

Case Study on Reduction of Rejection of Leaf Springs By Using Seven Quality Control Tools

Kush Garg¹, Didar Singh²

^{1,2}Dept of Mechanical Engineering

^{1,2}GGGI DINARPUR AMBALA

Abstract- Quality is the first priority in the product. The quality helps to improve the productivity. As improving the quality, the rejection is also reduced. With the help of quality control tools, we can solve the mostly problems. The quality control depends on the type of methods used. The topic is reducing the rejection of products in the Jamna Auto Springs by help of using Seven Quality Control tools. This is the case study on the light parabolic leaf spring which is manufactured in the Yamunanagar. The fishbone diagram and pareto chart are the two types of the 7 Quality control tools which I have used in the research for reducing the rejection of products. In the products, we have reduced the rejection related to previous month rejection. The defects like bend, dent, overheat, length size, width size etc. affecting the product quality. These factors are very common to affect the productivity and product quality. We have reduced the rejection by the help of increasing product quality. The pareto chart and fishbone diagram are very common methods for finding the defects in the process. The company in which my study has carried out is Jamna Auto Industries Springs Yamunanagar.

Keywords- Quality control tools, Pareto chart and Fishbone diagram, Leaf springs, quality improvement.

I. INTRODUCTION

The main objective of this paper is to reduce the reduction in the industry.

The quality and productivity are the two main factors for the manufacturing speed of the company. In modern time, quality is the most common factor. Quality depends on many factors like man, machine, material and method. The quality and the production rate also depend on the management.

It helps in reducing the wastage, and customer's satisfaction can also be increased by implies the quality controls.

The cost reduction can be continuously reduced and there is also an improvement in the quality of the products. With the help of quality control tools, we can easily find the

problem in the process. There are 7 classes instruments used to control quality.

The quality control tools are applied in the various organizations:

1. Product development
2. Production
3. Marketing

The main aim of the quality control tools is to please the new and old clients by improvements in the products.

There is a research in the industry to reduce the time and wastage of products. The first aim is to satisfy the customers. The rejection can be reduced by applying the 7 QC tools.

The research is applied in the industry to investigate on the application in the industry. The Quality and the productivity relate to each other. By this, our aim is to customer's satisfaction and customer should be satisfied by purchase high quality product at a very low cost.

- Customer's satisfaction can be reduced.

1.3 Types of quality control tools:

1. Check Sheet
2. Pareto chart
3. Flow diagram
4. Cause and Effect Diagram
5. Histogram
6. Scatter diagram
7. Control chart

1. Avinaw Pratik and Priyanka Kumari(2017) have studied and research on the quality control tools. They have founded the problem by the help of **fishbone diagram** and **cause and effect diagram**. They have researched on the part BPH in which they have founded the problem. The fishbone diagram helps for improving the quality of the product. They have identified the defect and give solution for enhancing the

material. In the **fishbone diagram**, they have used the **4M** which means **man, machine, material and method**. They imply the **fish bone diagram** and then found that there is nothing problem in the man. Machine and material, then found the problem in the method. The error which is found in the method is **chip rubbing** and **chip Pressure drop**.

2. Deepak and Dheeraj Dhingra (2016) studied the 7 quality control instruments. They have used in the bicycle industry. There is a huge rejection in the rims of bicycle industry. This study reduced the rejection trends of the rims. There is almost 9.44% in the rejection of the rims and then they have found the problem then rejection was reduced to 7.75% which means that after implies the fishbone diagram and Pareto chart, there is changing in the rejection. The rejection reduced percentage was 1.69.

They have found the different types of defects in the rim. These defects like dents, corrosion, poor weld quality, rim explosion, weld gaps etc. The pareto chart shows the defects on the basis of the percentage of the 4M which means man, machine, material and method. The graph shows the overall monthly rejection of rims.

3. Nitin K Mandavgade and Santosh B. Jaju (2009) have studied the seven quality control tools. They had case study on the control valve cylinder head. They have found the all refusals in the home are 10 values with 16 values of piece reverted. There are huge number of elimination which have been minute by him. His aim was to obtain 0% rejection but a little rejection is observed, that is nearly 0.5%. He used various apparatus like coolant, guage, lubricant etc.

4. Huda Habib (2015) He worked in bamboo textile which is very common material since ancient times. Due to good absorbing properties, it is easily available. He analyses terry towels because the quality is very good which should be in the terry fabrics. He conducted few experiments with this and the result founded some differences. The selection is mostly depends on the fabrics. Results have been calculated different from previous experiments. He has evaluated the quality of this material which have more flexibility as compared to other materials. There are some properties which does not indicate the values as thought by him. This is beneficial for the last use of the product.

5. Herhova Stella and VagaskaALena (2012) have studied on the possibility of using artificial intelligence elements for evaluating the quality of the manufacturing processes. The selected indexed are described of a process lying on the statistical based process control. Previously, the data observed

consists of various errors and incorrect values. To overcome this, they use different software to obtain the desired result.

II. EXPERIMENTAL METHODOLOGY

4.1.1 Identify the problem

There are some defects in the leaf spring like camberless, camberover, heating not OK, tempering, hardness issue etc. We have found the problem in the leaf springs. The problems should be first found and then analyze. There are different types of problems found in the springs.

4.1.2 Collecting the information

Industries collect the refusal of information with the help of employees and arrange the all data defects. The data must be collected before analyzing the data.

4.1.3 Data Analysis

I am using firstly Pareto chart and moreover fishbone diagram to analyzing the information. Data analysis is done with these 2 quality control instruments. These are very basic out of seven Quality control tools.

4.1.4 Corrective Actions

There are some defects in the leaf spring, therefore there is a problem in the quality of the final product. We have to find the problem in the product. We should apply the corrective actions for the smooth flow. We have to reduce the defects in the springs.

For reducing these defects, the corrective actions should be taken

4.1.5 Results

There are some problems in the previous steps, Now by applying Fishbone and cause & effect diagram, we have improved the product quality.

4.1.6 Standardization

After the result is obtained, the standard operating procedure should be revised, because there is a requirement of the method applied and quality improved by the method.

By applying the above method, we have to find the problems in the quality of the leaf springs. There are different types of problems like dent, bend and other problems like

overheat and oversize etc. The problems first to be find out. So, we have to find out the problem by fishbone diagram and the pareto chart.

III. RESULTS AND DISCUSSIONS

- Now we have found the problem in the defects
- There is idle and unskilled labor work which we have found.
- The problem is founded by the help of fishbone diagram.

As the Production and the productivity is increased, so the quality of the product is also increased. In the previous months, the rejection was almost 1.5% and then we have applied the two methods i.e fishbone diagram and the pareto chart these are the types of seven quality control tools and then our result becomes improved. The rejection of the leaf spring was reduced to 1.2% which was 1.5% and then the quality is also improved.

IV. CONCLUSION

The quality control tools has helped us in the reducing the rejection and also improves the production in the Jamna Auto industry. With the help of Pareto Chart and the Fishbone diagram, we have reduced the rejection of the product. Quality is improved by the quality control tools. Production rate is also increased so it helps us in saving the time. Quality control tools are very common used tools. These tools can be applied in the industries and the companies. These tools are the basics of the industrial engineering and management. After we have studied and find the problem, there are little changes in the production and the productivity. We have found the problem and improve that problem by the help of applying the fishbone diagram and pareto chart. We have improved these:

- The Rejection has reduced to 1.5% to 1.2%.
- Rejection is reduced so there is a lot of save of money.
- Production and productivity are increased.
- Quality is improved
- Labor cost is decreased.
- Production cost is decreased.
- Smooth process in the industry
- Failure of the machinery is reduced.

REFERENCES

[1] DhingraDheeraj and Deepak in (2016), “ Application of quality control tools in Bicycle industry: A case study,

International Journal of Research and engineering and technology Eissn: 2319 to 1163 I Pssin : 2321 to 7308.

- [2] Lindsay & Evans J.E in (2004), The management and control of quality (Edition 6th) . Mason, H: The south-western college of Pub.
- [3] AmedieYimerWassihun, Singh Pal Ajhit (2012), “ Improving quality by using Special tools in glass bottles mfg industry” International Journal of quality research 7(1) pp 107-126 and issn 1800-6450
- [4] I. A khan and mohitsingh in (2012) , “Techniques and tools in quality management in manufacturing industries, “Proceeding of the national conference on trends and advances in Mech. Engg. , in the YMCA university of Science and technology, Faridabad, Haryana, October 2019-20.
- [5] Fwad H.K. and Mukthash A 2010 (A practice guide in Jordanian industrial Engg. Jordan journal of industrial and mechanical engineering vol4 and number 6 Pp693 to 770
- [6] Paliska and socovic 2008 (Application of quality engineering instruments in a processing industry An Advance engineering journal Vol2 ,and number 1 and Pp-73 to 86
- [7] Mandavgade N.K, Jajus. B in (2009) “Costing optimization by use of 7 QC tools” International journal of engg. Studies The volume 1 and no.3 &Pp 149 to 160
- [8] Pavitic D scotic M and Paliska in (2008) , “ practical applications of quality tools” International journal of quality research Volume3 and Number 3 and Pp from 297 to 305
- [9] S. Mantha and SS Kumar A in (2003), “ Reduction of scrap by help of using TQM tools” Internatioinal Journal of industrial engg.” The Volume 16 and no.4&Pp from 364 to 369
- [10]Khan R, Khan M and Islam M in 2012 , “ Reducing and minimization of reworks in the the productivity and quality in the apparel industry” International Journal of Engineering& applied sciences” Volume 1 and number 2 Pp from 147 to 164
- [11]Ramchandran K, Ganapathi K.N and Matathil A, in 2012, “ Scrap reduction In the Electronic assembly line by using DMAIC Approach,” SASTECH Journal, Volume 11 and no.2, pp from 53 to 59
- [12]J Pal in 2012, “ Reducing the rejection of Casting components by implementing of Quality control tools” International conference on research and innovations in MechEngg, Pp from 613 to 622.
- [13]Dalvi D.S, Patil B.T , Thampi G.T, Srinivas B and Sarao S.M in 2012 Reducing wastage through Lean manufacturing Tools and Techniques, International Journal of Research in management and Technology, Volume 2 No. 2 and Pp from 253 to 257.

- [14] D.V Cheema and D.R Prajapati in (2013), “ Explosion defects of weld cracks in wheel rims Optimization” International journal of Innovative research in Science, “ Volume.2 No. 8, Pp 3437 to 3446.
- [15] Ahmadi H and Shaheen A, Ravinchandran N and Hekmatpanah M, in (2013), Investigating the six sigma methodology and QC tools & Techniques in Sepanhan Oil company,” THE GLOBAL eLearning Journal, Volume2, No.3 Pp from 67 to 74.
- [16] Bangar A and Solanki S (2013),”Reduction Analysis in rejection of process of Plastic Molding Jar By Using Six Sigma Methodology,” International Journal of Engineering Science and Technology, Volume 5, No. 11 and pp. from 1824-1831.
- [17] Shilwant S.C., Bhosale D.S and Patil S.R. (2013),” Improvement of quality in manufacturing processes using SQC tools,” International Journal of Engineering Research, Volume 3, No.3, pp. from 832-837.
- [18] Tyagi R.K., Jha M and Gupta G (2013),”Reducing the rejected components in the Automobile assembly line by using the quality tools,” European Journal of Applied Engineering and Scientific Research and Technology, Volume 2, No. 3, pp. 13 to 17
- [19] Teli S.N., Surange V.G and. and Rane S.S. and Adak D.D (2013),” Effective Utilization of reducing the Quality Cost Tools in an Automobile Industry,” International Journal of Advanced Technology and Engineering Research,” Volume 2, No.2, pp. 44 to 53.
- [20] Kapoor V and Trehan M in 2011, The Tota Quality Management Journey of An Indian milk productive co operative, TQM Journal Volume 23, NO. 4, PP 423 to 434.
- [21] Venkatraman (2007) “ A framework for implementing Total Quality Management in higher education program” Quality assurance in Education, Volume 15 No. 1 and Pp 92 to 112
- [22] Yen J, Langari R. (1999). “Fuzzy Logic, Intelligence, Control and Information”, Prentice Hall, New Jersey.
- [23] Zadeh L.A. (1965). “Fuzzy sets”, Information and control 8, 338-353.
- [24] Young T.M, Winistorfer P.M and Sigum Wang, (1999). “Multivariate control charts of MDF and OSB vertical Density profile attributes”, Forest product Journal, 49 (5), 79-86.
- [25] Zadeh L.A. (2008). “Is there need for fuzzy logic”, International Journal Archieve: Information Sciences, 178 (13), 2751-2779.