

Building Creativity Of Packaging Products Using Vacuum Suction Method

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Abstract: Efforts to improve the competitiveness of small industrial products in South Sulawesi in general and the City of Makassar in particular in general have constraints on the variety of packaging offered. Where they are still highly dependent on the variety of packaging products offered. So efforts to build a product image or add value to the product becomes very limited. Therefore, this research is intended to solve the problem. By using the method of design research and experiments conducted experiments are based on the need for problem solving, so then get a form of formula or working mechanism accordingly. The end result of this research activity is obtained a basic design of a compatible and practical tool that can be used for small industries.

Keywords: Creativity, packaging products, suction method

1 INTRODUCTION

The high competition level of small industry in seizing the market both local and national is still a major obstacle. Several factors are the constraints of product quality, packaging quality, and market strategy. When referring to these three factors, they are related to the packaging design. As it is known that packaging design plays an important role in an effort to increase market interest in the product. Therefore a design approach is needed to solve the problem.



Figure 1. Marning Maize snack product with simple packaging design.

Source: <http://cdn.bisnisukm.com>, diakses 17 Juli 2017



Figure 2. 'Pisang Ijo' culinary product with simple different packaging design.

Source: Kios Amanda, 2017

STUDY METHOD

Methodology

This project proceeded as follows:

1. Literature search;
2. Subject and research topics;
3. Research method and instrument;
4. Survey sample;
5. Survey interviewing;
6. Drafting and Assembly of survey sample;
7. Data collection;
8. Data analysis;
9. Evaluating; Rendering draft.

Literature Search

A literature search was conducted in order to determine relevant topics warranting further investigation. Studies have been conducted in Makassar and elsewhere on the following subjects: portfolio and hiring expectations; and theoretical and creative

preparation of experimental mechanism of moulding technology and the process system. The aim's in-depth literature of subject needed for the experimental preparation.

Packaging is a creative design that links form, structure, material, color, image, typography and elements with product information to make the product marketable. Packaging is used to wrap, protect, send, remove, store, store and distinguish a product on the market.⁽³⁾

Functionally, the packaging has two functions: (1) Protective function, related to product protection, climate difference, transportation infrastructure, and all that impact on the packaging. With protective packaging, consumers do not have to. (2) Promotional function, packaging is also used as a promotional tool. With regard to promotion, the company preference goods color, size, and appearance.⁽⁴⁾

Based on the content structure, packaging is divided into three types, namely; (1) primary packaging, ie packaged material directly accommodate foodstuff (milk can, drink bottle, etc). (2) secondary packaging, ie packaging of important functions, food box packaging, food box packaging, food box packaging, food box packaging, packaging of goods (3) tertiary and quartz packaging, ie packaging required for storage, delivery or identification. Tertiary packaging is generally used as a protector during transport. Considered aspects of product quality to be protected. The quality of products when reaching consumers depends on the conditions of raw materials, processing methods and storage conditions. Thus the packaging function must meet the following requirements:

- Good wrapping capability to facilitate handling, transport, distribution, storage and compilation / buildup.

- The ability to protect its contents from a variety of external risks, such as protection from hot / cold air, sunlight, odor, mechanical stress, microorganism contamination.

- Ability as an appeal to consumers. In this case identification, information and appearance such as shape, color and beauty of packaging materials should get attention.

- Economic requirements, which means ability to meet market desires, target communities and destination places.

It has size, shape and weight that conform to existing norms or standards, is easy to dispose of, and is easy to mold or mold.⁽²⁾

Subject and Research Topics

The subject of research is focus on design design of *Pisang Ijo* packaging as product sample project. Where the design of the packaging to be designed later can be produced using packaging tools with the method of suction.

Research Method and Instrument

The method used is a research design method that prioritizes the collection of initial data as a review material before proceeding to the design method that contains the required design data. After that the results of the design will be evaluated according to the rules of good packaging conditions.

Survey Sample

Survey sample will doing by collecting a number of documentation and interviews on producers and consumers related to the feasibility variables of a packaging design that suits their needs on both sides. So that will be obtained the basic data is accurate to be used as a reference in the design process. Of course, by putting the necessary needs to be realized in the form of the design of the prototype of the prototype.

Survey Interviewing

The fundamental questions related to the model and type of packaging they have been using, the reasons for using, the choice of using the packaging, the price of the packaging used, find out the details of their expectations with their ideal idealized prototype.

Hine in Underwood (2003)⁽⁴⁾ explains the role of packaging in attracting the attention of consumers, so that consumers have a picture related to the product. To summarize all of these suggestions, it could be concluded that packaging communicates various marketing messages via its communicative dimensions which consist of the following elements are:

- shape,
- packaging size,
- packaging colour,
- packaging material,
- carried information,
- graphic applications (e.g. brand logo, fonts, pictorials, etc.).

All of these elements together communicate various marketing messages to the consumer in both the purchase and consumption phases. The message that the consumer receives is a combination of particular messages carried by the communicative dimensions of packaging, as showing in picture below.



Figure 3. Communicative dimensions of packaging

Drafting and Assembly of survey sample

The process of presenting the form is done by conducting a study of the sketches made to find an alternative form that will be evaluated further. Once an alternate form is selected then an in-depth evaluation of the form which will be used as a basic reference form in the next development process, before entering the stage of making the drawing work or detail engineering design.

Data Collection

To reassure the direction of the design process, the initial set of reference data is presented for use as an evaluation material, the goal being to reconcile the next stage to stay focused and stay focused.

Data Analysis

Due to complexity of perception and different approaches to the comprehension of it, there are a number of theories that attempt to explain the essence of perception. However, there are two major approaches resulting in two main theoretical directions – constructive perception and direct perception. These theories are usually presented in opposition to each other, although sometimes they simply deal with different aspects of the same phenomenon (Sternberg, 1995)⁽⁵⁾.

Based on the intended theoretical objectives, the image that will be used as a reference is how to keep showing the performance of the authenticity of the form of *Pisang Ijo*. So line out the rendering process will consistently refer to the product form. So the product image becomes the main focus of packaging

Result and Conclusion

Literature search

Consumer packaging could be defined as “a medium between producer and consumer whose aim is to guarantee a product with fixed qualitative standard

from the producer and at the same time offers to the consumer a product which corresponds to the illustrated standards” (Meroni, 2000, p. 243) ⁽⁶⁾. It is a container containing goods where the goods are placed for sale and it includes any container or wrapping in which any consumer commodity is enclosed for delivery or display of that commodity to consumers. (WELMEC, 1997) ⁽⁷⁾

Fill (2009) suggest that packaging communicates through various dimensions. ⁽⁸⁾ Based on it indicates that each packing basically communicates its shape, size, color to be easily perceived by the consumer. In addition, related to the form must be related to the consideration of dimensions, the ability to protect the product on the delivery process.

Based on the results of data collection obtained information that, generally the producers are worried about Pisang Ijo products they will be damaged if they send their products far away or outside the city. The most common occurrence of occurrence is *Pisang Ijo* received by the consumer in a state of dent due to other goods override when sent. From this information leads to underline this problem to find a solution during the design process by thinking of its construction structure system.

The recommended design recommendation for this problem as a solution is to give consideration to placing embossing bend surface or structural grooves on the packaging vertically.

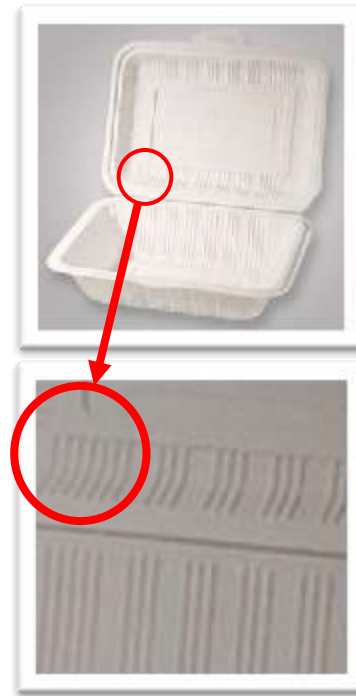


Figure 4. embossing bend surface or structural grooves on trimmed corner.

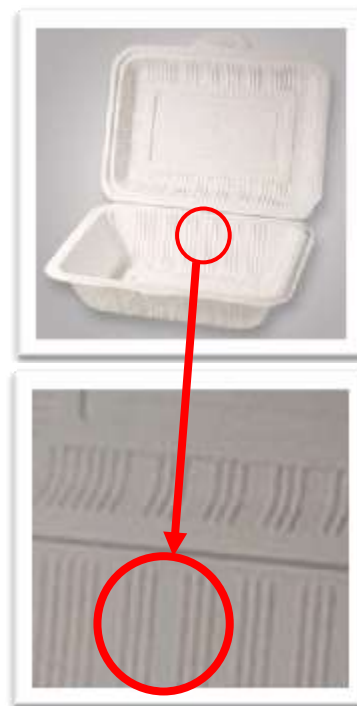


Figure 5. Vertically embossing bend surface or structural grooves on rear side of packaging.

Product Data

Based on the visual data of the packaging collected based on the most widely used

by the manufacturer, the following description is obtained below.



Figure 6. Good and strong packaging, the weakness of this product does not feature Banana Ijo in its entirety, has been mixed with its sauce and syrup and is not prepared for products that can be delivered to distant places.

Documentation: Es Pisang Ijo LiNi, 2017.



Figure 7. Packaging is not good and weak, very commonly used by manufacturers. Structural reinforcement systems are minimally used on the packaging so that the weakness of this product are on packs that are particularly vulnerable to cause crumbling products on the delivery process or when stacked in shipment to distant places. Many manufacturers choose this packaging product because of the cheap price, in addition to their reasons that there are no other design alternatives.

Documentation: sedapur.com, 2017.



Figure 8. The package used by 'Kulinerpakhendra' is included both with the method of packaging system utilizing the use of 2 sub-containers in a container that serves as a place to store the sauce and syrup as well as serves as a pressure barrier if it gets the load from the top so as to protect the product. The main strength factor in this package is the proper material selection and design.

Documentation: kulinerpakhendra, 2017.

Vacuum Suction Method Data

Some printing molding techniques and methods use the following plastic materials;

Extrusion is a processing technique for converting a powder or grain thermoplastic material into a continuous uniform melt and promoting the melting through a shaping die located at the end of the machine. The final product formed depends on the shape of die orifice through

which the polymer melts. This extrusion is a process that combines several processes including mixing, cooking, kneading, destruction, molding, and formation. The purpose of extrusion is to increase the diversity of food products in various shapes, textures, colors, and flavors. But the price of this tool is very expensive and not affordable by the small home industry. In addition, the cost of making a master mold is also expensive, which is only able to be held by a large industrial manufacturer of plastic products.

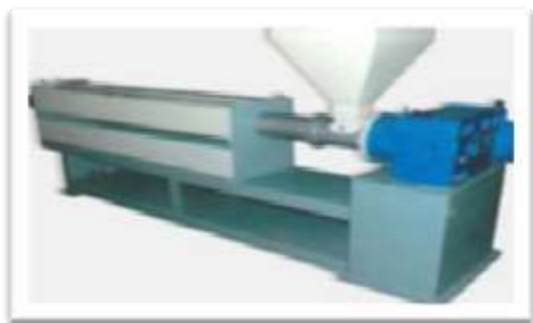


Figure 9. The extruder machine for making variant of plastic product.

Injection Molding, One technique that is quite effective and widely used for thermoplastic material processing is injection molding. This technique was first introduced by John Wesley Hyatt in 1868, by injection of hot celluloid into mold, to make ball billiards. Together with his sister Isaiah, he patented an injection mold machine for a vacuum header in 1872. In 1946 James Hendri for the first time made screw machine injection mold, resulting in major changes to the plastics industry. And 95% of current molding machines follow this technique, to produce efficient heat, mix efficiency and plastic injection into molding (Anonymous, 2008). But the price of this tool is very expensive and not affordable by the small home industry. In addition, the cost of making a master mold is also expensive, which is only able to be held by a large industrial manufacturer of plastic products.

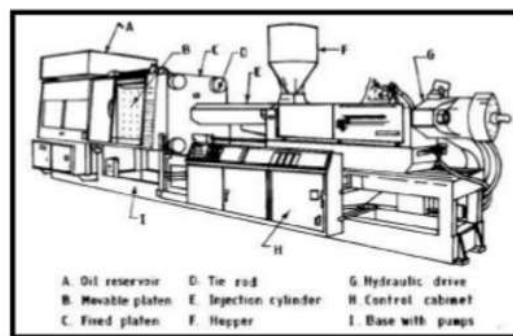


Figure 10. Major parts of a typical injection-molding machine.

Blow molding, is a method of printing hollow workpieces by blowing or blowing air into materials using molds consisting of two parts of the mold that do not use the core as the cavity shaper (Yuswinanto, 2011)⁽⁹⁾.

Thermoforming, is one method and widely used in processing plastic materials. Thermoforming is the formation of plastic sheets into parts through the application of heat and pressure. Tooling for this process is the least expensive compared to other plastic processes. Can also accommodate a very large piece of sheet and small parts.

Vacuum Forming: The working principle of the vacuum forming process is to heat the plastic sheet form (sheet) to soften/soft and put it abovemold. Then the vacuum starts sucking the material into mold. Then the material was removed from the mold. In this short formation, the vacuum forming process utilizes pneumatic, hydraulic and heat controls that allow shorter production time. The product of the vacuum forming process is very much and plays an important role in everyday life.

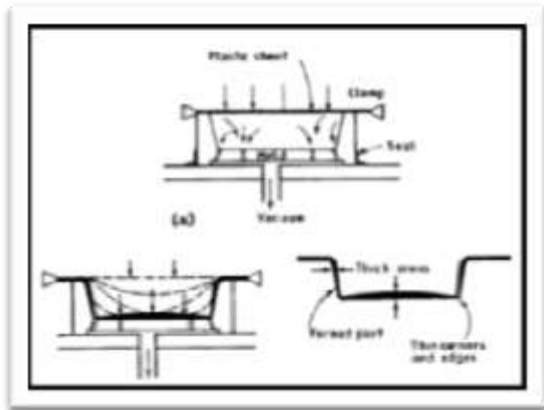


Figure 10. Steps in the vacuum forming process.

The technique to be developed is one of thermoforming technique, namely vacuum forming method.

The current vacuum forming molding equipment can only be produced by large manufacturing companies because the equipment is expensive and the amount of production is high.

This method has been widely used since the 1980s to produce products such as plastic doors, plastic sinks, bath-tubs, car dashboards, etc. The equipment is known as Vacuum Membrane Press as shown below.



Figure 11. The vacuum former machine.
Documentation: formech.com, 2017.

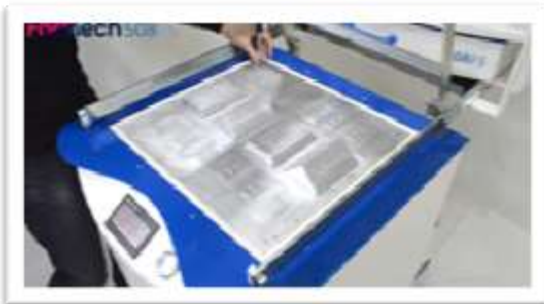


Figure 12. Master object molding prepared.
Documentation: formech.com, 2017.



Figure 13. Steps in the vacuum forming process:
Acrylic vinyl prepared above.
Documentation: formech.com, 2017.



Figure 14. Steps in the vacuum forming process:
Acrylic vinyl heating below.
Documentation: formech.com, 2017.

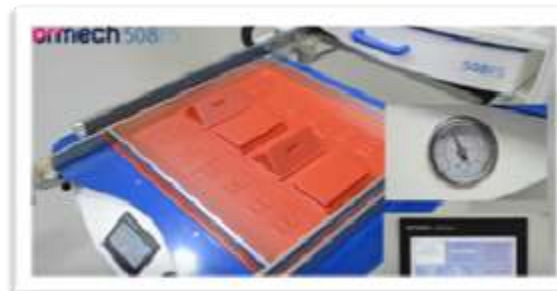


Figure 15. Steps in the vacuum forming process:
Acrylic vinyl suction with 80 Psi/5 bar.
Documentation: formech.com, 2017.

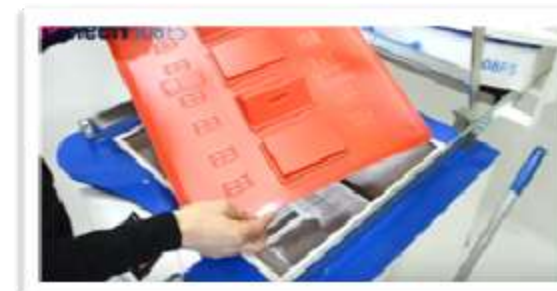


Figure 16. Steps in the vacuum forming process:
Acrylic vinyl already molding has been in shape.
Documentation: formech.com, 2017.

Thus a brief overview of the molding process using the vacuum suction method that became the basis in the tool creation experiment. The difference that is the basis of the tool is the use of air blowing in the

process, where alattersebut use two methods in the process, namely the process of suction and blowing mechanism. So on the process of creating tools that are in experimental stage we only rely on the method of suction mechanism.

Experiment

The materials prepared are as follows; Triplex board, lackban, pvc pipe 3/4. While the equipment used is as follows; saw, drill, glue gun or silicon gel. Here are some photos that illustrate the experimental process as below:



Figure 17. Bottom box that has been pipe fitted as a lane to suck air using a vacuum cleaner tool commonly used in many homes.
Documentation: Roboforcex2000, 2017 ⁽¹⁰⁾



Figure 18. The top board as a perforated cover
Documentation: Roboforcex2000, 2017



Figure 19. Perforated cover with a diameter of 1 mm is 1 cm away which serves to suck air during the forming process.
Documentation: Roboforcex2000, 2017



Figure 20. Frame holder of acrylic vinyl sheet and the base of the holder.

Documentation: Roboforcex2000, 2017

Basically, the working process of forming the vinyl plastic sheet is very simple which consists of several stages, are:

- Stages of placing the plastic in the holder frame,
- Stages of heating the plastic sheet,
- Stages of sucking,
- Stages releasing plastic sheets that have been formed.

The process are showing below.



Figure 21. The master object to be duplicated is placed on the evaporator board, the unwanted hole is covered with the lackban so that the suction area is focused on the master object.

Documentation: Roboforcex2000, 2017



Figure 21. The heated plastic sheet is placed over the master object then sucked.

Documentation: Roboforcex2000, 2017



Figure 22. Releasing the molding result.
Documentation: Roboforcex2000, 2017



Figure 23. The molding result with PET vinyl.
Documentation: Roboforcex2000, 2017

In the first experiment the results obtained were not satisfactory. This is caused around the object of molding there are unwanted folds. After done many times the experiment found the cause of errors in the process of closing the suction area should not be covered with a lackban.

Closing the suction hole makes the pull caused by the suction to be uneven. Although treatment efforts have been made using heat blowers it is considered unhelpful to leave the suction holes unbound in the desired area.



Figure 24. Some creative products resulting from the vacuum forming process, such as the remote control car body, the mask, the plastic wrapping package and more according to other creative desires.

Documentation: Roboforcex2000, 2017

Conclusions

Produce a variety of unique packaging and according to the desire or according to the form of packaged products or other creative uniques can be realized, without relying on products offered by other manufacturers that only provide a variety of forms common in the market. So the goal to raise the image of the product packaged according to taste is no longer the reason for small industries or home industries. The designed equipment is not as expensive as it is widely used by industries worth tens to hundreds of millions of rupiah. The packaging tool that will be made is estimated only for less than a million rupiah and according to the ability of small industries in Indonesia. This product design development plan is aimed at designing comprehensive products, ease of operation in the tool, concise, lightweight and portable form.

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