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Design of Attachment for Shock Absorbers Outertube

Nikhil A. Sangale

nikhil.sangale21@gmail.com

MET Bhujbal Knowledge City, Nashik, Savitribai Phule, Pune University

ABSTRACT

From the most high-grade raw material they manufacture shock absorber and provides a smoother ride to the customer while driving. Shock absorber they manufactured is very efficient in performance. They improve the durability of the shock absorber by plating them chrome and nickel to prevent corrosion. The casting part of shock absorber body is imported. While machining on the casting body of shock absorber different defects occurs. Due to this many components were rejected. Causes due to which component was defected are milling width oversized and m6 tapping. In our research, we find some remedies to overcome these defects which occur during the machining processes. To overcome from defect of milling width oversized we are going to provide coolant arrangement in the current industry locator design. And to overcome from second defect M6 Tapping we are going to provide coolant arrangement in current drill tool. So, in this way, our project aim is to overcome from these two defects and improve the production rate of company by eliminating occurring defect due machining.

Keywords: *VMC, Gauging, Mild Steel.*

1. INTRODUCTION

From the most high-grade raw material they manufacture shock absorber and provides a smoother ride to the customer while driving. Shock absorber they manufactured is very efficient in performance. They improve the durability of the shock absorber by plating them chrome and nickel to prevent corrosion. The casting part of shock absorber body is imported. Further. While machining on the casting body of shock absorber different defects occurs. Due to this many components were rejected. Causes due to which component was defected are milling width oversized and M6 tapping.

We find some remedies to overcome these defects which occur during the machining processes. To overcome from defect of milling width oversized we are going to provide coolant arrangement in the locator design. And to overcome from second defect M6 Tapping we are going to provide coolant arrangement in current drill tool. So, in this way, our aim is to overcome these two defects and improve the production rate by eliminating occurring defect due to machining.

1.1 Problem Statement

Milling Width over Size

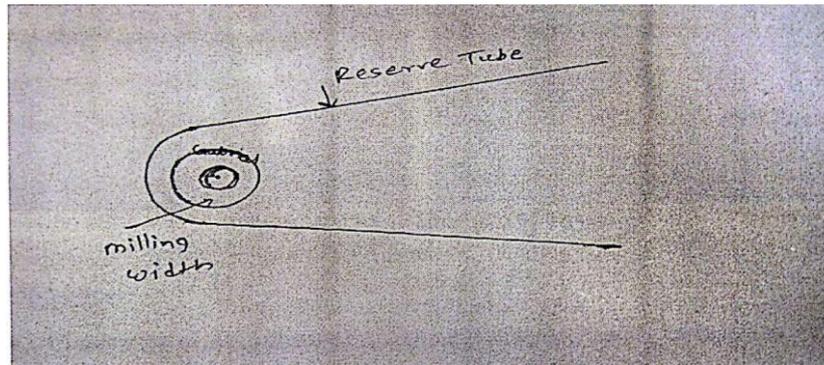


Figure No. 1

Milling width oversize is the major defect in the outer tube of the shock absorber. During the face milling operation this defect occurs and due to this defect two major problems occur they are:

- The brand name embossed over the outer tube slightly vanishes.
- There will be a problem of misalignment occurred during the assembly of shock absorber in the automobile. Variation in M6 Tapping: M6 Threading (Minor Diameter 0/Size) Resultant Bolt Fitment Loose During Tightening.

1.2 Objectives

- Elimination of setup change by designing a new mechanism for the machine.
- Modification of fixtures for VMC.
- Time study for machining of the front fork.
- Checking the Parallelism on VT^v1C.
- Remove the M6 Tapping Error 13 Scope: 1.3.1 Percentage Rejection Product Due To Top Two Defects: Defects Percentage Rejection M6 Tapping 0.5% Milling Width 0.5%.

Front Fork Outertube Machining Cell

- Both End Processing Machine (2T Machine): On Both End Processing machine drilling, boring and chamfering operations are performed axially on the outer tube.
- Deep Hole Boring (5T Machine): Further Outer tube goes through the finish boring operation axially on Deep Hole Boring machine.
- Vertical Machining Centre (6T Machine): On VMC operations like Tapping, Milling and Drilling is performed vertically. While machining, right and left outer tube of the front fork cannot be machined on the same setup without changing the setup because of different geometrical parameters like axle boss diameter, mudguard hole, and lug.

1.3 What is Gauging?

Gauging is a method through which we can determine whether or not the manufactured part within their specified limit. This process is carried out using various types of tools called gauges. Gauges do not say actual size of the dimension. [3]The measuring tools and gauges are different. While some gauges find actual dimension of the manufactured part. High carbon and alloy steels usually used for manufacturing of gauges. Some engineer's blame that steel gauges having surface hardness limit and it cannot use in heat treating operations. But these objections are minimizing by using chrome plating or cemented carbides. There are some gauges which entirely made by using cemented carbide.[3]

Types of Gauges

There are many types of gauges, but they can all be placed into three broad groups:

- Fixed Gauges
- Indicating Gauges
- Combination Gauges

Fixed gauges are the most common and are used for both large and small production. Fixed limit gauges are used to ensure that a product is within the prescribed limits of size. Most of these are standard gauges built to specifications of Precision Gauge Design Committee and manufactured in large quantities by companies specializing in this type of tool. However, the tool designer is frequently given the job of designing simply fixed gauges for special work.[3]

1.4 Design of Attachment for Shock Absorbers Outertube

Limit Gauges: There are two types of limit gauges

Go gauge and No gauge.

- **Go Gauge**

Hose gauges are designed and manufactured for a maximum material condition for checking outside diameter of inner tube according to Taylor's Principle. A tube going into the gauge shows that its outer diameter is less than the maximum permissible diameter and is acceptable. Also, the jets help in indicating the diameter of its numerical value.[3]

- **No Gauge**

These gauges are designed and manufactured to check the minimum material condition for the tube according to Taylor's principle. An acceptable tube should not pass through a No0 Ring or Snap Gauge i.e. if a tube passes through a no-go gauge, its outer diameter is below the minimum permissible diameter of the more tube and is not acceptable. In the actually modified setup of snap gauge fixture, 2 jetted breaths of air snap Go Gauge is used. [3]

1.5 Milling Process

Milling is a metal removal process in which various types of tools are used to remove material from the workpiece. The cutting tool which is used during this process having multiple cutting points.[4].In a milling operation, the rotary cutters are placed in such a way that it makes a certain angle relative to the axis of the tool. Milling is very commonly used operation in mechanical field and company today for machining various components to accurate size and dimensions. There are two main types of milling process: 1.FACE MILLING: In this type of milling process, metal removal action performed at end corners of milling cutter. Face milling operations generally used for remove metal from flat surfaces.2.Peripheral milling: In peripheral type of milling, the metal cutting operation performed along the circumference of cutter. Peripheral milling operations mostly used for machining of deep holes, gear teeth.3: GANG MILLING: In this type of milling, two or more cutters placed on same arbor in horizontal manner. In this type of milling operation, all cutters may perform same work or every individual cutter performs different work. Gang milling is very popular and important before CNC era, but nowadays CNC used in large extent causes less use of Gang milling.

1.6 Design of Locator

- **4.1.1Mild Steel (EN8)**

Mild steel is the most common form of steel as its price is relatively low while it provides material properties that are acceptable for much application. Low carbon steel contains approximately 0.05-0.15% Carbon and Mild Steel contains 0.16-0.30% Carbon. Mild Steel has relatively low tensile strength. But it is cheap and malleable: Surface hardness increase through Carburizing. It is used where ductility or softness is important. It is malleable and ductile therefore bends fairly and easily. The density of mild steel is approximately 7.85 g/cmj (7850 kg/m3) and Young's modulus is 210 GPa. Major of everyday products made of steel contain some amount of milder steel. Anything like cookware, motorcycle body and motorcar body having mild steel content. Mild steel has poor resistance to corrosion hence it should be protected by painting or sealed. Also, coat of oil or grease will help seal it from exposure. Mild steel is soft metal it is easily welded. Also it is a good conductor of electricity so it can be use in various plants and industries. Currently, Mild steel is very popular in mechanical firms.[9]

Properties

- Malleable
- Ductile

Components

- Base Plate
- V-Block
- Locating Pins (studs)
- Dead center

1.7 Selection of Drilling Tool

- The drill tool of having through coolant is selected for producing the hole for M6 tapping.
- The drill tool having an arrangement as shown in the following figure is selected.
- The diameter of drill tool is changed to 5.48 for achieving the more accuracy while performing machine tapping.

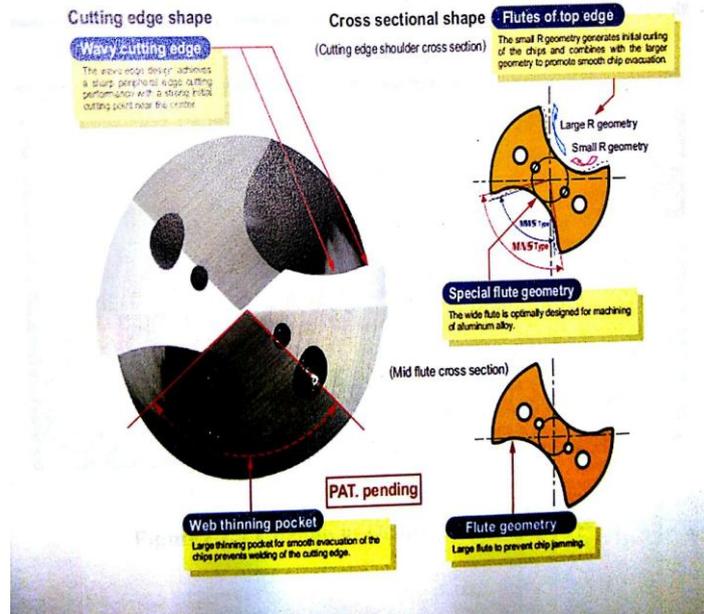


Figure no. 2

2. CONCLUSION

- Milling width oversize error can be eliminated by the burr removal which settles down to the outer tube of the shock absorber by using the flow of coolant provided by the locator near the fixture for machining the outer tube.
- The locator designed for providing a flow of the coolant will provide the coolant flow through it and because of the fluid velocity the burr will remove and flow along the coolant.
- The M6 Tapping Error is can be eliminated by providing the through coolant through the drill bit by the provision of the small holes on its cross section for the passing of the coolant inside it.
- The coolant used is an oil-soluble coolant for the elimination of both the errors having low viscosity and better fluidity for the burr removal and cooling ability for avoiding the development of the buildup edge in order to prevent the M6 Tapping Error.
- Although there is the provision of through coolant inside the drill bit still there is M6 tapping error found in some pieces in some negligible amount for the complete removal of the M6 Tapping error the run out of the drill bit must be accurate for the lower run out the schunk holder is used.
- The run out of the schunk holder is 5 micron which is the lowest. By providing the locator the Milling Width Over size Error is reduced to 0.05% from 0.5%
- By provision of the through coolant in the drill bit, the M6 Tapping error is reduced the 0.05% from the 0.5%

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