

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

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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 diperolehi 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.

TABLE OF CONTENT

CHAPTER	TOPIC	PAGE
	ABSTRACT	i
	<i>ABSTRAK</i>	ii
	TABLE OF CONTENT	iii
	LIST OF TABLES	viii
	LIST OF FIGURES	ix
	LIST OF ABBREVIATIONS	xiii
CHAPTER 1	INTRODUCTION	1
	1.1 Background	1
	1.2 Problem Statements	2
	1.3 Objectives of project	3
	1.4 Scopes of project	3
	1.5 Project Planning	3
CHAPTER 2	LITERATURE REVIEW	4
	2.1 Introduction	4
	2.2 Definition of Term	4
	2.2.1 Jig	4
	2.2.2 Wheel and Rim	4
	2.2.3 Hub	5
	2.2.4 Spoke	5
	2.2.5 Nipple	6
	2.2.6 Dial Gauge	6
	2.3 Dial Gauge Concept	7
	2.4 Tyre and Rim Assembly Process	9

2.4.1	Method One	9
2.4.2	Method Two	17
2.5	Measuring the Offset	22
2.6	Spoke Wheel Lacing	23
2.7	True a Wheel	24
2.8	Current Product	27
2.8.1	Jig	27
2.8.2	Techniques	29
2.9	Fabrication	31
2.9.1	Welding Process	31
2.9.2	Grinding Process	33
2.9.3	Cutting Process	34
2.9.4	Sand Casting	36
2.9.5	Lathe Machine	37
2.9.6	Drilling	40
2.10	Product Design Specification (PDS)	41
2.11	Conceptual Design	41
2.12	Detail Design	42
2.13	Summary	43
CHAPTER 3	METHODOLOGY	44
3.1	Introduction	44
3.2	Method	47
3.2.1	Archival Collection	48
3.2.2	Observation	48
3.2.3	Surveys and Questionnaires	49
3.2.4	Online research	50
3.3	Summary	50

CHAPTER 4	CONCEPTUAL DESIGN	51
4.1	Introduction	51
4.2	Product Design Specification (PDS)	52
4.3	Conceptual Design	55
4.3.1	Morphological Chart	56
4.3.2	Design Decision Matrix	61
4.3.3	Final Concept Design	63
4.4	Summary	63
CHAPTER 5	DESIGN ANALYSIS	64
5.1	Introduction	64
5.2	Part Design	64
5.3	Exploded Drawing	70
5.4	Assembly Drawing	71
5.5	Structure Analysis	72
5.6	Safety Factor	75
6.7	Summary	75
CHAPTER 6	FABRICATION	76
6.1	Introduction	76
6.2	Primary Process	76
6.2.1	Sand Casting	76
6.3	Secondary Process	78
6.3.1	Lathe Machine	78
6.3.2	Cutting, Welding, Drilling and Grinding	82

	6.3.2.1	Cutting Process	82
	6.3.2.2	Welding	83
	6.3.2.3	Drilling	84
	6.3.2.4	Grinding	85
6.4		Tertiary Process	86
	6.4.1	Painting	86
	6.4.2	Assembly Process	87
6.5		Summary	89
CHAPTER 7		RESULT AND DISCUSSION	90
7.1		Introduction	90
7.2		Result	90
	7.2.1	Product Function	90
	7.2.2	Operation Time	91
	7.2.3	Product Operation Techniques	92
7.3		Discussion	93
	7.3.1	Conceptual Design	93
	7.3.2	Detail Design	94
	7.3.3	Fabrication	95
7.4		Summary	96

CHAPTER 8	CONCLUSIONS AND FUTURE WORKS	97
8.1	Conclusions	97
8.2	Future Works	98

REFERENCES**BIBLIOGRAPHY****APPENDICES A - E**

LIST OF TABLES

NO.	TITLE	PAGE
2.1	Rim size	11
2.2	Comparison table	16
2.3	Type of metal and it secondary gas	35
2.4	Lathe Machine Components and Functions	38
4.1	Morphological Chart	56
4.2	Design Decision Matrix	62
5.1	Bill of Material	70
7.1	Testing and Comparison Result	91

LIST OF FIGURES

NO.	TITLE	PAGE
1.1	High and Low Run Out Adjustment	2
1.2	Side Run Out Adjustment	3
2.1	Motorcycle Rim	5
2.2	Motorcycle Hub	5
2.3	Spokes	6
2.4	Nipple	6
2.5	Dial Gauge	7
2.6	Dial Gauge Concept	8
2.7	Dial Gauge Terminology	8
2.8	Tyre and Rim Assembly Process Flow Chart for Method One	9
2.9	Spoke Inserting	10
2.10	Type of Spoke	10
2.11	Nipple setting	12
2.12	Nipple tightening	12
2.13	Rim adjusting	14
2.14	Tyre setting	14
2.15	Tyre checking	15
2.16	The first spoke installed	17
2.17	3 holes between 2 spokes	17
2.18	A wheel with the first row of spokes installed	18
2.19	A wheel with the first inner spoke installed	18

NO	TITLE	PAGE
2.20	The spoke hole that must be filled with spoke	19
2.21	A Wheel with all of the spokes installed on the first side	19
2.22	A wheel with all of its spokes installed	20
2.23	Screwing on the nipples	20
2.24	Drawing for wheel assembly process	21
2.25	Measuring the offset	22
2.26	Spoke wheel lacing process	23
2.27	Spoke wrench	24
2.28	Current Jig	27
2.29	Reference point at current product	28
2.30	Location of Spokes	29
2.31	Rim touches at left side caliper	30
2.32	Rim touches at right side caliper	30
2.33	Electrode and holder of arc welding	32
2.34	Arc welding machine	32
2.35	Chamfered or beveled edges after grinding process	33
2.36	Grinding machine	33
2.37	Basic principle of plasma arc	34
2.38	Dual gas	35
2.39	Sand Casting Process to produce this product	36
2.40	Lathe Machine Components	37
2.41	Image of Thread	39
2.42	Imagine of Thread Cutting Process	40
2.43	Cutting Work Process	40
2.44	Catia Detail Design Process Flow	42
3.1	Flow Chart Process of Project for PSM 1 & 2	44
3.2	Flow Chart Process of Project for PSM 1	45
3.3	Flow Chart Process of Project for PSM 2	46

NO	TITLE	PAGE
3.4	Process flow to collect the information	47
4.1	Process flow for Conceptual Design	55
4.2	Concept 1	57
4.3	Concept 2	58
4.4	Concept 3	59
4.5	Concept 4	60
4.6	Evaluation Criteria	61
4.7	Final Concept	63
5.1	Base	65
5.2	Main Part	66
5.3	Clamper	66
5.4	Clamper Cap	67
5.5	Dial Gauge	67
5.6	Dial Gauge Housing	68
5.7	Dial Gauge Housing Support	68
5.8	Dial Gauge Housing Support Connector	69
5.9	Exploded Drawing	70
5.10	Assembly Drawing	71
5.11	Stress Analysis	72
5.12	Displacement Analysis	73
5.13	Strain Analysis	74
6.1	Sand Casting Process Parts	77
6.2	Thread Making Progress 1	80
6.3	Thread Making Progress 2	81
6.4	Thread Making Process Finished	81
6.5	Cutting Machine that used in this fabrication	82
6.6	Plasma Cutting Machine	82
6.7	Welding Parts	83

NO	TITLE	PAGE
6.8	Drilling Machine that Used in this Process	84
6.9	Drilling Parts	84
6.10	Grinding Parts	85
6.11	Painting Parts	86
6.12	First Assembly Process	87
6.13	Second Assembly Process	87
6.14	Third Assembly Process	88
6.15	Sub-assembly Process	88
6.16	Complete Assembly	89
7.1	Product Function Testing	91
7.2	Time Comparison Graph	92
7.3	New Technique Improvement	92
7.4	Percentage of Advantages for each Conceptual Design	93
7.5	Detail Design Process Flow	94
7.6	Fabrication Process Flow	95

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.

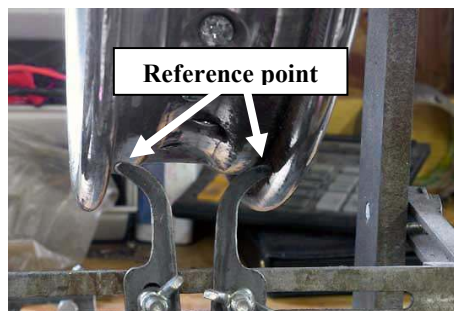


Figure 1.1: High and Low Run Out Adjustment

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.

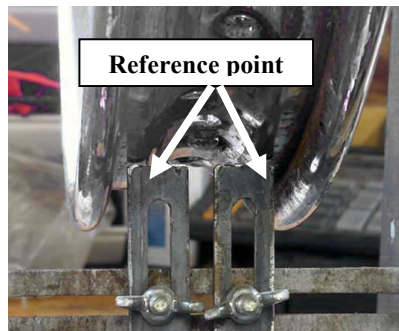


Figure 1.2: Side Run Out Adjustment

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.

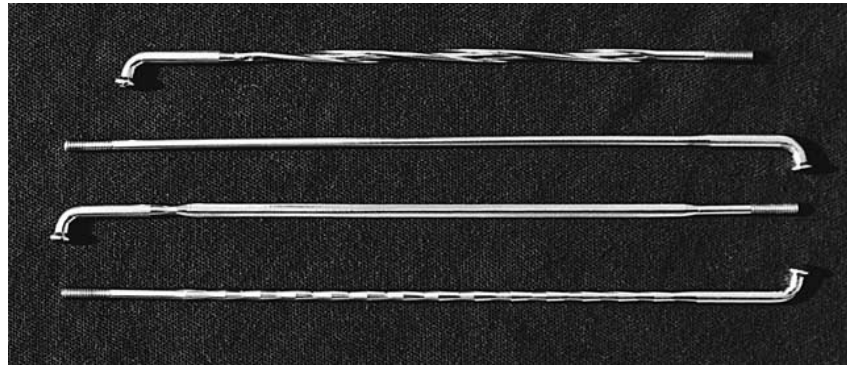


Figure 2.3: Spokes

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.