

# **DESIGN AND DEVELOPMENT OF A RATTAN BASKETS TOOL MANUFACTURER**

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**UNIVERSITI TEKNIKAL MALAYSIA MELAKA  
2014**



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**DESIGN AND DEVELOPMENT OF A RATTAN BASKETS  
TOOL MANUFACTURER**

This report submitted in accordance with requirements of the Universiti Teknikal Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering  
Department of Manufacturing Engineering (Design)

By

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## BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: **DESIGN AND DEVELOPMENT OF A RATTAN BASKETS TOOL MANUFACTURER**

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I hereby, declared this report entitled “Design and Development of a Rattan Baskets Tool Manufacturer” is the results of my own research except as cited in references.

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## **APPROVAL**

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Manufacturing Engineering Department of Manufacturing Engineering (Design). The member of the supervisory is as follow:

.....  
EN. ZULKEFLEE BIN ABDULLAH

## **ABSTRAK**

Projek ini dijalankan untuk mereka bentuk sebuah alat bantu kepada pertukangan kraftangan dari segi pembuatan bakul rotan. Rotan adalah sebuah hasil rimba yang boleh diolah untuk dijadikan produk dan dapat menghasilkan pendapatan kepada manusia. Kebiasaannya, proses penghasilan dan anyaman bakul rotan adalah dengan menggunakan kaedah manual atau tradisional. Walaubagaimanapun, terdapat beberapa masalah yang perlu dihadapi oleh tukang dalam proses pembuatan ini iaitu tukang akan mengalami sakit pada tangan dan juga sendi, penghasilan saiz bakul rotan yang tidak sekata, dan juga kekangan masa. Kaedah yang digunakan untuk menyelesaikan masalah yang dihadapi adalah dengan mengedarkan soalan kajiselidik kepada tukang. RULA analisis juga dilakukan untuk mengetahui tahap keselesaan atau interaksi tukang dengan peralatan yang digunakan dengan menggunakan CATIA software. Manakala untuk menganalisis produk yang telah direka, FEA analisis adalah diperlukan untuk mengetahui tahap keselamatan bagi produk tersebut. Oleh itu, produk ini direka untuk memudahkan pekerjaan tukang sehari-hari.

## **ABSTRACT**

The main purpose of this project is to design of assisting tool in manufacturing of rattan handicraft. Rattan is a non-timber forest resources has variety of functions in the making of handicrafts and furniture. The product will be covered in this project is a round basket. The production of rattan handicraft typically carried out using manual and traditional methods. However, there are some problems to be faced by the craftsman in making the handicrafts such as the time constraints for the production of products until to the market, the size, and also pain in the hand while making the handicraft products. Therefore, assisting tool or devices in manufacturing of rattan handicraft is needed to solve the problem. The methods used are questionnaire survey, CATIA software and Solidwork software. CATIA software was used to analyze the posture body of the handicraft worker through the Rapid Upper Limb Analysis (RULA) analysis while, Solidwork software was used to analyze the Finite Element Analysis (FEA) of the design product. The survey was conducted at Kumawanan village, Tambunan, Sabah and got about 42 respondents. The body posture result very unsafe for handicrafts worker for manual making rattan baskets. The Factor of safety for the product is equal to one, so the product is safe and stable to be used.

## **DEDICATION**

*Special dedicated to my mother,*

Gomina @ Marnie binti Limpangon @ Harimin

*My supportive sibling,*

Mohd Faizal bin Janin @ Abdul Karim

Nurul Fatmah binti Janin @ Abdul Karim

Nurul Fariah binti Janin @ Abdul Karim

Mohd. Al-Faruq bin Janin @ Abdul Karim

*For my supervisor,*

En. Zulkeflee bin Abdullah (Lecturer)

*For My Co-supervisor,*

Pn. The Zanariah binti Hj. Mohd. Raus (Lecturer),

Pn. Nadiah binti Zainal Abidin (Lecturer)

**And to all my relatives and friends for their supports and prayers. May ALLAH  
bless all of you.**



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# CHAPTER 1

## INTRODUCTION

### 1.1 Background

Art is one of the cornerstones of the Malay culture which has been practiced and passed on for a long time and for generations to come. From this availability of art, the identity of the Malay community will be known and visible. Traditional artistic heritage was presented by hereditary either oral method, or act as an individual, but making the art, which will promote the creativity and aesthetic values to the artwork. The word rattan is derived from the Malay “rotan”. Rattans are climbing palms that live in the forest. It is also known as non-timber forest products (NTFS). Rattan is synonymous with the word amongst Malay crafts. According to (Hamid & Suratman, 2010), there are 600 different species and about 13 genera of rattan found around the world. High concentration of rattan species can be found in Malaysia and Borneo. In the Peninsular Malaysia, 106 species with eight genera, in Sarawak 105 species and Sabah about 79 species have been recognized. There are 13 genera of rattan in the world such as *Calamus*, *Daemonorops*, *Karthalsia*, *Plectocomia*, *Plectocomiopsis*, *Myrialepis*, *Ceratolobus*, *Calospatha*, *Pogonotium*, *Retispatha*, *Laccosperma*, *Eremospatha*, and *Onecocalamus*.

Rattan is one of the most important non-timber forest products which have been used in many furniture products, and decoration. These non-timber forest products are able to compete with wood-based products in the industry both locally and abroad. In

addition, products from rattan are able to raise and enhance the national economy. Malaysia is known to have abundant resources of rattan. There are various types and sizes of rattan available in this world.

Many equipments and facilities that can be produced with rattan, such as construction, furniture making, handicraft and arts, food source and medical potential, equipment for the convenience of the user and so on. Rattan is very popular in the furniture products such as basket, bag, mats and rack, also for making other decoration such as lamp frame, decorative wall and others.

In addition, there are several advantages which can be found with the use of rattan. Among them is eco-friendly as it can be recycled to reduce waste and also it is from natural sources of nature. Usually, this non-timber forest products of rattan is fast growing and sustainable. The rattan furniture is suitable for modern and classic design and decoration for home, office and others. These rattan products have high potential to be commercial in local and abroad. Also, rattan product can improve the economy of society and the country.

## **1.2 Problem Statement**

Rattan is a non-timber forest resources has a variety of functions in the making of handicrafts and furniture. Rattan can be used to produce quality products and have a high value in the market. A basket is also made by rattan. However, there are several problems faced by the craftsman in the process of producing rattan baskets. Often, the making of this rattan handicraft is manually and will result some problems to the craftsman. The first problem that often occurs is the craftsman would have pain in the hands while making the basket of rattan. It happens when the craftsman want to tighten the webbing at Rattan basket. The second problem is about the time constraints. This problem happened when the entrepreneurs should complete the requests of rattan baskets in bulks product. The third problem is the size or shape of the product produced is uneven. The fourth problem is the making of the rattan basket is still using the manual methods and traditional methods. The manual method causes the slow motion producing of rattan baskets. Therefore, this study will try to study and solve this problem.

### **1.3 Objectives**

The objectives of this research are:

- (a) To study about the rattan and craft making industry
- (b) To design a tool to help in weaving process of the rattan handicrafts.
- (c) To analyze the ergonomic aspect of the designed tool using CATIA software.
- (d) To analyze the finite element analysis (FEA analysis) aspect of the designed tool using SOLIDWORK software.

### **1.4 Scope**

These projects are limited to the making of round shape basket made from rattan. The material selections and the cost estimations for the devices are not taking into account for this project.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This section explains in detail the important aspect involved in the handicraft industry. The knowledge about the rattan and the making of rattan product (basket) is also explained in this chapter as well.

#### **2.2 Introduction of Forest in Malaysia**

Forest is an area of natural character and is a habitat for plants and wildlife flourish and grow. Forest in Malaysia can be classified in several areas of the highlands, lowlands and swamps. According to the World Food and Agricultural Association, 2005; forest in Malaysia has been identified as one of the 12 mega-diversities in the world with a leading source of biological wealth (Sam, 2011).

According to Forever, (1992), Malaysia consist of a combination of 13 states and three Federal Territories, with an area of 32.98 million hectares of area 13.18 million hectares in Peninsular Malaysia, for Sabah 7.48 million hectares and Sarawak 12.32 million hectares. From an area of 32.98 million hectares, there is an area of 18.48 million hectares of forested and 5.27 million hectares of trees planted with industrial crops such as rubber, oil palm, cocoa and coconut. In addition, to further promote the country's economic growth, a number of forest products have also been used and

processed into useful products to market and boosting the country's economic growth and industries such as wood products and handicrafts.

From 18.48 million hectares of total forest area, 79% or 14.61 million hectares have been gazetted as Permanent Forest Reserve under the National Forestry Act 1984 and the enactments and ordinances relevant state. An area of 1.83 million hectares out of Permanent Forest Reserve was gazette as national parks and wildlife parks under various legislations (Forever, 1992).

Forests provide many revenues and earnings to humans. Every plant in the jungle has its own usage for human being in improving quality of human life. Forest resources and non-timber wood able to generate production and economy through the production and handicrafts. Table 2.1 below show the total forested area in Malaysia. While, table 2.2 shows the permanent reserved forests in Malaysia.



### **2.3 Handicraft Industry**

Malaysia is very lucky to have rich natural forest and this forest help in increasing the income among Malaysian. As a result, the plants such as wood, bamboo, rattan, mengkuang, coconut shells and can be produce as handicrafts and can be marketable. There are many contributions and potential available from the handicraft industry to local people. Among the contribution of handicraft industry are providing job opportunity, producing capable handicrafts, attracting tourist besides increasing income among Malaysian.

Malaysians handicraft Development Corporation defines Craft Product as any artistic production that has the attractiveness of cultural or traditional and is the result of a process that rely solely or partly to hand skills. Handicrafts often bring the importance of culture and religion for a race. The art of craft has rules in production. Craft practitioners referred to craftsmen, in accordance with skills since generations. Appreciation of art craft taking into account the following aspects; the first is the knowledge and experience of craftsmen and secondly, the skills of artisans in applying techniques of production. Therefore, the handicraft industry triggered the beauty of art, design and originality of fineness which are hidden to the jungle.

Craft has three main features of product; the cultural, religious beliefs and traditional needs. These features are combine with own manpower to produce handicraft product without any high-tech technology. Various types of handicrafts available agro-forest produce such as furniture, mats, baskets and others. Figure 2.1 illustrate the various types of handicraft products. The types of handicrafts included the batik product, wood product, and bamboo product.

