APPLYING DESIGN FOR 3R AND DESIGN FOR DISASSEMBLY METHOD TO DETERMINE THE END-OF-LIFE STAGE OF THE BICYCLE.

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APPLYING DESIGN FOR 3R AND DESIGN FOR DISASSEMBLY METHOD
TO DETERMINE THE END-OF-LIFE STAGE OF THE BICYCLE.

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A report submitted in partial fulfilment of the
requirements for the award of the degree of
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SUPERVISOR'S DECLARATION

We hereby declare that we have checked this project and in our opinion this project is satisfactory in terms of scope and quality for the award of the degree of Bachelor of Mechanical Engineering with Manufacturing.

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Signature : _________________________

Name of Panel :

Date :

STUDENT DECLARATION

"I declare that this thesis is the result of my own research except as cited references. The thesis has not been accepted for any degree and is concurrently submitted in candidature of any degree".

Signature	: ....
Name of Candidate	: MOHD SUHAIMI BIN MUSTAPAR
Date	: …………………………………….

Dedicated to my beloved

“family“

For their endless support in term of motivation,

supportive and caring as well throughout the whole project

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ABSTRACT

Recycling is one of the popular ways to ensure that the product is environmental friendly. There are several value recovery processes, including cannibalization and remanufacturing. However, the design of most products does not favor the recovery of added value. Product designed for optimal marketing and ease of manufacturing are not necessarily good candidates for a recovery scheme. Design measure such as recyclability, disassemblability, and reusability are defined and used as the basic of the product recovery time. This project proposed a framework for design method that adopts the environmental – friendly philosophy via the concept of reuse, recycle and remanufacture. The bicycle is adopted as a case study. The expected output is the design method that considers 3R philosophy.

ABSTRAK

Kitar semula adalah salah satu cara yang terkenal dalam memastikan sesuatu produk yang dihasilkan mempunyai ciri-ciri mesra alam. Terdapat beberapa nilai dalam proses pengawalan semula termasuk penjenteraan dan pembuatan semula. Walaubagaimanapun, kebanyakan rekaan produk tidak memenuhi nilai penambahan pengawalan semula.Produk yang direka untuk pasaran yang optimum dan mudah untuk di hasilkan adalah bukan pilihan yang baik untuk pengawalan semula. Ukuran rekaan seperti kitar semula, penceraian dan penggunaan semula telah di tentukan dan digunakan sebagai asas dalam menentukan masa pengawalan produk. Projek ini mencadangkan langkah-langkah yang dapat menyesuaikan diri dengan persekitaran menggunakan konsep 3R. basikal digunakan sebagai bahan kajian dalam projek ini.

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INTRODUCTION

1.1 Introduction

During the industrial revolution, environmental issues were not addressed when designing and manufacturing products. However, in the last decade or so, Environmentally Conscious Manufacturing and Product Recovery (ECMPRO) has become an obligation to the environment and to the society itself, enforced primarily by governmental regulations and customer perspective on environmental issues.

Environmentally conscious manufacturing (ECM) is concerned with developing methods for manufacturing new products from conceptual design to final delivery and ultimately to the end-of-life (EOL) disposal such that the environmental standards and requirements are satisfied. Product recovery, on the other hand, aims to minimize the amount of waste sent to landfills by recovering materials and parts from old or outdated products by means of recycling and remanufacturing (including reuse of parts and products).

Many thinkers have adopted the "three Rs" banner- remanufacture, recycle, and reuse-in order to develop environmentally conscious production process. Remanufacturing represents the combination of the three Rs in to single activity. It is the process of making renovated products or assemblies with some components or subassemblies that have previously been used. It requires the disassembly of the used item, selection parts that can be reuse, inspection and renovation of critical components, reassembly into a final product.

1.2 Project objectives

Every project must have their own objective to achieve their target. For this project, the objectives are:

1. To evaluate the end-of-life of the product design by using a bicycle as a case study.

1.3 Project scopes

One of the most important things in the project is the scopes. The scopes for this project are:

1. Literatures reviews studies of the "3Rs" – remanufacture, recycle, and reuse.
2. The study is limited to the Reuse, Remanufacture and Recycle application only.
3. Pugh method is selected as a tool to select the design alternatives.
4. The bicycle is selected as a case study.
5. Comparison with DFA is based on the quantity of parts and the assembly time.

1.4 Project background

For this project, the bicycle is using as a case study to evaluate the end –of-life of the product design. A bicycle consists of many parts. The part is manufactured from many materials like steel, alloy and rubber. The flow of this project is starting by sketching and then draws the bicycle using the solid work software. Disassembly method.

After that, analysis results in a recommendation of the following recovery process for the bicycle. Identify what the component of the bicycle can be remanufacture, recycle and reuse. From that the component, generate the new alternative. By using DFA software, compare the design based on the quantity of parts and the assembly time. The design is between the old and the new bicycle.

1.5 Problem Statements

1. To determine what the component from the body part or bicycle can be recycle, reuse and remanufacture.
2. To evaluate the end-of –life of the product design by using a bicycle as a case study.

1.6 Expected output

To Design method that consider 3R and disassembly.

1.7 Significant of research

This significant of this study is to aim to promote the consideration for eco design at the early phase of the design process and development.