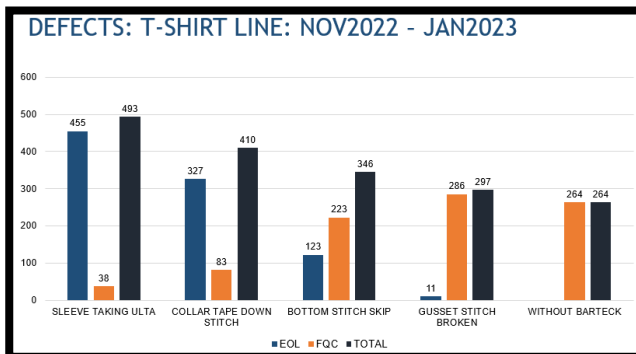
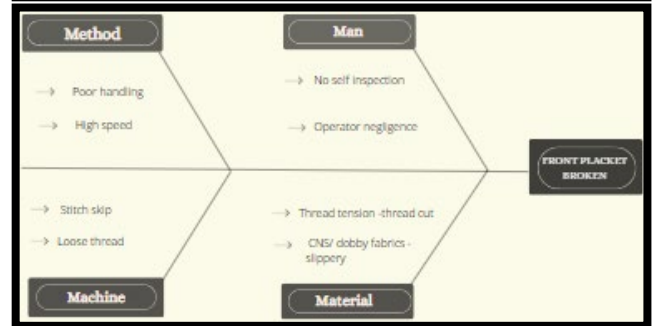Fig. 1. Top 5 defects in T-shirt line
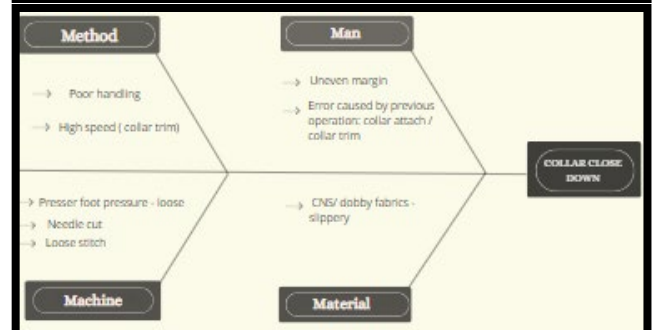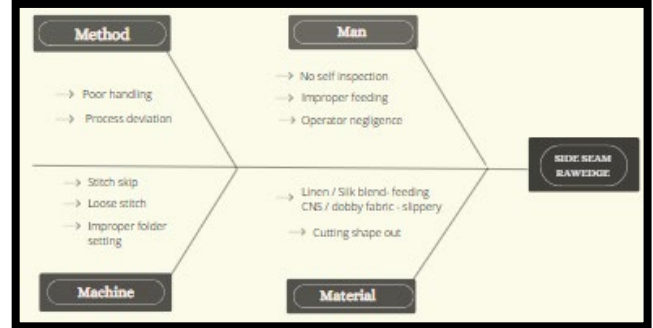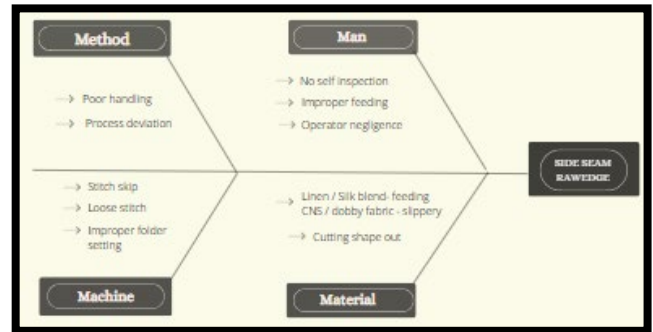

Fig. 2. Top 5 defects in Shirt line

Fig. 3. Fishbone diagram for top 5 defects in shirt line

3. Conclusion

This paper presented an overview on the reduction of final inspection returns to sewing by 25%.

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