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Reduction of rejected components in an automobile assembly line using quality tools

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Abstract

This paper investigate and analysis the reduction of scrap in automotive components. The objective of the paper is to reduce the rejection of components which incurs huge costs to the company .This paper aims to control the rejection occurring at the time of automotive part assembly in order to maximize the profit with reducing the scrap and it helps to increase the output as due to less vehicle hold. This work helps the companies to reduce the rejection rate with the help of quality tools.

Keywords- canopy, rejection, Pareto, Ishikawa

INTRODUCTION

The increasing of demand in automotive sector make all company is competed to increase their product to fulfil the requirement. Beside that the company should have the best solution in order to reduce cost, eliminate waste and improve performance and relationship. Quality with least cost is only possible by reducing the rejection rate. This project concentrates on the reduction of rejected component as it is capable of reducing profit [1].

Hence the need for rejection control and statistically controlling the rejection was felt. In this work, data of rejected components from a Truck manufacturing company has taken, and after collecting information of rejection of these components, then analysis these with Pareto chart, after analysing find out the frequent rejected component having more cost to the company than to find the cause of the rejection by the help of Ishikawa diagram and at last giving a proper solution to control rejection [2].

MATERIALS AND METHODS

II.METHODOLOGY USED

Literature review on production line and assembly techniques to understand basic quality tools for problem solving. Collection of rejected material data using CHECK SHEET for a duration of one month, then identify the frequently rejected component which are having more cost by the help of PARETO CHART. Once the data has been compiled, it is easy to identify the component that is being rejected most frequently [3]. The next step would be to determine why the component is being rejected and what are the reasons for this component to be rejected which can be showed by ISHIKAWA DIAGRAM, by analyzing the current process & operating procedure it is easy to identify the root cause for scrap generation. Once the cause is identified, the next and final step is to come up with a solution to prevent this problem [4, 5].

III. IDENTIFICATION OF PROBLEM

The data of all the components which are getting rejected at the time of assembly was taken and collected in a check sheet. By collecting this information it will be easier to find the frequently rejected components. Once the data from

the check sheet has been compiled, it is easy to identify the component that is being rejected most frequently and which are having more cost, because that component will effecting most to the company.

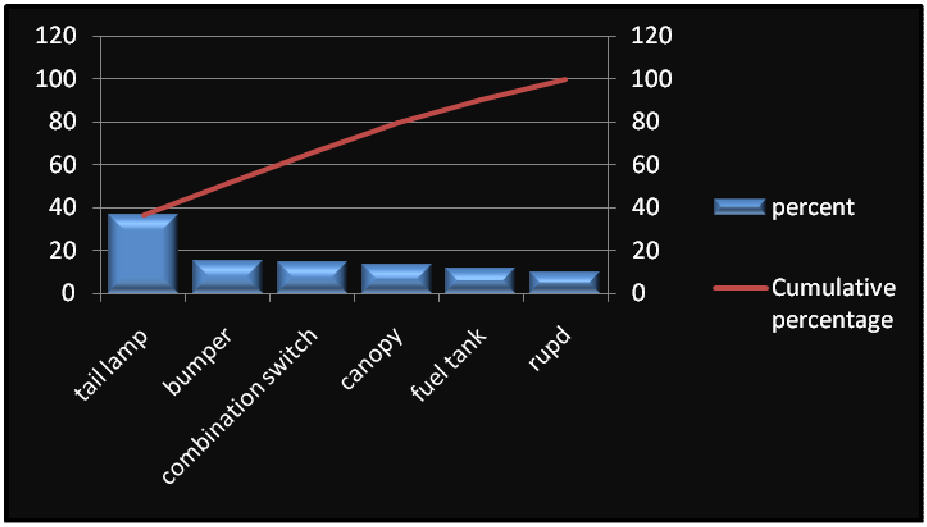

Fig 1. Pareto diagram of rejected components

After compiling all the data we are able to find out the frequently rejected component is **tail lamp**, now we have to find out the cost of tail lamp and other components. After studying the cost it has been seen that the cost of the tail lamp is to less which will not give much effect to the company.

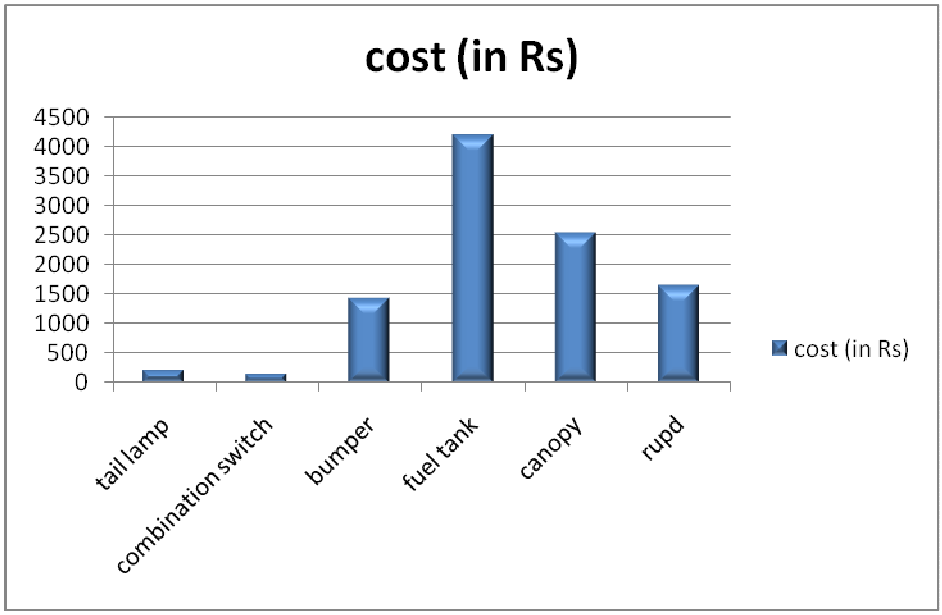

Fig 2. Cost of frequently rejected components

So on the basis of cost, it is evident that the Fuel tank is the component that is being frequently rejected and has the highest cost. But this component is returned to the vendor and the company does not incur the costs. By cross referencing, we arrive at the second major component, the **Canopy,** which has to be dealt with by the company.
With the help of Ishikawa diagram all the possible causes of rejection for canopy has been studied. By analyzing the current process & operating procedure to identify the root cause for scrap generation which are by Ishikawa diagram.

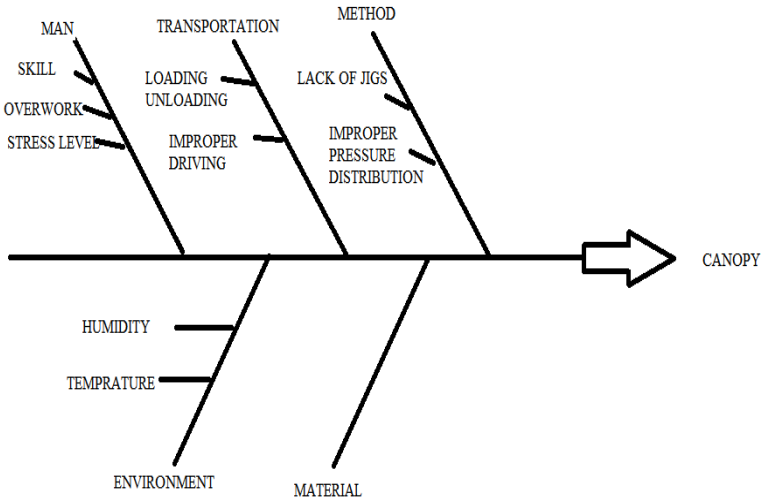

Fig 3. Ishikawa diagram for possible causes

RESULTS AND DISCUSSION

At the time of assembly we have to give a proper shape to the canopy as it not properly bended at the time of transportation due to payload. It is find that the methodology used for obtaining the proper **canopy** shape is faulty due to which the canopy sustains a substantial amount of damage, there is no standardized procedure; the worker simply uses his arms and legs to try to get the canopy into its approximate shape. This is injurious both to the component and the worker.

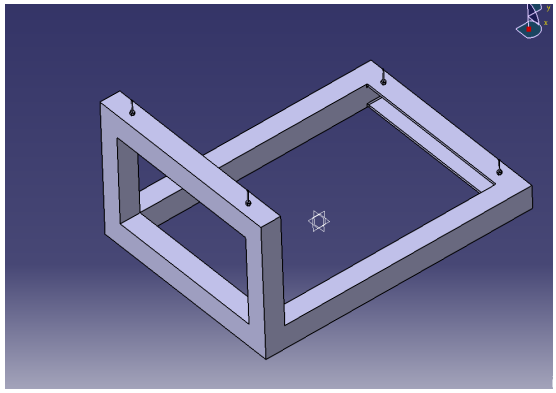

Fig 4. CAD design of jig

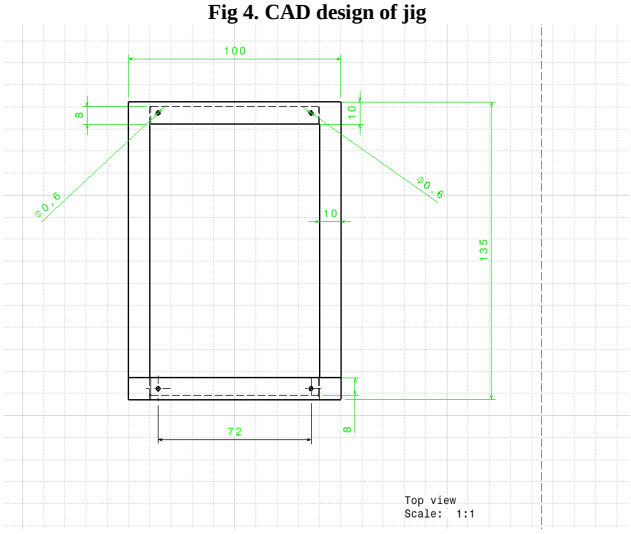

Fig 5.Top view

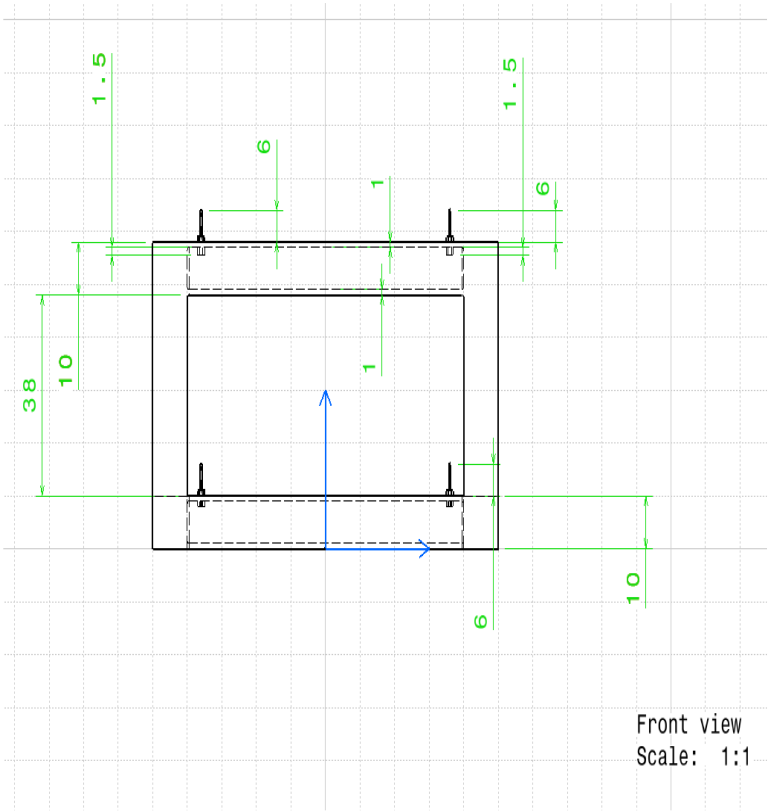

Fig 6. Front view

BEFORE

AFTER

The only viable solution is to introduce a proper fixture arrangement to standardize the procedure for obtaining the required canopy shape. I have designed and developed such a jigs which will help to give a proper canopy shape. The design has been done by CATIA software.

With the implementation of this design, the amount of rejected canopy is estimated to come down. By the old procedure, an average of 17 canopies was being rejected per month. That is, in a year, 204 canopies were being rejected. The cost of 1 canopy is Rs.2550; this means that an amount of Rs. 520200/year is incurred as losses to the company. So, with the implementation of this design, the estimated savings to the company will therefore be Rs. 520200/year.

CONCLUSION

A methodology has been designed and developed for reducing the rejection and for improving the production of the company .It is known that some changes has taken for reducing the rejection and improving the productivity. This study is helpful to those industries who want to reduce the rejection rate due to which they can increase the profit and improve the production as due to less vehicle hold.

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