

Implementation of Quality Control Tools for Reducing Customer Complain in a Label Manufacturing firm

Deepa Sanjay Pandey, Niyati Raut

Abstract— This research is focusing in implementing Quality control tools activities for solving the customer complain in an industrial sector. The study is carried out in a Label Manufacturing industry which is now facing problem in establishing new printing Machines in their Plant, and also maintaining it to reduce downtime due to maintenance issue. Due to some faults in the quality of few products there is rise in customer complaints. The approach is directed in the direction for finding the root cause of the problem, due to which quality issues rise in a manufacturing sector in Indian industries. The work includes solving the customer complaints by doing root cause analysis (RCA) of the problem by doing why why and fishbone analysis of individual customer complaint and Corrective action and Preventive action (CAPA) is made and given to the individual customers for their satisfaction. The study highlights the contributions of Quality Control tools which initiatives to organisational performance and also the need for the successful management of Quality control programmes for establishing sustained quality improvement initiatives. By doing why why and fishbone analysis, quality issues of the customers are reduced by 50%.

Index Terms— Quality Control (QC), Root Cause Analysis (RCA), Corrective Action and Preventive Action (CAPA), Customer complaints, organisational performance.

1 INTRODUCTION

For achieving the target to reduce the customer complain by 50%, study should be done on the way of working of the quality department and the quality control tools for improving the quality of the dispatched labels so that there should be a steep reduction in the customer complain.

1.1. Quality Department.

Quality department co-ordinates with the store production and slitting department. Firstly inspection of the raw material is done by taking samples of the raw material from the store. Online inspection of the job setting on the machine is done before starting the production. Final inspection of the slitted material is done in the end before dispatching the job.

1.2. Seven Basic Tools of Quality

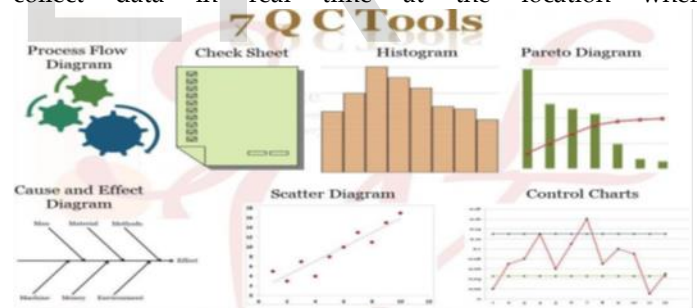
The Seven basic tools of quality is a designation given to a fixed set of graphical techniques identified as being most helpful in troubleshooting issues related to quality. They are called basic because they are suitable for people with little formal training in statistics as they can be used to solve the vast majority of quality-related issues. [1]

The seven tools are as follows:

1. Cause and Effect diagram (also known as the "Fishbone" or Ishikawa diagram):- Ishikawa diagrams are causal diagrams created by Kaoru Ishikawa (1968) that showed the causes of a specific event. Common uses of the Fishbone diagram are product design and quality defect prevention, to

identify potential factors causing an overall effect. Each cause for imperfection is a source of variation. Causes are usually grouped into major categories to identify the sources of variation. [2] [3]

2. Check sheet: - Check sheet is a form (document) used to collect data in real time at the location where



1. Figure shows 7 quality control tools the data is generated. The data which it captures can be quantitative or qualitative. When the information is quantitative, the check sheet is called a tally sheet.

3. Control chart: - Control charts, also known as Shewhart charts (after Walter A. Shewhart) or process behaviour charts in statistical process control are tools used to determine whether a manufacturing is in a state of statistical control.

4. Histogram: - A histogram is a graphical representation of the distribution of data. It was first introduced by Karl Pearson and is an estimate of the probability distribution of a variable.

5. Pareto chart: A Pareto chart named after Vilfredo Pareto, is a type of chart that contains both bars and a line graph, where individual values are represented in descending order by bars, and the cumulative total is represented by the line. [4]

6. Scatter diagram: - A scatter plot, scatter plot, or scatter

- Deepa Sanjay Pandey, M.E.(Manufacturing System Engineering),E-mail:deepapandey007@gmail.com,Contact no:9172371266
- Niyati Raut, M.E.(Thermal Engineering), Email: shubhangi.nr@rediffmail.com, Contact no:9769225116

graph is a type of diagram using Cartesian coordinates to display values for two variables for a set of data. The data is displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis. This kind of plot is also called a scatter chart, scatter gram, scatter diagram, or scatter graph.

7. Stratification (alternately, flowchart or run chart):- A flowchart is a type of diagram that represents an algorithm, workflow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation illustrates a solution to a given problem. Flowcharts are used in analysing, designing, documenting or managing a process or program in various fields.

8. A run chart also known as a run-sequence plot is a graph that displays observed data in a time sequence. Often the data displayed represent some aspect of the output or performance of a manufacturing or other business process.

2 PROBLEM ARISING DUE TO QUALITY ISSUES

Quality related issues were rising in the company. Also the quality department is facing an issue of customer complaint about the product which is delivered. Some of the customer complaints are:

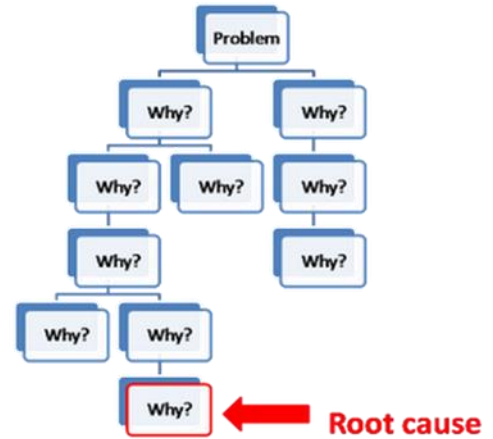
1. Die out of the job
2. Number of labels received was less.
3. Dots arising on picture on the label
4. mis-printing
5. Shade variation
6. Foil cut
7. Wrong colour given to the image.
8. LOGO not as per artwork
9. Registration out.

These are the major complains given by many customers. Target was to reduce customer complain by at least 50%. For achieving this, each and every complain was to be studied deeply and root cause of the complaint should be found on an urgent basis so that proper explanation can be given to the customer and also such issues should not rise in the near future. Also co-ordination and time of all the members of other departments was required so that solution to these problems can be solved easily and in a better way.

3 PROPOSED METHODOLOGY FOR SOLVING COMPLAINS

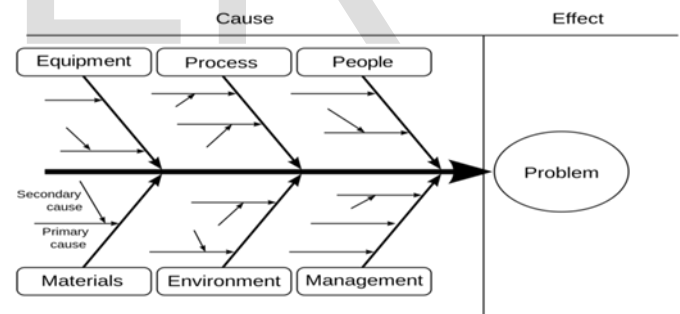
The quality department is the department which faces the main issues of customer complains. The quality department checks the raw material by taking samples of it, this department also checks the first roll of job, and if its ok then only further production is allowed. All the jobs which has been finally produced by the production department is finally checked and only after getting an ok statement by the quality

head, then only the final job is dispatched. Instead of all this process done before dispatching the final job, there has been rise in the customer complain. Hence in order to avoid this issue why why analysis and 7 quality control tools is been used on a new basis. In why-why analysis a single complain is taken and CAPA is made by the quality member in co-ordination with the production supervisor, and root cause of the problem is found and preventive and corrective action is taken for that complain.



2. Why why analysis

Along with why-why analysis, Fishbone diagram is also made by the quality people for finding the root cause of the problem in a better way.



3. Fishbone Diagram

A CAPA (Corrective Action Preventive Action) sheet is made which represents detailed solving of each complain and action taken to solve the problem. Both of this CAPA and Fishbone diagram is been send to the customer for customer satisfaction. [5]

4 IMPLEMENTING QUALITY TOOLS

Quality department faces the issue of customer complains. Customers generally complain if they are not satisfied with the final product. Then for solving the customer complaint the following analysis is done by the quality department:

- why- why analysis
- Fishbone Analysis

5.1. Why Why Analysis

In why-why analysis a single complain is considered and Failure of detection mode and process mode are found and

Action Plan is been taken for that failure by asking „why“ to each of the reason of failure. It can be done as follows: Two complains are taken for why-why analysis and CAPA is made for the same and given to the customers.

- Die out of the job
- Number of labels received was less.

Why-why analysis (1)

Job details: JOY H & A 20 ml
Bk
Customer: RATNASAGAR
HERBAL
Supply detail: P/15/5063 DTD
15.09.15
qty 3400 rmtrs
Quality issue: Die out of the job
In-house detail: JC 83873

Failure in Process Mode

why Distortion Factor of Cylinder Block and Thin Plated die (TPD) mismatching.

why TPD and Cylinder block was having a distortion difference of 0.3% which the prepress people were unaware.

why Gap between text and the edge of label is very less which results in a cut near the text.

Failure in Detection Mode

why During Inspection the difference was not observed

why Difference is distributed in 8 ups and impact on any particular row was not easy to identify.

Action Plan:

Corrective action:

Artwork would be made carefully as per the drawing by keeping in mind the distortion factor which should be less than 0.3%. It will then compensate the distortion factor of the block and TPD.

Preventive action:

Distortion factor of TPD, which is 0.3%, will be calculated and eliminated while die making process only, which would be useful for making new artwork of another jobs.

Hence there won't be any distortion factor between the artwork and TPD which would help to get the die cut on label at the accurate position.

The job in which there is very thin gap between the text area and die would be taken again for machining.

Why-why analysis (2)

Job details: ITC 120ml engage men
Customer: ITC limited Kolkata
Supply detail: P/15/5129 DTD
09.09.15 qty 2700 rmtrs
Quality issue: Less number of labels received
In-house detail: JC 56673

Failure in Process Mode

why Sample was cut from the roll but final actual quantity was not mentioned.

why Reworking and reinspection of few rolls are done. Operator fails to make standard running metres rolls.

why It's a human error.

Failure in Detection Mode

why Slitting supervisor fails to verify the rolls which were reinspected.

Action Plan:

Corrective action:

Cross verification would be done by supervisor to avoid less quantity issue.

Preventive action:

Random sampling will be done to check the standard running meters.

After making CAPA of these complains, it was been supplied to the customers.

5.2. Fishbone Analysis

In Fishbone analysis a single complain is considered and a fishbone diagram is made to show get each and every factor which is responsible for the complaint. This method helps to get the factors responsible for the complaint. It can be done as follows: Two complains are taken for Fishbone analysis and Fishbone diagram is made for the same and given to the customers.

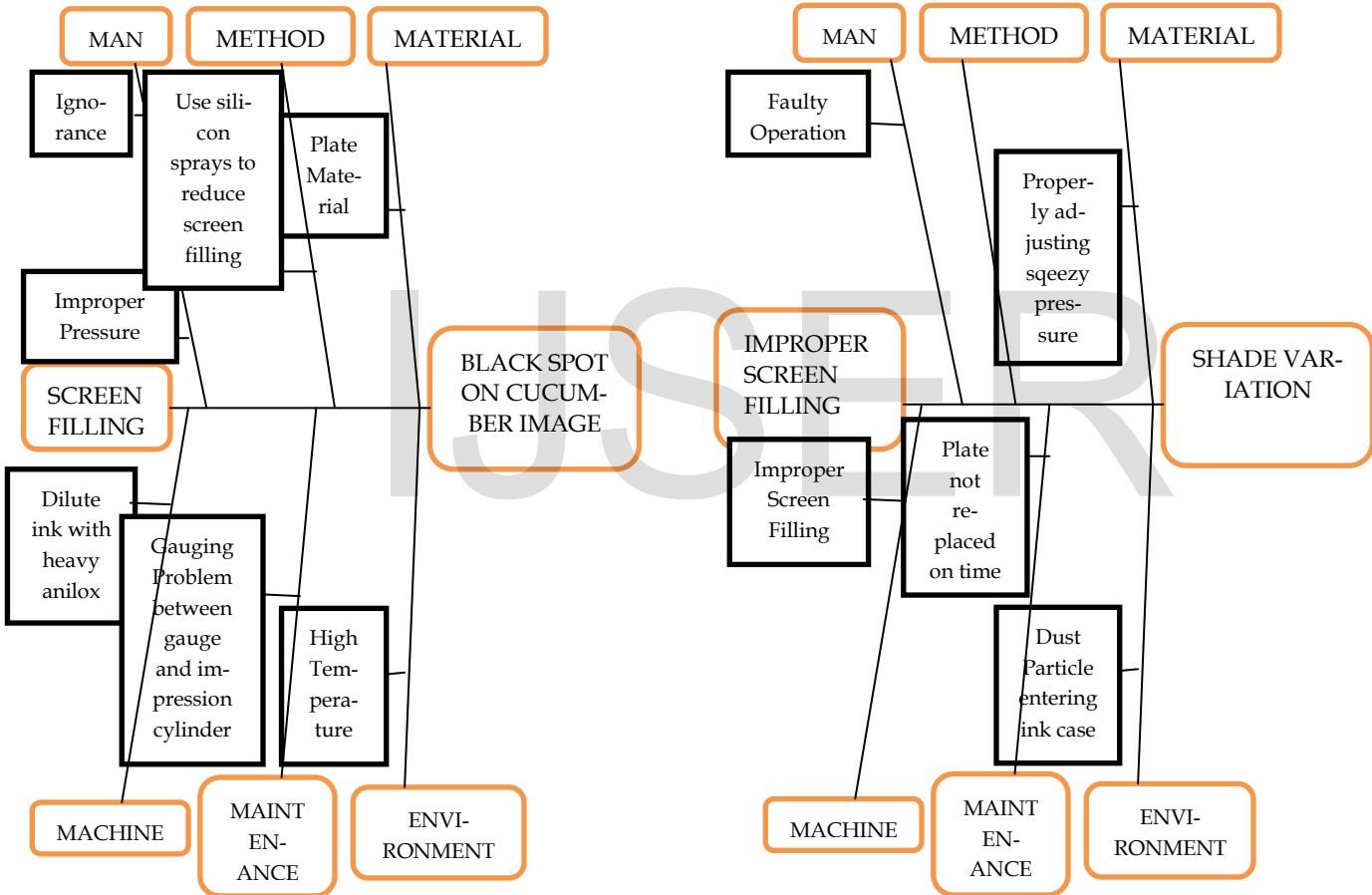
- Black spot on cucumber image
- Black Dot on almond Brown colour
- Misprinting
- Shade Variation
- Foil Cut

Fishbone analysis (1)

Job details: HIMALAYA FACEWASH
 500ml
 Customer: 3D Technopack Ltd
 Supply detail: P/15/4859 DTD 08.09.15
 qty 31000 rmtrs
 Quality issue: Black spot on cucumber
 image
 In-house detail: JC 84883

Fishbone analysis (2)

Job details: JOY H & A 50 ml Bk
 Customer: RATNASAGAR HERBAL
 Supply detail: P/15/5083 DTD 1.09.15 qty
 3850 rmtrs
 Quality issue: Black Dot on almond Brown
 colour
 In-house detail: JC 85673

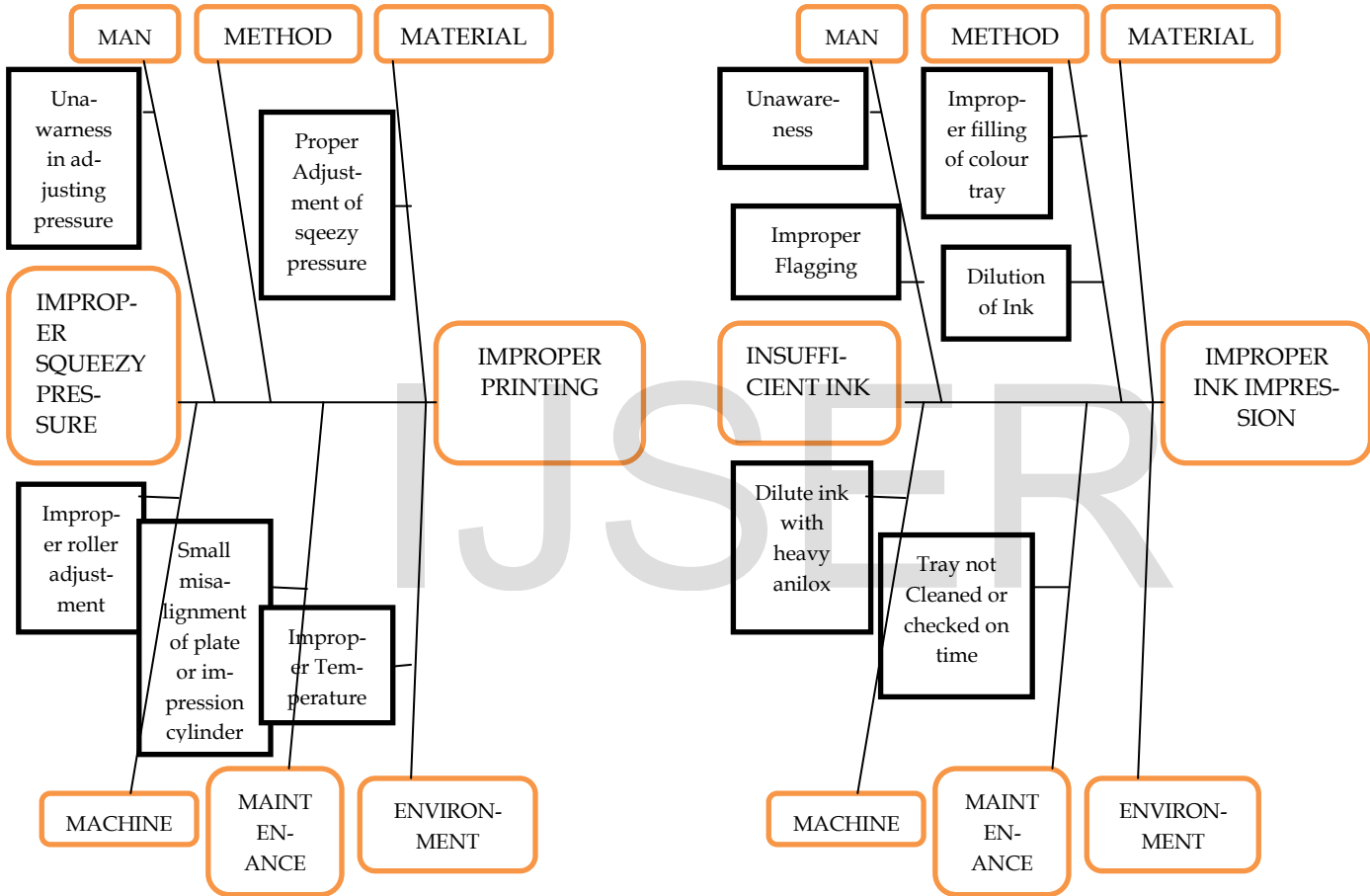


Fishbone analysis (3)

Job details: Loreal shampoo 500 ml
 Customer: ITC India
 Supply detail: P/15/2776 DTD 1.10.15 qty 28500rmtrs
 Quality issue: Misprinting
 In-house detail: JC 83754

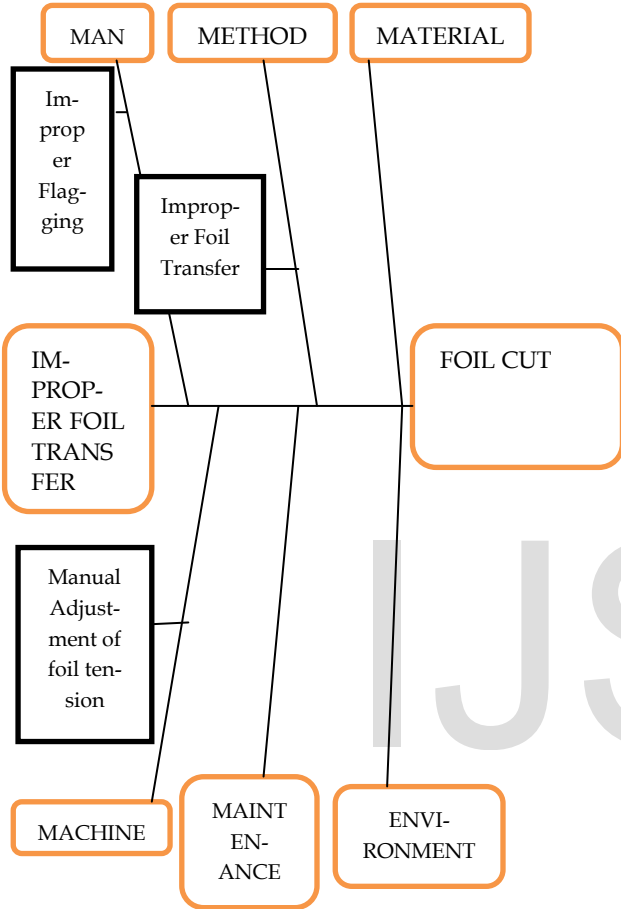
Fishbone analysis (4)

Job details: Engage Deo Spray 250 ml
 Customer: ITC India
 Supply detail: P/15/5129 DTD 15.10.15 qty 4800 rmtrs
 Quality issue: Shade Variation
 In-house detail: JC 82578



Fishbone analysis (5)

Job details: Emami Face cream 50 ml
 Customer: ITC India
 Supply detail: P/15/5672 DTD 21.10.15
 qty 2580rmtrs
 Quality issue: Foil Cut
 In-house detail: JC 88769



5 CONCLUSION

By doing why why analysis 2 complains were solved and by doing fishbone analysis 5 complains were solved. So out of 9 complains at least 7 are been solved. Hence the given target to reduce the customers complains by 50% was achieved. By doing analysis of customer complain and taking preventive and corrective actions for the same, sale of labels increased due to increase in productivity of the labels.

ACKNOWLEDGEMENT

This comprehensive work could be completed successfully by me alone. Here is my sincere acknowledgement to all the individuals generously contributing to my research and giving support in my everyday life.

I express my foremost gratitude to my guide Prof. Niyati Raut, HOD Mechanical engineering at Viva Institute of technology, Virar, for all able guidance, inspiration, and remarkable equanimity during the period of my research.

I am thankful to Mr Omkar Pandey (Quality Control Head), Skanem Interlabels for providing the technical guidance and clarified doubts prompt through email communications and through our verbal communication in the company. They patiently gave me their valuable time and encouragement, and unselfishly shared with me their experience. I would also like to thank the other members of the company who helped me to complete my research work.

REFERENCES

[1] Boer Jozsefa, et al, 2012, " A more efficient production using quality tools and human resources management", *Procedia Economics and Finance* 3,pp-681 – 689
 [2] Varsha M. Magar et al, 2014, "Application of 7 Quality Control (7 QC) Tools for Continuous Improvement of Manufacturing Processes", *International Journal of Engineering Research and General Science* Volume 2, Issue 4, pp.364-371
 [3] Stephen raab, et al, 2013, "Quality and Patient Safety in the diagnosis of breast cancer, *Clinical Biochemistry* 46, pp-1180 – 1186
 [4] Raji Al-Ani and Firas I. Al-Adhmawi, 2011, "Implementation of Quality Management Concepts in Managing Engineering Project Site", *Jordan Journal of Civil Engineering*, Volume 5, No 1, pp-89-106
 [5] Yara Hamdara, et al, 2015, "Performance-Based Specifications for Sustainable Pavements: A Lean Engineering Analysis", *Energy Procedia* 74,pp-453 – 461