Analysis of Rejection in Sealing, Cutting and Packing Shop by USING 7QC Tools

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Abstract - *Organizations need to improve their processes to continually achieve customer satisfaction and, to do that in an effective and efficient way, should use quality tools. The main objective of this research project is to improve the level of quality through the use of quality tools in a company in the installation phase. Also this paper will help to provide an easy introduction of 7 QC tools and to improve the quality level of manufacturing processes by applying it. QC tools are the means for Collecting data, analyzing data, identifying root causes and measuring the result. Cause of rejections were found by application of QC tools and rejections where reduced by giving remedies. In this project total rejection is 3.43% aim of this project is to reduce rejection up to 2%.*

Key words: Quality tools, Cause and effect analysis, Brainstorming, Check sheet, Flow process chart.

1. INTRODUCTION

In today's industrial scenario huge losses/wastage occur in the manufacturing shop floor. This waste is due to operators, machine, material, maintenance personal, process, tooling problems and non-availability of components in time etc. Seven quality control tool realize that can help developing and solving with operational problem solving with efficiency. This study was carried out at Colgate brushes manufacturing company. Here authors used main three tools i.e. Pareto Chart, Fishbone Diagram and Check Sheet. Pareto Chart and Check sheet is very basic tool which identify the problems.[1] According to problems established Fishbone Diagram are used to analyze the problems. This Study was carried out at Varsa plastic manufacturing company. Here Pareto chart is used for problem identification and it was found that 3.42% the problem was related to the packing of tooth brushes in baker card according to problem draw chart which shows that data sampling technique was not proper after it was held effective brainstorming session to established the Cause-and-effect diagram for analyzed the problems This study was carried out at packaging section, here main two basic Quality Control tools i.e. Pareto chart and Ishikawa diagram used for the Quality control. By using Pareto Chart it identified the different problems of baker card and to analyze this problem author drawn the Ishikawa diagram for the causes behind this major problems and this diagram will also help to Continuous Quality improvement. The purpose of this study was continuous Process improvement at Varsa Plastic Private Limited. For this basic quality tools like the histogram and cause-and effect diagram were used. Here histogram are used to find out the major problems in packing of brushes and Author draw the cause and effect diagram to study the major problem causes with the help of causes author took the action plan to improve the productivity at desire level. The aim of this study was to improve the product Quality. After this effective brainstorming session was held to establish the Ishikawa Diagram which analyzed the problems.

1.1 Introduction of Industry and Products

This Firm is recognized as the largest manufacturing company in the field of Plastic manufacturing in India. The company manufactures following class products Zig-zag revite handle tooth brush; (color code), New super flexi relanch-black, New super flexi relanch-white, Super-shine new colors, Cibaca T-2, kids-panda Black.

In the Varsa plastic pvt.ltd there is rejection of baker card i.e. baker card it mean generally use to packing of brushes at the time of packing of brushes, the rejection come which are the following .Matter cut, Improper Sealing, Printing mistakes on baker card, Dust on tooth brush, Cross cut, Misplacement, Absence of nylon wire in hanger, Paper damage etc. these problems will study by following 7QC tools.

2. APPLIED TOOLS

Quality tools can be used in all phases of production process, from the start of product development up to product marketing and customer support.[3] The 7 QC Tools are simple statistical tools used to monitor the overall operation and Quality control. These 7 QC tools were developed by the Deming and Juran. Ishikawa has stated that these 7 QC tools can be used to solve 95 percent of all problems. The following are the 7 QC Tools: [3]

1. Flow Diagram
2. Check Sheet
3. Pareto Chart
4. Cause &Effect Diagram
5. Scatter Diagram
6. Histogram
7. Control Chart

2.1 Flow diagram

Flow diagram is a graphical or a pictorial way to depict process. With the help of a flow diagram we can show process sequence. It can be used to guide a process for better understanding and analysis. Flow diagram will help to carry out the process sequences for a particular process with help flow diagram process cycle time will be reduce and it will be beneficial for worker to do the work very help full it will reduce the time of material handling at particular stage availability of material will reduce the human effort and create interest in the work.[3]

2.2 Check-Sheet

The check sheet is used for collecting and analyzing data in real time at the location where the data is generated. Data Collection is staring point of useful process improvement and problem-solving tools. This data should be used with others quality tools such as Pareto Diagram, Histogram. Table.1 is shown example of a check sheet with modes of defects of Tooth brushes packing cards while during Production Process. It shows the type of defects, rejection of each types occurred during that period.

Table -1: Check Sheet

Defect	Machine 1	Machine 2	Machine 3	Total
Matter cut	376	365	239	980
Improper sealing	227	223	175	625
Printing mistakes on baker card	87	89	53	229
Dust on toothbrush	63	61	33	157
Cross cut	60	63	33	156
Misplacement	16	15	9	40
Absence of nylon wire in hanger	13	15	10	38
Paper damage	15	16	8	39

Total Production 66155

Total Rejection 2264

2.3 Pareto diagram

A Pareto Chart is simply a frequency distribution (or Histogram) of attribute data. [2]. It consists "a series of bars whose heights reflect the frequency or impact of problems. The bars are arranged in descending order of height from left to right. It states that about 80 percent of the problems come from 20 percent of the causes and it is extremely useful to identify the factors that have the greatest cumulative effect on the system, and will able to classify them according the weight of effect to focus on them. [3]
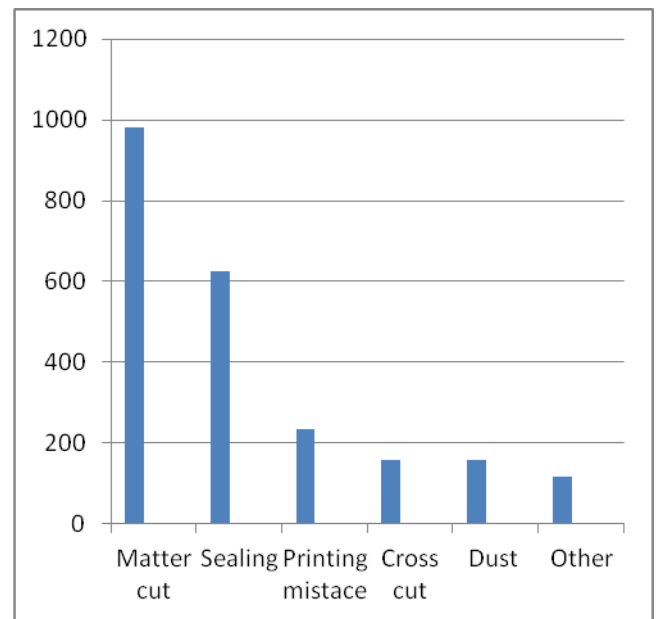
Chart- 1 Pareto chart

2.4 Histogram

A Histogram is one of the basic quality tools. It is used to graphically summarize and display the distribution and variation of a process data set. A frequency distribution shows how often each different value in a set of data occurs. The main purpose of a histogram is to determine the shape of data set. [2]

2.5 Scatter-Diagram

A scatter diagram is tool which shows relationships between two variables. Among the two variables one variable is plotted on horizontal axis and other and other variable is plotted on vertical axis.[3] There is no co-relation between the two variables so in this study scatter diagram is not shown.

2.6 Brainstorming

It is a process for developing creative solution to problem. Brainstorming work by focusing on problem, and then deliberately coming up with as many solution as possible by pushing the idea as far as possible. one of the reason it is so effective is that the brainstorming not only come up with new idea in a session, but also spark off from associations with other people's idea by developing and reefing them, During the brainstorming session there no criticism of idea-the idea is to open up as many possibilities as possible, and break down preconceptions about the limits of the problem. Once this has been done the result of the brainstorming session can be analyses and the best solution can be explored either using further brainstorming or more conventional solutions.[3]

Table-2 Brainstorming

Sr. no.	Causes	Quality engineer	Shop Incharge	Production supervisor	Maintenance supervisor	Worker	Rating	Rank
1	Matter cut	Yes	Yes	Yes	Yes	Yes	5	1
2	Printing mistakes	No	No	No	No	Yes	1	4
3	Improper sealing	No	No	Yes	Yes	Yes	3	2
4	Dust	Yes	Yes	No	Yes	No	3	2
5	Cross cut and missing tuft	No	Yes	No	No	Yes	2	3
6	Other	No	No	Yes	No	No	1	4

2.7 Cause-and-Effect Diagram

A cause and effect diagram, also known as an Ishikawa diagram or fishbone diagram which shows the graphically the defects and causes. While developing this cause and effect diagram brainstorming technique very helpful because this technique involves more numbers of experts and it helps to identifying maximum number of causes. On Fig. show Cause-and-effect diagram which defines the causes of Matter cut during Sealing Process with the help to brainstorming technique. [4]
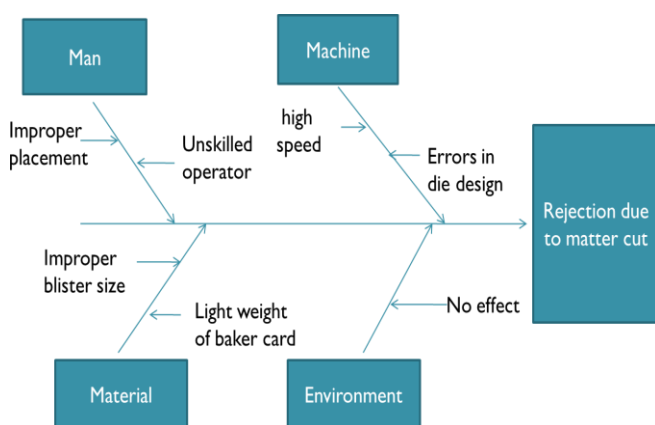

Fig -1 Cause and Effect Diagram

3. RESULTS AND DISCUSSION

After applying 7 Quality tools at Colgate brushes manufacturing industry we found the Root-Causes, quality level, Process Performance, cost due to wastage and QC tools are apply for the some major rejection of tooth brushes cards are mention below.

Table-4 Root cause chart

Defects	Causes	Remedies
Matter cut	Card sticks on die	Three pin Solution on die
Improper Sealing	Absence rubber	Application of Rubbers
Printing mistakes	Due to lable of hard and soft baker card	Use alphabets A for hard and B for soft baker card
Dust on Baker Cards	Due to human error	Handling with hand gloves
Cross cut	Margin cutter	Three pin on die
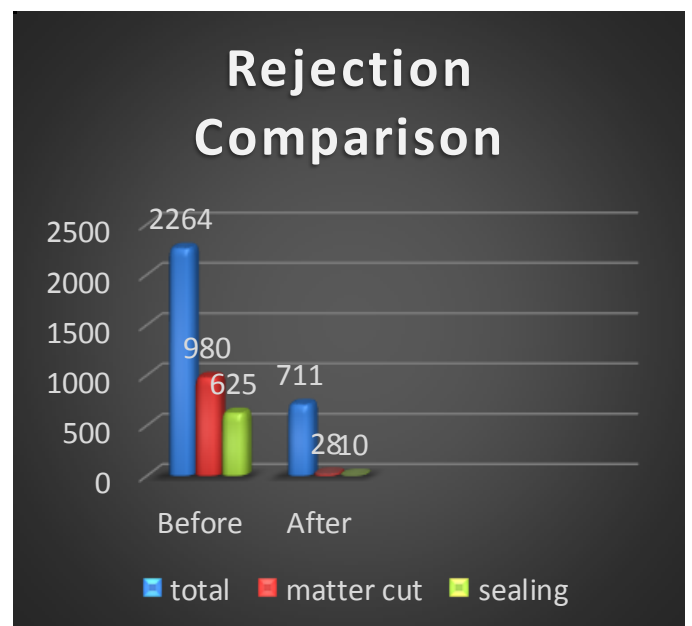
Chart-2 Rejection Comparison

4. CONCLUSIONS

This paper presents a study of Colgate brushes manufacturing demonstrating the application of 7QC to reduce the rejections. it was found that errors in die design was the root cause for this major defect i.e. Matter cut and high temperature was the root cause for improper sealing.

The necessary remedial action was made in design of the die and application of rubber on die. After application of remedial actions, the matter cut defect is reduced by up to 95% and sealing defect is reduced by up to 98 %. Due to the application of remedial actions total rejections are reduces from 3.42% to 2%. Cost of backer card saved for matter cut and sealing per month is 28,500 Rs. As a part of future scope it will help to study the natural variation during the production process.

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