THE DESIGN OF MOTORCYCLE RIM ADJUSTING JIG USING DIAL GAUGE

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’ I / We confess that have been read this outstanding piece of works and at my / us this piece of work is acceptable from the scope and the quality for the awarded Bachelor of Mechanical Engineering (Design and Innovation) ‘

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This report is submitted as partial fulfillment of the requirement for the award of Bachelor's Degree of Mechanical Engineering (Design & Innovation)

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"I declare that this report is done by my own unless the citation with the mentioned references for each."

Signature :……

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ABSTRACT

Motorcycle Rim Adjusting Jig is used for wheel alignment of motorcycle tyre. This jig is very familiar especially at the workshop's motorcycle service centre. Current jig that has in the market is very hard to operate and require more time for this process. So, new jig is designed to overcome these problems. The jig designed considers the time and techniques of application. Time is reduced and the technique became much easier. This report intends to design new jig with improvement technique during adjustment rim process, which is uses the dial gauge concept. It saves time and facilitates the job process. In fact, results are more precise and accurate because the dial gauge is very sensitive upon differentiations. An information about the functions and aspects involve with the current jig will discussed for benchmark. It sets out rules which will be used to design the new jig that facilitate the adjustment process. Several conceptual designs and detailed design has been built. The jig's design is then being analyzed and fabricated. Finally, it structures has been tested by using COSMOSworks 2007 Software in order to get a sound product.

ABSTRAK

Jig pelarasan rim motosikal digunakan untuk melaraskan kedudukan rim dengan hab, iaitu bahagian tengah roda. Jig ini banyak digunakan terutamanya di bengkel dan pusat servis motosikal. Jig yang terdapat di pasaran sangat sukar untuk dikendalikan. Oleh itu, rekabentuk jig yang baru dicipta bagi mengatasi masalah ini. Jig yang dicipta mestilah mempertimbangkan aspek utama iaitu masa dan cara perlaksanaannya. Jangka waktu melaksanakan proses ini mesti dikurangkan dan teknik perlaksanaannya juga mesti dimudahkan. Laporan ini akan merekabentuk jig yang baru dengan teknik yang diperbaharui semasa proses penyelarasan rim, dimana konsep tolok penunjuk akan digunakan. Ia dapat menjimatkan masa dan memudahkan kerja pelarasan. Dengan ini, hasil yang diperoleh akan lebih tepat dan jitu kerana tolok penunjuk amat peka terhadap perubahan jarak. Segala maklumat tentang fungsi dan aspek yang terlibat pada jig yang terdapat dipasaran akan digunakan sebagai panduan bagi mencipta jig yang baru. Beberapa rekabentuk konsep dan rekabentuk terperinci dibina bagi mendapatkan satu rekabentuk yang terbaik. Jig yang telah direka akan difabrikasikan bagi menghasilkan produk sebenar. Seterusnya, analisis strukturnya akan dilakukan dengan menggunakan perisian COSMOSWorks 2007.

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LIST OF ABBREVIATIONS AND SYMBOLS

PSM	Projek Sarjana Muda
UTeM	Universiti Teknikal Malaysia Melaka
RO	Run Out
RI	Run In

CHAPTER 1

INTRODUCTION

1.1 Background

Motorcycle is one of the important vehicles in the world. So, the aspect of safety is crucial by person who riding the motorcycle. One of the aspect is rim alignment or rim adjusting. If the tyre of motorcycle is not aligning with their location, it can cause some incident to rider. This aspect is very important to ensure the safety of the rider. If this problem to happen, one have to realign the rim either by themselves or send to motorcycle workshop. However, the current motorcycle adjusting jig has in the market takes more time to operate this jig. Their technique also is difficult. To overcome this problem, the new jig was designed to develop the process where it can reduce the time operation and make the process technique much easier.

The concept of the dial gauge is to adjust the rim tolerance. It's including the side and high low tolerance. Dial gauge is a tool that use to measure the small changes value in measurement. The rim is not in align position if there is differential in both sides tolerances. In addition, the torque of the nipple and spoke must be checked to avoid it from bend, snap or loose. The spoke snapped if the value of torque is very high or very low.

Finally, this jig designed for do it yourself. It just require needs a few minutes to operate. So, it can save time and energy.

1.2 Problem Statements

Nowadays in the competitive environment, to keep the company survives and develops in the market, they have to present their new product to the public rapidly and continuously. Developing the new product has to satisfy the costumers' requirements and make them appear in the market as soon as possible becomes the key to share more part on the market.

Generally, all products produced must consider operating time, cost and method to operate or use the product. The product should save time, low cost and can make job much easier. These are the main factors to make product still alive in the market.

Current product of Motorcycle Adjusting Rim Jig has in the market is difficult to operate the technique. The operation time is also very long. To overcome this problem, the new jig must be designed where it can reduce the time operating and facilitate the rim adjustment technique. **Figure 1.1** shows the High and Low adjustment technique of current jig has in the market. The technique is not user friendly because it requires work's concentration to operate. The rim must be adjusted until get the align position with the reference point.

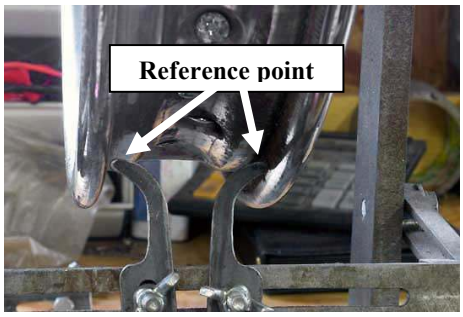

Figure 1.1: High and Low Run Out Adjustment

Figure 1.2 shows the Side Run Out adjustment technique for motorcycle rim that use in the same jig. This technique is very hard and requires longer time during the process. The results also are not very precise and not suitable in mass production as well.

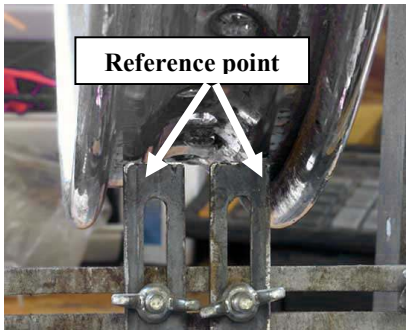

Figure 1.2: Side Run Out Adjustment

1.3 Objectives of project

Objectives of this project are to analyse and apply the dial gauge technique for the motorcycle adjusting rim jig. The main purposes of using Dial Gauge are to reduce time operating and facilitate the adjustment technique.

1.4 Scopes of project

The scopes of this project are list as below:

- To study about the motorcycle adjusting rim jig.
- To analyse the motorcycle adjusting rim jig using dial gauge techniques.
- To generate the conceptual design of motorcycle adjusting rim jig.
- To design motorcycle adjusting rim jig using CATIA Software.
- To design and apply motorcycle adjusting rim jig.
- To fabricate the motorcycle adjusting rim jig using dial gauge.
- To present the motorcycle adjusting rim jig using dial gauge.

1.5 Project Planning

Project Planning can be referred in Appendix A.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter will cover the literature review. It includes the techniques, current product and method of product process. It also discuss briefly about Product Design Specification, Conceptual Design, detail design and fabrication.

2.2 Definition of Term

Definition of term contains all parts and simple descriptions about all parts that involved in this adjustment processes. It includes the jig, wheel and rim, hub, spoke, nipple and dial gauge.

2.2.1 Jig

Jig can define as a device that holds a piece of machine work and guides the tools operating on it. We can finish all processes with faster, better and more precise if we hold the workpiece on the jig. In this study, rim adjusting jig means the device that will hold the motorcycle rim during the operation process.

2.2.2 Wheel and Rim

A solid disk or a rigid circular ring connected by spokes to a hub, designed to turn around an axle passed through the center can called as wheel. Rim is a circular metal structure around which a wheel tire is fitted. **Figure 2.1** shows the sample of motorcycle rim.

Figure 2.1: Motorcycle Rim

2.2.3 Hub

In this concept, hub can define as the device that holds the motorcycle rim through the tyre shaft. It also the central part of a wheel where the spokes come together. **Figure 2.2** shows the sample of motorcycle hub.

Figure 2.2: Motorcycle Hub

2.2.4 Spoke

Spokes have a head on one end to stop them from being pulled through the hole in the hub flange and an adjustable threaded nipple on the other end that goes through the hole in the rim. It support consisting of a radial member of a wheel joining the hub to the rim. **Figure 2.3** shows the sample of spokes.

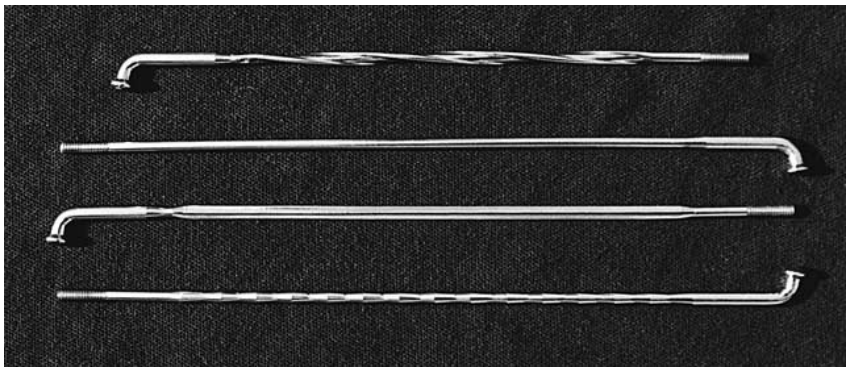

Figure 2.3: Spokes

2.2.5 Nipple

Nipple can define as the hollow device and has thread inside. The function of this tread is to connect and tighten with the spoke. The sample of nipples can illustrate in **Figure 2.4**.

Figure 2.4: Nipple

2.2.6 Dial Gauge

Dial gauges and high definition display measuring devices, colloquially often also known as a dial gauge, are precision instruments. As with all mechanical devices, they are also subjected to wear and tear, aging, or are adversely affected by "accidents," such as hard impacts. It is therefore necessary to test them for their measurement accuracy on regular intervals. This is also stipulated in various standards, as well as the required documentation for this. **Figure 2.5** shows the sample of dial gauge.