

THE IMPROVEMENT OF EXISTING TRUING JIG STAND

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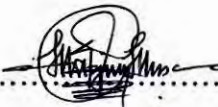
**This report is submitted as partial fulfillment of the requirement for the award of
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**Faculty of Mechanical Engineering
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MAY 2009

' 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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DECLARATION

“I hereby declare that this report is the result of my own work except for quotes as cited in the references.”

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“I hereby declare that I have read this report and in my opinion this report is sufficient in terms of the scope and quality for award of Bachelor of Mechanical Engineering (Design and Innovation) With Honours.”

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Specially dedicated to my beloved family

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ABSTRAK

Projek Sarjana Muda ini dijalankan bagi meningkatkan keatas sistem jig penyelarasan rim motosikal Peralatan jig ini merupakan alat yang begitu dikenali terutamanya di bengkel motosikal. Selain itu juga,alatan jig ini juga kini terdapat dipasaran. Akan tetapi kebanyakan peralatan ini sukar dikendalikan dan mengambil masa yang lama bagi menjalankan proses pemasangan rim, hub, lidi,.Oleh yang demikian kaedah alternatif lain di ambil bagi menyelesaikan masalah ini dengan menjalankan beberapa kajian dan merekacipta rekabentuk baru.Dengan ini, kajian akan dijalankan bagi mempertingkatkan sistem pemasangan rim motosikal.

ABSTRACT

The project relates to a improvement on existing motorcycle rim adjusting jig. This jig is familiar device especially at the workshop or motorcycle service centre. This jig also has in the market now. The most problem of this jig is hard to conduct and also need expand more time to finish the process assembly of rim, hub, spoke and nipples. The main objective of this project is to create a new technique and design to solve the problem. Via this project, the improvement and enhancement of current adjusting jig can be done successfully.

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CHAPTER 1

INTRODUCTION TO PROJECT

1.1 INTRODUCTION:

A wheel truing stand is a specialized tool or jig for straightening wheels. While individual models differ slightly, it consists of an axle stand on which the wheel can rotate and calipers, to measure slight deviations of the wheel's rim from ideal ("true") alignment. The stand is used in conjunction with an appropriately sized spoke wrench to loosen & tighten spokes that hold the rim in position.

A good wheel wright will ensure that the wheel is "true" in two ways: "lateral" (sideways wobble) and "radial" (roundness). Ideally spokes have similar tension although the two sides will be different if a wheel is dished [dished: the uneven bracing angle of spokes] on some multi speed wheels with tension high enough to give a rigid wheel and retain some tension under all loads but not so high as to lead to failure of spokes or the rim. Spokes should have no residual twist (windup) from tightening the nipples. The spokes may be "stress relieved", i.e. subjected to a greater tension during building than they are ever likely to encounter in use - usually by squeezing pairs of spokes together very hard. This is said to yield the spoke and the hub into a permanent shape where they bend around hub flanges and each other.

1.2 Objective

The main objectives of this study are:

- To improve the mechanism of the existing truing stand.
- To redesign and develop a prototype of truing stands by incorporating with the improvement on the selected mechanisms.

1.3 Scope of Study

Scopes of study are:

- To study about the adjusting motorcycle adjusting rim jig.
- To redesign motorcycle adjusting rim jig by using Solidwork Software.
- To analyze of adjusting rim jig by using COSMOSWork software.
- To analyze the motorcycle adjusting rim jig using dial gauge techniques.
- To study and incorporate the power window into design's mechanism sensors, locking systems as well as indicator lights.
- To generate the conceptual designs of the motorcycle adjusting rim jig.
- To build and test a prototype of the motorcycle adjusting rim jig by incorporating with few additional improvement on the selected mechanisms.

1.4 Problem Statement

Wheel adjustment is very important in order to ensure all riders are feel comfortable and always in safe condition. To fulfill this requirements lot of things are need to do. Hence, a high skill to maintenance a wheel is needed.

There are few problems while truing a wheel such as the time taken to truing a wheel is too long and wasting time because it need full concentration on the task. Furthermore, the lacing of the rim should be uniformly distributed and need high skill to operate the jig. One of the spoke problems associated with the assembly and truing of spoked wheels lies in the correct tensioning of the spoked to produce a wheel which will run true to a desired extent. This method of wheel truing is expensive in skilled labour and time.

As in 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.

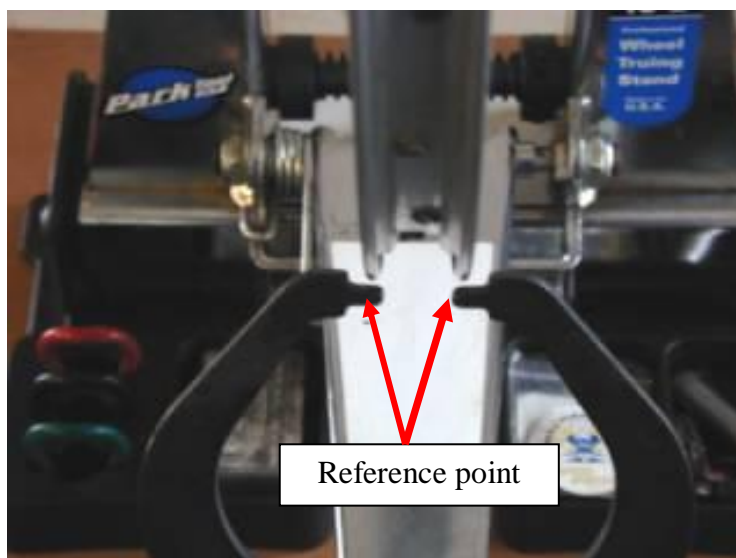


Figure 1.1: High and Low Run Out Adjustment

Figure 1.2 shows the Side RunOut 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.

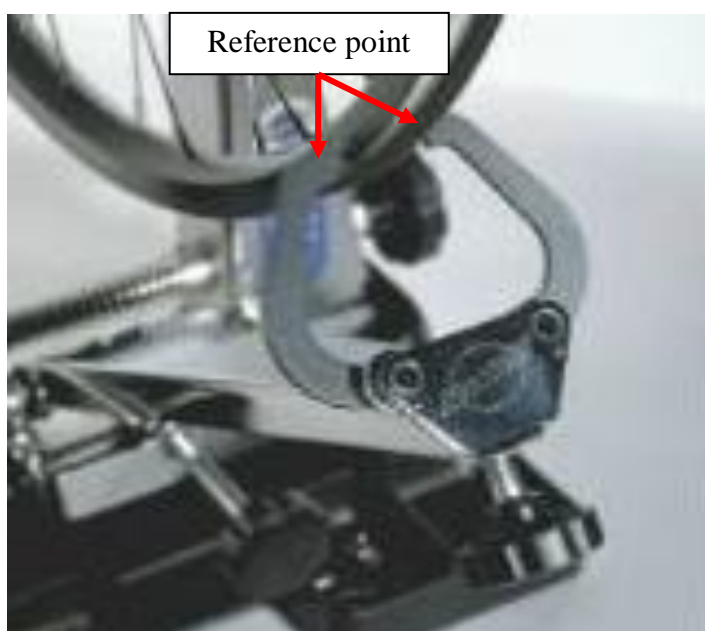


Figure 1.2: Side RunOut Adjustment

CHAPTER 2

INTRODUCTION TO MOTORCYCLE RIM ADJUSTING JIG

2.1 INTRODUCTION

If your bike has spoke wheels, then you need to know how to maintain, repair and true them, it's as simple as that. This article will cover the basics as illustrated with a dirt bike wheel, but the same principles apply to street hardware. Note that we're using a tube-type rim because most spoke wheels are like that. Second, you need a way to get your bike's wheels up off the ground, at least one end at a time. If you're changing components, the wheels obviously must be removed. But if you're just giving your wheels a truing tune-up, they can stay on the bike. Third, you've got to have some way of measuring very small deviations in the radial and lateral movement of a turning rim. Professional truing stands allow for rotation of a wheel's hub in a fixed plane, and include an adjustable armature for mounting a runout gauge or for using as a static indicator all by itself.

However, these professional grade tools are rather expensive, and you can probably improvise something adequate for a whole lot less (see sidebar). A fourth necessity, one that isn't particularly expensive, is a quality spoke wrench. Throw out that pot metal piece of junk that came in your bike's tool kit it'll do more harm than good. Spoke nipples are small but require significant torque. And if it's a dirt bike

you're working on, the nipples you'll be twisting are probably made of soft, easily deformed aluminum, and they may resist turning due to corrosion or excessive tension.

Either way, a precise tight-fitting match between the wrench and nipple is absolutely necessary to avoid rounding off and ruining the nipple's flats and crushing it against the spoke threads. You can usually pick up a much better-fitting version at your local motorcycle shop for under ten bucks. But know the exact size you need, as there are half a dozen in common use. Finally, because the procedures involved are extremely repetitious; use tiny increments of adjustment; and require a meticulously systematic approach, you will need above-average patience and a setting in which you can concentrate for an extended period of time.

2.2 EQUIPMENT

Definition of term contains most parts and sample descriptions about all parts that involved in this truing process. It includes wheel (rim), spoke, nipples, Dial gauge, hub and jig. All of this parts is use while assemble process of the wheel.

2.2.1 Wheel or Rim

The rim is the outer circular design of the metal on which the inside edge of the tire is mounted on vehicles such as automobiles. For example, on a motorcycle wheel the rim is a large hoop attached to the outer ends of the spokes of the wheel that holds the tire and tube.



Figure 2.1 Wheel or Rim

2.2.2 Spoke

Spoke is known as wire wheel where it was a hub connect to the rim with hold by nipple (figure 2.3) and it has a head on one end to stop them from being pulled through the hole in the rim. The figure 2.2 shows the sample of spoke.



Figure 2.2: Spoke

2.2.3 Nipples

Nipple is a part that has a hollow and thread inside. The function of thread is to connect and tighten with the spoke. Figure 2.3 below shows an example of nipple.



Figure 2.3: Nipple

2.2.4 Hub

Hub-center steering (HCS) is one of several different types of front end suspension/steering mechanisms used in motorcycles. Hub is characterized by a swing arm that extends from the bottom of the

engine/frame to the centre of the front wheel instead of two forks. Figure 2.4 is the sample of motorcycle hub.



Figure 2.4: Hub

2.2.5 Dial Gauge

Dial gauge is an instruments used to accurately measure a small distance. This instrument is also well known as a Dial Test Indicator (DTI), or as a "clock". They are named so because the measurement results are displayed in a magnified way by means of a dial. Dial gauge may be used to check the variation in tolerance during the inspection process of a machined part, measure the deflection of a beam or ring under laboratory conditions, as well as many other situations where a small measurement needs to be registered or indicated. Figure 2.5 show the sample of a dial gauge.



Figure 2.5: Dial Gauge