

Mekanika: Majalah Ilmiah Mekanika

Lunch Box Innovation Product Design In The Millennial Era

Bayu Pranoto^{1*}, Hilmi Iman Firmansyah¹, Hangga Wicaksono¹, Muhammad Fakhruddin¹, Rilis Eka Perkasa¹

¹ Malang State Polytechnic, Malang, Indonesia

*bayupranoto@polinema.ac.id

Keywords:

Lunch Box, 3D Design, Product Design

Almost of kids in the world still bring a lunch box and a bottle of water in their bag when they go to school. His mother always prepares a lunch box complete with a bottle of drinking water, hoping that his son can enjoy his favourite lunch and avoid starvation. Sometimes the mother is very worried when the lunch box has been brought by the child but the water bottle is left behind. Then the mother was willing to take her child's water bottle to her school. This is certainly not expected by either the mother or the child. As a form of concern for the author to this problem, the author proposes a lunch box design with a lunch box lid that also functions as a drinking water bottle. The idea of this design proposal is ones grab, both are food & drink in your hand. The goal is how to make kids can grab their food and drink easily and practice. So it is proposed to modify a top cover of common foodpack to become a drink bag. The design process begins with analyzing market needs, making sketches, creating 3D design models using the Autodesk Inventor CAD application, material selection, and product evaluation.

1 Introduction

In millennial era likes now, quality of life is defined as the result of combining living conditions and control of the environment around us. Balanced nutrition is a very important for healthy life [1]. To achieve this condition, the body must receive an adequate supply of nutrients. Especially at midday when the body has lost a lot of energy to work that starting from the morning. Lunch box is an useful tools which is handle between food and consumers; its primary functions are to protect and store food [2]. Therefore, a product that is used to store and carry food should have appealing colours, shapes and materials. In this regard, the increased competition in the lunch box and food packaging market is forcing companies and researchers to invest in a functional design that generates a positive emotional experience in the interaction between user and object, exploring, for example, the fact that materials with pleasant textures provide comfort through touch, the fact that balanced colours allow the product to convey pleasant sensations through sight, or of the fact that the shape of the product can trigger memories associated with other products or references to nature [3].

All the factors that allow a product to trigger an experience are intended to add value to it, so that it can stand out and meet the consumers' preferences [4]. That said, we wanted to create an aesthetically

<https://dx.doi.org/10.20961/mechanika.v20i2.52100>

Revised 17 June 2021; received in revised version 1 August 2021; Accepted 9 September 2021
Available Online 30 September 2021

2579-3144

© 2021 Mekanika: Majalah Ilmiah Mekanika. All right reserved

Pranoto et al.

appealing product to store, protect and carry meals, to the workplace, while traveling, and may be on the school, to be used either on a daily basis or occasionally [5]. The product containing food functions requires a number of basic requirements [6], that are: containment, protection and reservation, communication, machinability, convenience at proper shape, adapted to the use of the product it contains, friendly environment.

Based on this explanation, in this study the author proposes a lunch box design that is combined with a drinking water container in one hand. This ensures that food and drinking water are always carried and not left behind.

2 Experimental Methods

2.1 House of Quality

We have to know what the market want, so we need to take a market call. Have a short talk with some of people that routinely use a food pack for their children everyday to make a children's lunch at the school. In another ways, market call applied by using an internet survey. It is so easy to spread up our questionnaire to our target that we hope we can get a lot of thing and information from them. Actually our target just for people that have been living in Malang whose have a 6th – 35th years old. The gender have some amount, half of them is women and the others as men. We take the survey is about five days continously from 4th – 8th May 2020, at 08.00 – 13.00 o'clock. After we have a data, then we converting all of them to be a technical specification of our product.

Quality Function Deployment (QFD) is a method to capture requests from users through Voice of Customer (VOC) and then apply them so that they become a product with good functions. In order for this QFD to be implemented, a framework called the House of Quality (HoQ) is needed. House of Quality (HoQ) is used by translating customer needs or requests, based on market research and benchmarking data, in the amount that meets the target that must be met by the new product design. Figure 1 shows the house of quality of the proposed product

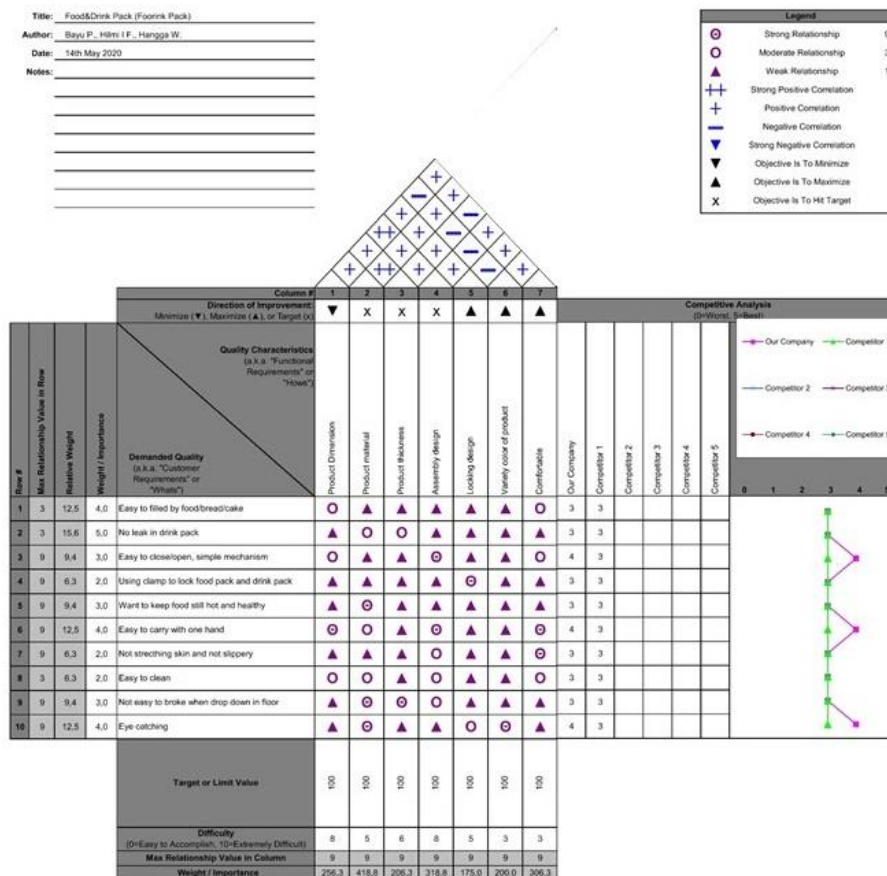


Figure 1. House of Quality (HoQ) of The Proposed Product

Pranoto et al.

2.2 Product Requirement Analysis

Identification of customer needs is an important part of the concept development phase which is one of the phases in the product development process. The resulting list of customer requirements is used to guide team members in setting product specifications, creating product concepts and selecting product concepts for further development.

		<i>List of Requirement</i>	<i>Page 1 of 1</i>
		<i>Product name: Fooring (Food&Drink) Pack</i>	
Rev.	T/H	Item	PIC (Person in Charge)
	T	1. Function	Engineering
	T	a. Easy to filled by food/bread/cake	Engineering
	T	b. No leak in drink pack	
		c. Simple Mechanism	
	T	2. Safety	Engineering
	T	a. No sharp edges	Engineering
	T	b. Easy to handle	Engineering
		c. Use a material spesified for food	
	T	3. Ergonomic	Engineering
	T	a. Light dimension	Engineering
	T	b. Unslippery	Engineering
		c. Easy to clean	
	H	4. Cost	Production
	H	a. Low production cost	Marketing
		b. Low market cost	

Where as:

T : Term

H : Hope

Figure 2. List of Requirement of The Proposed Product

3. Result and Discussion

3.1 Detail Drawing and Explanation of Proposed Product

The next step is to make a product design based on the table of consumer needs and the House of Quality. Every aspect of consumer needs must be implemented in product design. So that we get a design that fits the needs of consumers and can compete in the market. Figure 3 shows a drawing of the proposed product design. The design interprets the consumer's desire where each geometry is made as smooth as possible and minimizes sharp corners by giving it a radius. It also considers how the product is processed using injection blow molding. Ease of assembly between components is also an important consideration. This is also based on the ease of maintenance and cleaning of the product so as to minimize dirt deposits that may interfere with consumer appetite.

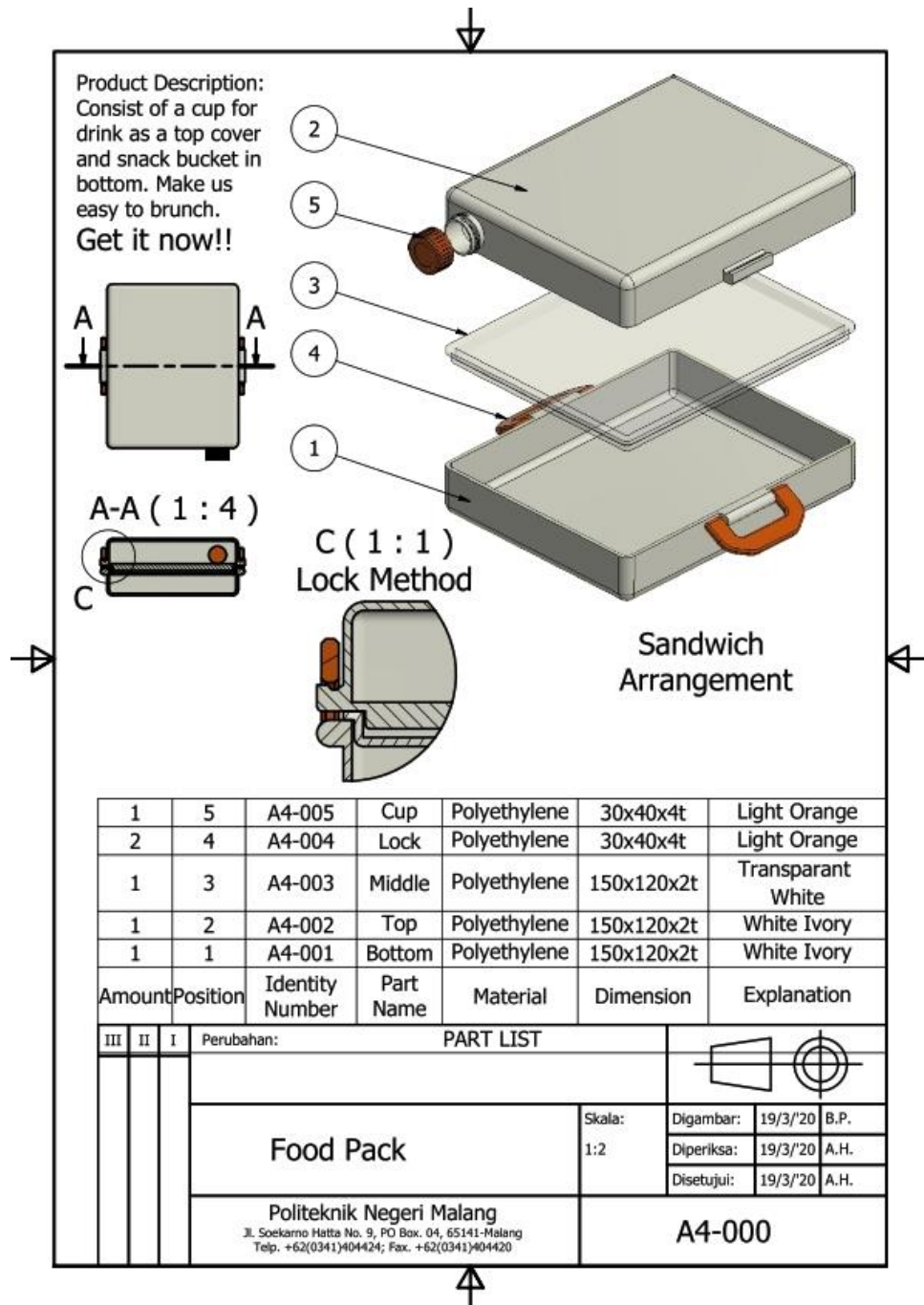


Figure 3. The Design Drawing of The Proposed Product

Pranoto et al.

3.2 Rendering

After the design process has been completed, the next step is to convert the 3d lunchbox model into a simulation image through a process known as rendering. This rendering process combines the harmony between 3d model materials, viewing angles, and lighting. All of these aspects are arranged in such a way that the rendering results can resemble real objects that are realistic and have attractiveness.

In addition, it also serves to attract consumer interest in the proposed product and provide an overview to consumers regarding the product. In other words, the rendering step is done for presentation and marketing purposes. So that the product can be accepted by the community and make it easier to enter the market for goods or similar products, and can also compete strongly.

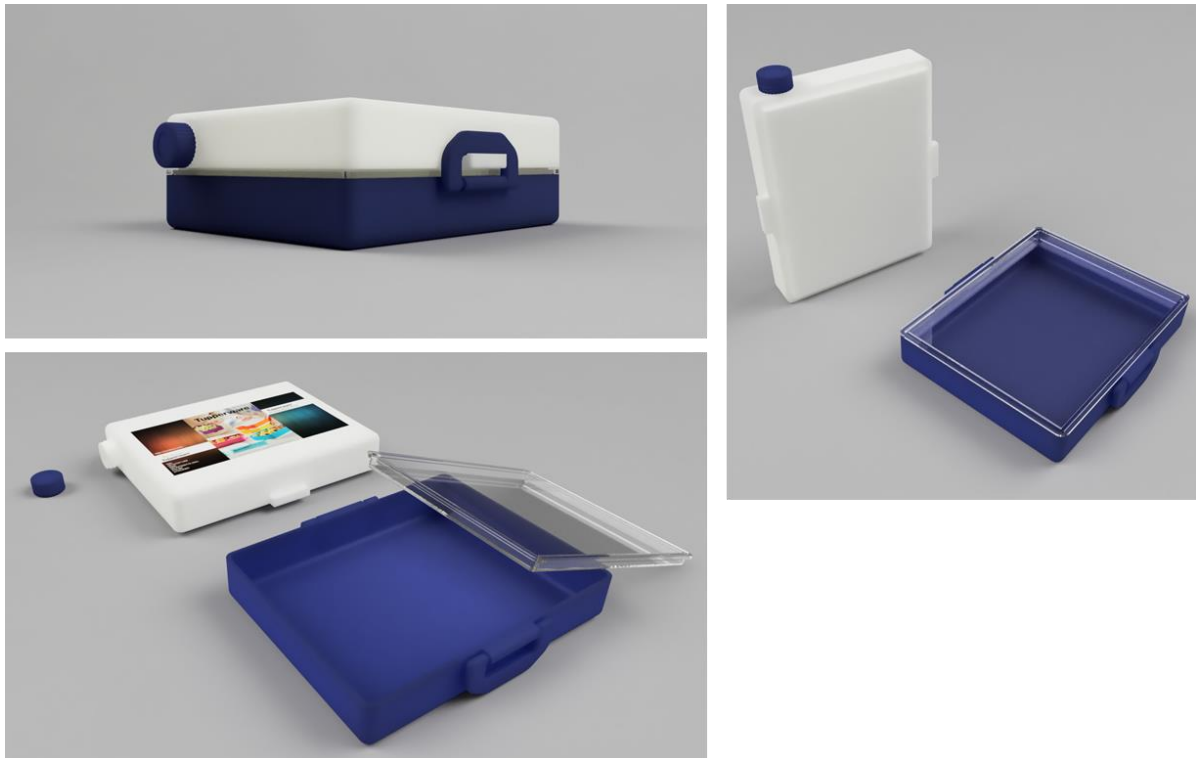


Figure 4. Rendering Result of The Proposed Product



Figure 5. 3D Printing Result as a Prototype

Pranoto et al.

4. Conclusion

The product design stages, starting from making a list of product requirements, product design, to product marketing are important steps in making products that are attractive and accepted by the market. Clarity of concept and ease of use are also important aspects that must be met by a product. Therefore, analysis using a quality house becomes important in determining the specifications of a product that is superior or at least better with existing similar products. The breakthrough of the lunch box lid which also functions as a drinking place is the focus of developing a common lunch box. With this innovative lunch box design, it is hoped that it can start a new trend, especially in the field of product design.

References

1. S. J. Walters, "Quality of Life Outcomes in Clinical Trials and Health Care Evaluation: A Practical Guide to Analysis and Interpretation", Chichester, UK: Wiley, 2009.
2. A. Meroni, "Active Packaging As An Opportunity To Create Package Design That Reflects The Communicational, Functional And Logistical Requirements of Food Products", *Packaging Technology And Science*, Vol. 13, Pages 243-248, 2000.
3. E. Dransfield, F. Zamora, & M. C. Bayle, "Consumer Selection of Steaks As Influenced By Information and Price Index", *Food Quality and Preference*, Vol. 9(5), Pages 321-326, 1998.
4. H. Honea, & S. Horsky, "The Power of Plain: Intensifying Product Experience With Neutral Aesthetic Context", *Marketing Letters*, Vol. 23(1), Pages. 223-235, 2012.
5. M. F. Ashby, Y. J. M. Brechet, D. Cebon, & L. Salvo, "Selection strategies for materials and processes", *Materials and Design*, Vol. 25, Pages 51-67, 2004.
6. F. A. Paine, & H. Y. Paine, "A Handbook of food packaging, 2nd edition", UK: Springer Science + Business Media Dordrecht, 1992.