

Analysis and Reduction of surface defects in cars

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Abstract – Cars are manufactured in various stages and stations and the occurrence of defects is inevitable. The aim of this project is to reduce the commonly occurring secondary defects in cars which are dent, scratch and peak. These defects are the most occurring ones that play a major role in the production decline. It is learnt that the secondary damages like scratch, dent, peak, multi-dent, inner peak, are the major reasons for the production decline. It is found that, in order to rectify and eliminate the defects, about 4 hours is required. If we concentrate on the defective cars then it will affect the production of the remaining cars. Eventually, this stymies the production and results in unwanted losses. On observing for many days, it's seen that the secondary damage "scratch" occurs repeatedly in fenders and this seems to be an intimidating problem. Hence, we have suggested a suitable protective material "Acrylic Fiber" which prevents any further damage.

Catchphrase: Defects, Dents, Multi-Dents, Scratches

1. INTRODUCTION

In every automobile company, cars are rolled out after passing through umpteen processing units and stages and it is needless to say that various defects occur during the processes. Certain defects are easily rectified while certain are troublesome and due to the latter, many cars are singled out for defect correction that may eat too much time. So, it would be wise to reduce the repeated defects that cause more trouble than the ones that don't. In a car, secondary defects directly contribute to the production decline and they must be at least reduced, if not eliminated. The commonly occurring secondary abnormalities are dents, scratches, peaks with multi-dents occurring rarely. Dent is nothing but a hollow indentation in an even hard surface. It occurs due to a force suddenly and unexpectedly applied on a surface that causes it to bulge inwards thus sticking out. A scratch is a score or mark created on a surface with a pointed object. However, a dent with a scratch is a rare occasion. Clifford Schoff et al[1] worked on surface defects are as old as paint itself and have plagued generations of paint technologists. Some people think that we should have cleaned up the defects and gotten rid of them years ago, yet they are more common than ever. Why do defects occur so often? Why are coatings so different from the materials they coat? Why is it so difficult to solve defect problems? What can we do about them? This paper attempts to answer these and other questions. It addresses a number of defects and their causes, including craters and other surface tension related defects, dirt (the most common defect of all), popping, and flow problems. It also reviews

techniques for defect identification and root cause analysis and discusses counter-measures.

Qinbang Zhou et al[2] worked on automobile surface defects like scratches or dents occur during the process of manufacturing and cross-border transportation. This will affect consumers' first impression and the service life of the car itself. In most worldwide automobile industries, the inspection process is mainly performed by human vision, which is unstable and insufficient. The combination of artificial intelligence and the automobile industry shows promise nowadays. However, it is a challenge to inspect such defects in a computer system because of imbalanced illumination, specular highlight reflection, various reflection modes and limited defect features.

Xinming Zhang et al[3] worked on the global automotive industry demands world-class levels of product quality, productivity, and competitiveness as well as continual improvement. To achieve this goal, many vehicle manufacturers companies use quality control tools to improve the quality of the product with zero defects and highly satisfied to the customer. Nowadays, there are a lot of quality tools applied to solve the problem quickly but it's still the fact to find out good and efficient solving way. The study emphasizes the identification of potential failure which failures may have encountered in the production process and it will lead to car scrap. After the complete study of the manufacturing process and production data-failure causes, failure rate and data etc. FMEA discover the weak processes in the form of higher risk priority number in the manufacturing of the car painting process, which required reducing by identifying and implementing of the defects and this will improve the process quality of the painting surface of the car. To

analysis, the improvement of the car surface defects SPC (Statistical Process Control) tools are more efficient where can easily visible the defects trends.

II.COMMONLY OCCURING DEFECTS ON CARS

There are various types of defects that occur on a car in certain prominent locations. The widely occurring ones are dent, scratch, peek and a dent along with scratches.

A dent is nothing but a small indentation or a hollow in a hard even surface. It may occur due to a force suddenly and accidentally applied on a surface that may cause it to bulge inwards thus sticking out!

A scratch is a score or mark created on the surface with a pointed object. However, a dent with scratches is a rare occasion.

SCRATCHES

A scratch is a score or mark created on the surface with a pointed object. However, a dent with scratches is a rare occasion.

DENTS

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III.RESULTS AND DISCUSSIONS

Protective Material

Scratches widely occur in the fender portion of the cars, so in order to prevent them we suggested a protective material to cover the fender during the operations.

The material is Acrylic Fiber or Synthetic fiber made from Polyacrylonitrile. The reason behind choosing this material is due to its advantage that it is resistant to wrinkling. It can also be wet or dry spun.

We use two layers of this material on the top and bottom and the material used betwixt these layers is Foam Rubber or Cellular sponge.

The thickness of Acrylic Fiber is 2-3mm both in the top and bottom layer while that of Foam Rubber is 5mm.

The main advantage of Foam Rubber is the reason behind its use here. It is manufactured with a foaming agent in order to create a air-centered matrix structure. And that acts a cushion thus preventing the damages to the fender.



IV.CONCLUSION

It is concluded that the secondary damages occurring in the cars have been analyzed and reduced or rectified by the use of Statistical Quality tools. The secondary damages that commonly occurred were dent, scratch, peak with multi-dent and inner peak occurring rarely.

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