CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Developing successful product requires the ability to predict, early in the product development process, the life cycle impact of design decisions. Any misjudges can leads to poor product designs that may cause unforeseen problems and excessive costs. Cost to redesign at this late stage can be prohibitive. Sometimes companies must simply accept higher manufacturing costs and reduced product effectiveness resulting from early design errors.

Even for a product that has been already available in the market, product improvements are required for survival from every competition from other companies that are in the same business. Improvement can be done by optimizing a design itself, or production process for manufacturing and assembly.

This chapter provides an overview of the project of Product Design and Optimization of Kitchen Scale with using Design for Assembly (DFA) Method. Generally, problem statement briefly discuss about how the product improvement are important to highly demand product in market.

In this chapter, an overview of the background, objectives and scope of this project are reviewed. Basically, the objective of this study is to redesign a new selected product for a better design and lower production cost. Here, the DFA Method has been applied to analyze the original product (Kitchen Scale). Lastly, in this chapter, the overall thesis outlines are review and discussed in general.
1.2 PROJECT BACKGROUND

In recent years, research in the area of design for manufacturing and assembly has become very useful for industries that are considering improving their facilities and manufacturing methodology. In manufacturing industries, manufacturers focused on the quality and productivity of the product. To increase the productivity of the product, manufacturing companies and researchers have developed many design decision support tools referred to as Design for X (DFX) methodologies. The ‘X’ in DFX represents any one of a variety of design considerations occurring throughout the product life cycle, such as quality, manufacturing, production, or environment. A DFX decision support tool can take many forms. It could be procedure or a set of guidelines on paper, or it could be a computer program that performs various types of analyses resulting in cost, manufacturability, or performance estimates, which are then used by the designer in making decisions.

Design for Manufacturing (DFM) and Design for Assembly (DFA) are two of the most common and popular DFX tools. Traditionally, DFA methods evaluate the ease of assembly, and DFM methods evaluate the feasibility and cost of manufacturing the product at the operation level Bralla (1986), Anderson (1990), Corbett et al. (1991), and Boothroyd et al. (2002) provide detailed discussions on manufacturability and design.

1.3 PROBLEM STATEMENTS/ PURPOSE OF STUDIES

As kitchen scale is widely used by customer in the household appliance in the market nowadays, the product life volume of this product must be high due to high demand by the user. Thus, any cost reduction in kitchen scale production can be very significant to the manufacturer in term of profit and production cost.

This studies is to redesign a kitchen scale for improvement in term of product design and optimization in assembly process for a production, by using a one of many design decision support tools referred to as Design for Assembly (DFA) methodology.
For the original product (datum), kitchen scale consists of 24 components including screws and other type of fasteners. While to assemble the component of kitchen scale, there have problems that occur such as difficult to assemble the component because of having the different types and sizes of fasteners. The material of parts that been used and the process of making one part also affected the cost to manufacture the products.

Continuous development of kitchen scale can lead to improvement of manufacturing and assembly process, thus enhance rapid development of technology in manufacturing industry.

1.4 OBJECTIVE OF STUDIES

The main objective of this study is to analyze the selected product by using DFA method and propose potential alternative design for improvement in term of ease of assembly, cost estimates, and highly design efficiency. Besides that, the other objectives of the study are:

i. To design and improve existing design by using DFA method and observation upon information content optimization/ candidate for part elimination strategies.

ii. To suggest alternatives design and quantify the benefits of the redesign products/parts.