To Improve Productivity By Eliminating Defects In Manufacturing Process of Outer Tube of Front Fork

Satyam A. Birar[1], Rupeshkumar S. Burhade[2], Ketan A. Dashpute[3], Bhushan B. Gunjal[4], Dr. Amol B Kakade[5]
[1, 2, 3, 4] Dept of Mechanical Engineering
[5] Guide & Professor, Dept of Mechanical Engineering
[1, 2, 3, 4, 5] M.V.P.S.'s K.B.T. College of Engineering, Nashik-422013, Maharashtra, India.

Abstract- *Today vehicle majorly concern with ride quality and safety. Suspension system plays important role in it. Suspension of vehicle responsible for better ride quality and to minimizing shockes transferring to body from wheel. This document regards to minimize defects in shock absorber for better life span and performance. Also it affects the rejection of parts in industry.*

I. INTRODUCTION

In today's world of automobile, the suspension system is the most vital component of an automobile. A vehicle is run on different road conditions such as even, uneven, rough etc.

Suspension system is used to isolate the passengers and other vehicles component from the irregularities of the road surface. Demand of an automobile is increasing day by day, so high rate of production is expected. But required production is not getting because of the many reasons such as Set up and Adjustment loss, Management loss,

Tool Change loss, Planned shutdown, loss, stoppage loss, speed loss, Equipment failure loss etc. But one of the most critical loss is set up and adjustment loss of machining process.

So we decided to focus on the concentricity in outer tube machining cell. Front suspension consists of front forks. Front fork has three parts Inner tube, Outer tube, U/B assembly.

II. LITERATURE REVIEW

The various literature we have absorbed in the field of shock absorber which are discussed below,

Prof. S. M. Karlekar, Shailesh Kabra, Karan Ladhane , Performance Analysis of leakage testing for oil seals , International Journal For Research in Emerging Science and Technology, Volume 2,Issue-4, April 2015 studied that oil seals are commonly employed in many applications which require that a fluid (primarily lubricating oil) be prevented from migrating along a moving shaft. An important part of the development process of a sealing system is the rigorous testing of the new design. Normally comprehensive qualification testing of the sealing systems as well as 100%functional testing of production units prior to delivery is performed. Mindful of commercial issues such as cost, availability and sourcing. Oil leakage is very serious problem. If oil level decreases it increases friction resistance, and overall efficiency is reduced. For a manufacturer, leakage testing of oil seal is necessary to evaluate its performance and sustainability in the working conditions specified by the user.

Gadhia Utsav D, Analysis of Quarter model of McPherson and modified suspension system, International Journal of Advance Research in Science and Engineering, Volume 3, August 2014 in 2012 presented that Suspension system is a very essential part of the automobile vehicle. Also, stability and comfort is totally dependent on the suspension system of the vehicle. Where, suspensions are used to deal with hump in road surface. It enhances ride comfort from pitsand other irregularities.

Karthik Dhayakar, T. Kamalahar, S. Shanmugasundaram, Comparison between dual suspension and mono suspension of two wheelers, International Research Journal of Engineering and Technology , Volume 5, Sep 2018studied that Front suspension: Motorcycle's suspension serves a dual purpose: contributing to the vehicle's handling and braking, and providing safety and comfort by keeping the vehicle's passengers comfortably isolated from road noise, bumps and vibrations. The typical motorcycle has a pair of fork tubes for the front suspension. The most common form of front suspension for a modern motorcycle is telescopic fork. Other fork designs are girder forks, suspended on spring parallel links and bottom leading link designs. Some manufacturers used a version of the swinging arm for front suspension on their motocross designs.

III. OBJECTIVE

- To eliminate the transfer of defective front fork to the assembly line from machining cell.
- To find and eliminate root cause of defect on the VMC machine.
- To reduce noise from front fork assembly due to oil leakages.
- Improving the quality of the product

IV. PROBLEM CAUSE AND SOLUTION:

After study and analysis of industrial process our team got information about process flow. Outer tube which having groove for fitting of circlip (use to fit oil rings) is contributing defects in majority of parts . This is because of small area of groove holds chips remain their after grooving and followed by milling process.

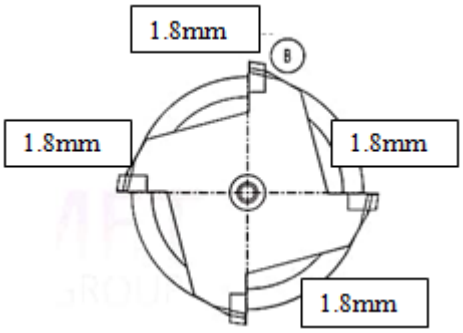


Fig shows grooving tool with similar teeth previously used

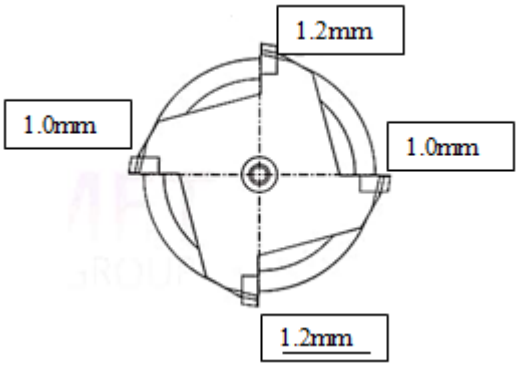
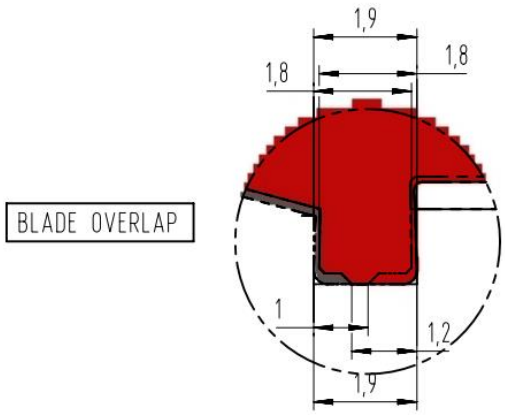


Fig shows newly design staggered to with teeth overlap of 0.4 mm



Because of overlap chips forms are of very small size and removed by upcoming teeth this solves grooving problem. Remaining chips problem in milling process is removed by adoption of enriching coolant flow in cooling stand near groove of outer tube. Below image shows provision of holes under high pressure flow to remove remaining chips stuck inside groove.

V. RESULT

Simply design of tools solves 80% of leakage and loose fitting problem. Modification of VMC cooling stand results in reduction in customer complaint , scrap reduction , reduce reworking and Reduce cycle time. Tools having pay back period of 14 days afterwards annual profit of app. 5-6 lakh is obtain.

VI. CONCLUSION

By adopting traditional technique like Kaizan, Pareto Diagram, Fishbone Diagram most of engineering problem can be solve . Also active participation of workers leads to finding out actual situation on shop floor and an improvement in it. Brainstorming is also one of responsible factor in problem elimination.

REFERENCES

[1] Prof. S. M. Karlekar, Shailesh Kabra, Karan Ladhane, Performance Analysis of leakage testing for oil seals , International Journal For Research in Emerging Science and Technology, Volume 2,Issue-4, April 2015

[2] Gadhia Utsav D, Analysis of Quarter model of McPherson and modified suspension system, International Journal of Advance Research in Science and Engineering, Volume3, August 2014

[3] Karthik Dhayakar, T. Kamalahar, S. Shanmugasundaram, Comparison between dual suspension and mono suspension of two wheelers, International Research Journal of Engineering and Technology , Volume 5, Sep 2018