CHAPTER 1

INTRODUCTION

1.1 Introduction

As the product life cycle is getting shorter and the producing cost is increase as well as to meet the global demands and remain competitive, the manufactures are pressured to produce the design that packaged with the low cost, short time to reach the market. Thus the manufacturers adopted various methodologies to deal with such pressure. These include Value Engineering (VE) and DFA. The Boothroyd Dewhurst DFA method is enhance the outcomes of VE, resulting in significant savings in materials, design costs, tooling, and processing of parts and assemblies.

**Value Engineering** (VE) can be defined as the systematic application of recognized techniques to identify function of a product or service, established a monetary value for that function, and provides the necessary function reliability at the lowest total cost. (Ellias, 1998, Fong, 1998)

The goal of VE is to eliminate unnecessary features and functions by optimizing the value. This process thus provides a simple but structured approach to optimizing design for both customer and manufacturer. It has been formulated as (Ellias, 1998, Fong, 1998):

\[
Value = \frac{Function(F)}{Cost(C)} \quad ...............(Equation \text{ 1})
\]

**Design for Assembly** (DFA) is defined as a set of practices that aim to reduce the time and cost required to assemble a product by examining mating part features for improvements in part handling, insertion and fastening(Stoll, 1999). It is aim to design the product for ease of assembly. The Boothroyd-Dewhurst (1990) pointed out that DFA means
designing the product for ease of assembly that leads to improved design efficiencies with quality following.

Design evaluation is done by measuring the design efficiency using the formula below (Boothroyd et al, 1994):

\[
Design efficiency = \frac{\text{“Ideal” assembly time}}{\text{“Actual” assembly time}} = \frac{3 \times \text{min parts}}{\text{Assembly Time}} \quad \text{...(Equation 2)}
\]

This paper’s aim to propose a framework of developing software that aids the designer as well as the manufacturer in decision making process during the early design stage. This paper is structured into five sections the problem statement, research objective and scope are discussed in section 1. The related literatures is discussed and tabled in section 2. The project methodology flow chart is discussed in section 3. Sections 4 are discussed about significant of this research and expected outcome from this research. The conclusion is discussed in section 5.

1.2 Problem Statement

The problem is to develop a computer based system for evaluating the design at the conceptual stage to increase the speed of the product development. The problem formulation is:

1. How to increase the speed of the product development?
2. How to accelerate the assembly cost and time estimation during the process?

1.3 Research objective

The objectives of this project are:
To develop a software for assembly by using the integrated VE and DFA approaches to reduce the time and assembly cost.
1.4 Research scope

The limitations of the proposed research are as follows:

1. A wira driver seat component is selected as a case study.
2. The product that use VE and DFA concept in improving the selected product design for the ease of assemble.
3. Microsoft Visual Basic 2006 6.0 will be use to develop the software.
4. Methodology is based from the previous developed PSM by Mgt Arnaz Bin Mgt Ramli.

1.5 Significant of study

This significant of this study is aim to reduce the cost, time and maintain the efficiency of the product design assembly with the use of intelligent based system. This would lead to the reduction of human energy used and it will shorten the time to reach the market.

1.6 Expected output

The expected outputs of this study are:

1. A software to support in optimizing the efficiency of assembly process in the early stages.
2. An intelligent based software for assembly sequences in manufacturing sectors.

1.7 Summary

Chapter 1 has been discussed generally about project, problems statement, objective, scope of the project, significant of this study and expected output in order to achieve the objective as mention. This chapter is as a fundamental for this project and as a guidelines to complete the project research.