

# Reduce The Rejection Of The Rocker Lever Arm

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**Abstract-** *In order to survive in a competitive market, improving quality and productivity of product or process is a must for any company. This study is about to apply the 7QC tools in the production processing line and on final product in order to reduce defects by identifying where the highest waste is occur at and to give suggestion for improvement. The approach used in this study is direct observation, thorough examination of production process lines, brain storming session, fishbone diagram, and information has been collected from potential customers and company's workers through interview and questionnaire, Pareto chart/analysis, histogram and control chart was constructed. This paper intends to exhibit the exact application of seven quality tools in Automobile manufacturing industry.*

## I. INTRODUCTION

In today's world, business has become more and more competitive. All industries and organizations have to perform well in order to survive and be profitable. "Quality" means those features of products which meet customer needs and thereby provide customer satisfaction. In this sense, the meaning of quality is oriented to income. The purpose of such higher quality is to provide greater customer satisfaction and, one hopes, to increase income. However, providing more and/or better quality features usually requires an investment and hence usually involves increases in costs. Higher quality in this sense usually "costs more." One of the strongest motivating forces is "Delighted Customer". Industries believe that prosperity is directly linked with prosperity of customers. Mutual trust, healthy relationship, ethical values, innovative technologies, quality products and services are the constituents of commitment towards the customers. If defects are in large number it not only does an organization waste its resources and time to re-manufacture the products, but it also contributes to the loss of customers' satisfaction and trust. Customer satisfaction comes from those features which induce customers to buy the product. Dissatisfaction has its origin in deficiencies and is why customers complain. Some products give little or no dissatisfaction; they do what the producer said they would do. Yet they are not saleable because some competing product has features that provide greater customer satisfaction. So it is important to reduce defects and maintain quality of product. Quality of the product is achieved by

minimization of rework, reducing scrap rate and minimizing man hour on rework. Now a day's rework of rejected parts are common but rework add losses to the company net profit, if the company is a continuous mass production where the products go through a series of process to come out with final product. The Seven Quality Control Tools popularly called the 7 QC Tools, According to kaoru Ishikawa more than 95% company problems can be solved using these tools. It comprise of graphical methods and help to transform the data into easily understandable diagrams or charts. This further helps to understand the situation or to analyze the problem easily and leads to developing solutions which aim towards quality improvement. Further, these charts and diagrams help to highlight the important aspects of a problem clearly so that the concerned persons can focus attention on them and start developing the solution. Pareto analysis helps to identify and classify the defect according to percentage significant. Cause and effect diagram is a useful tool in identifying the major causes. This diagram helps to build a relationship. Brainstorming is done with utilizing these quality tools to provide an effective solution.

Thus quality management tools are effective and significant in reducing the rework and rejection rate.

## II. LITERATURE REVIEW

The key to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypothesis and provide helpful orientation for definition of the problem, background for selection of procedure and comparative data for interpretation of results. In order to be creative and original one must read extensively and critically as a stimulus to thinking. Every research begins from where the previous researches have left it, and goes forward, may be one inch or even less, towards finding the solution of a problem or answer to a question.

Varsha M. et al (2014) provides an easy introduction of 7 QC tools and to improve the quality level of manufacturing processes by applying it. Pareto Diagram is a tool that arranges items in the order of the magnitude of their contribution, thereby identifying a few items exerting maximum influence. A Cause-and Effect Diagram is a tool

that shows systematic relationship between a result or a symptom or an effect and its possible causes. It is an effective tool to systematically generate ideas about causes for problems and to present these in a structured form. Histograms or Frequency Distribution Diagrams are bar charts showing the distribution pattern of observations grouped in convenient class intervals and arranged in order of magnitude. Histograms are useful in studying patterns of distribution and in drawing conclusions about the process based on the pattern. Control chart makes possible the diagnosis and correction of much production troubles and brings substantial improvements in the quality of the products and reduction of spoilage and rework. It tells us when to leave a process alone as well as when to take action to correct trouble. When solving a problem or analyzing a situation one needs to know the relationship between two variables. A relationship may or may not exist between two variables. If a relationship exists, it may be positive or negative, it may be strong or weak and may be simple or complex. A tool to study the relationship between two variables is known as Scatter Diagram. Graphs of various types are used for pictorial representation of data. Pictorial representation enables the user or viewer to quickly grasp the meaning of the data. Different graphical representation of data is chosen depending on the purpose of the analysis and preference of the audience. As measurement and collection of data forms the basis for any analysis, this activity needs to be planned in such a way that the information collected is both relevant and comprehensive. Check sheets are tools for collecting data. They are designed specific to the type of data to be collected. Check sheets aid in systematic collection of data.

Some examples of check sheets are daily maintenance check sheets, attendance records, production logbooks, etc. Statistical QC is chiefly concerned in making sure that several procedures and working arrangements are in place to provide for effective and efficient statistical processes, to minimize the risk of errors or weaknesses in procedures or systems or in source material. Seven QC tools are most helpful in troubleshooting issues related to quality all processes are affected by multiple factors and therefore statistical QC tools can be applied to any process. The continuous use of these tools upgrades the personnel characteristics of the people involved. It enhances their ability to think, generate ideas, solve problem and do proper planning.

### III. METHODOLOGY

#### PROBLEM IDENTIFICATION –

Rejection of the Rocker Arm-

This project deals with repetitive the issue of repetitive dimension oversize i.e. Shaft center to Toe height is Specification of  $-3.5 \pm 0.1$  mm

**Problem:** Shaft center to Toe center 3.5 mm distance oversize Specification:  $3.5 \pm 0.1$  mm

**Observation:** The above mentioned dimension Shaft center to Toe center 3.5 mm distance is observed within the range of the 3.7 mm to 3.9 mm (i.e. accepted within 3.4 mm to 3.6 mm). Which is observed plus by around 0.1 to 0.3 mm

#### PROBLEM STAGE –

**Manufacturer :** M/s. Supreme Engineering, Tilawani (Vender)

Problem Observed at: Customer End (M/s. Kirloskar Oil Engines Ltd. Kagal)

i.e. Problem is observed at the customer end.

#### IMPACT-

- Reduction in productivity & profitability
- Increase in rejection rate
- Dissatisfaction of customer
- Loss due to rejection
- Operator Fatigue

#### OUR TARGET-

Reduce the rejection of the Rocker Arm , sustain the quality & Customer satisfaction

#### OUR OBJECTIVES –

1. To increase productivity and profitability in an organization.
2. To reduce rejection rate of product.
3. To reduce rework and scrap of product.
4. To increase moral of internal customer of an organization.
5. To provide better solution for process improvement.

#### FINDING THE ROOT CAUSE

In this session, we have done the why why analysis for the defect- Shaft center to Toe center Dimension  $3.5 \pm 0.1$  mm distance is not within control limits . After certain brainstorming on the above defect, we came to the root cause. During this we got the two root cause as given below:

#### **Improper Machining Flow sequence**

The present Machining Flow sequence of the Rocker lever manufacturing is Improper & it has to modify.

### Improper Inspection method

We observed the mistakes in the existing inspection method of the Rocker lever

### INTANGIBLE BENEFITS

1. Customer demands are fulfilled.
2. Increase productivity.
3. Increase in employee's moral.
4. Cost of poor quality decreased.

### REGULAR IMPLEMENTATION

Rocker Lever inspection frequency decided – 100% -

To monitor the effectiveness of our implantation of the our project, we have initiated the 100% inspection frequency for few days. Once the process get regularized then we will reduce this inspection frequency as per the requirement.

Line control Chart monitoring method implemented per shift -

Line type control chart monitoring method is implemented per shift, so that the trend of the process can be understood easily and necessary actions can be taken accordingly

### IV. CONCLUSION

Quality leads to improvement in productivity and at the same time it also leads to customer's satisfaction. Study has been conducted to define the role of quality control tools in rocker lever manufacturing industry. Quality tools are not so wider spread as expected although they are quite simple for application and easy for interpretations. Main goal of the study is to reduce the cost per component by reduction in monthly rejection of the components After studying the problems, various parameters affecting the quality of the final product were identified and data was collected with accuracy and precision. Most of the quality tools are used in the study. The main conclusions of the study are summarized as below.

- Fixture design validation is to be done during process designing & approval.
- Rejection of the fork has been reduced from production of components.
- Process is standardized and additional audit is started.

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