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Improvement of Take-Away Water Cup Design by Using Concurrent Engineering Approach

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Abstract

Take-away water cup is widely used in fast food restaurant, the customer demand to satisfy when using this product. Although the take-away it is look perfect but it is still have drawback. The problem is what possible improvements of take-away water cup are and how to match voice of customer with technical description in order for improving the cup design. To this problem, there are several method use to get voice of customer through interviewing, analyze Quality function deployment (QFD) tool, design the product, and lastly fabricate the product by using rapid prototyping. QFD is one of the tools in concurrent engineering (CE). QFD is a system to deploy the voices of the customers in understanding their requirements into the appropriate technical requirements for each stage of product development and production. Based on the result and discussion after analyzing the QFD, it shows that customer really need to improve the cover of the cup by adding tip on the cover in order for easy to drink and make a hole for easy to mix between sugar or creamer with the hot coffee.

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1. Introduction

Take-away water cup is widely use in fast food restaurant, customer demand to satisfy use this product. It is because, the customer is still become more demanding to be improved all the time. Based on the analysis in the world market, customer requires product functions and quality are continuously increasing. To improve the design, the customer requirement matching using, concurrent engineering as approaches.

The concurrent engineering (CE) concept has been introduced in 1988 by the US Department of Defense (DoD) in order to help supplier to produce better product at lower cost within a shorter time frame [1]. Concurrent engineering also called simultaneously engineering approach allowed the design and prototype process being performed simultaneously. CE also is a systematic approach to the integrated and concurrent development of a product and its related processes that emphasizes response to customer expectations and embodies team values of cooperation, trust, and sharing the decision making by consensus involving product design, process design, marketing in parallel from the beginning of the product life cycle [2-4].

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Concurrent design involves the consideration and integration of various design activities throughout the product life cycle. The concurrent engineering system is developed to meet the demand of the customer for the better quality products with lower production cost and time. The goal of concurrent engineering is to improve quality, reduce manufacturing costs, or improve reliability [5-7]. Redesign of a product is costly and time-consuming when it has to be done after the design phase. This redesign can be necessary because of manufacturing restrictions, or to streamline the manufacturing process [3,8]. One of the tool can be used to meet customer requirement is QFD (quality function deployment).

QFD is a system to deploy the voices of the customers in understanding their requirements into the appropriate technical requirements for each stage of product development and production [1,4]. QFD is a tool for bringing the voice of the customer into the product development process from conceptual design through to manufacturing [5,9]. This is an innovative approach bringing quality as demanded by the customer upstream in the product development process [2,3].

With such fast-paced change occurring nowadays, especially in our social and economic development, many companies are facing rapid changes in industrial caused by technological innovation and changing consumer trend. In this stage, these companies are finding that the effort to develop new products is important for their survival. If they not take serious their company will close because they should compete with other companies at the same industry. QFD provides specific methods for ensuring quality throughout each stage of the product development process, starting with design. It is means that, QFD is the method for developing a design quality aimed at satisfying the customer and then translating the customer demand into design target. QFD also is a way to assure the design quality while the product is still in the design stage. Others definition is, QFD is a technique to transform user demands into design quality, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and component parts, and ultimately to specific elements of the manufacturing process. QFD is designed to help planners focus on characteristics of a new or existing product or service from the viewpoints of market segments, company, or technology-development needs.

In the literature, Chen [10] applied QFD to assist a decision maker for selecting an appropriate semiconductor assembly processes consisting of wafer materials and product features. While Viaene and Januszewska [11] used QFD to improve chocolate quality. Additionally, application of QFD is widely utilized in piping installation [7], print circuit board manufacturing [10], software [1] and food industry [2]. As a result there is a lack of utilization of this method in consumer product. In this paper, QFD approach is dedicatedly applied to improve take away cup design.

2. Methodology

There are several method uses to improve take-away water cup. The sequence of the methods has been planned as shown in Fig. 1. The processes involved in achieving notified objectives are interview with the customer to get the requirements for improvement, analyze QFD, design, and fabricate the prototype.

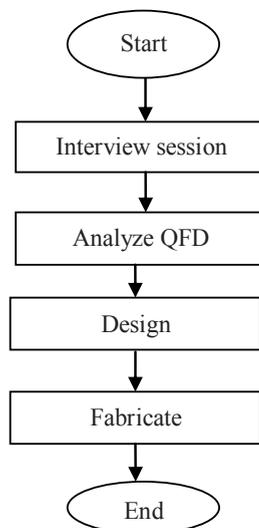


Fig. 1. Sequence of the method.

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